

**AARUPADAI VEEDU INSTITUTE OF
TECHNOLOGY, PAIYANOOR, CHENNAI**

&

**VINAYAKA MISSION'S KIRUPANANDA
VARIYAR ENGINEERING COLLEGE, SALEM**
(Constituent Colleges of Vinayaka Mission's Research Foundation,
Deemed to be University, Salem, Tamil Nadu, India)

(AICTE APPROVED AND NAAC ACCREDITED)



**VINAYAKA MISSION'S
RESEARCH FOUNDATION**

(Deemed to be University under section 3 of the UGC Act 1956)

Faculty of Engineering and Technology

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

2017 REGULATION

Programme:

**B.E / B.Tech - COMPUTER SCIENCE AND ENGINEERING
(CYBER SECURITY)
Full Time (4 Years)**

STRUCTURED CHOICE BASED CREDIT SYSTEM (SCBCS)

CURRICULUM AND SYLLABUS

(Semester I to VIII)

VISION

“To establish a centre of excellence in computer education and research and to create a platform for professionals thereby reaching a pinnacle of glory”

MISSION

Computer Science and Engineering is committed

- To develop innovative , competent and quality computer engineers by imparting the state-of the –art technology
- To enrich the knowledge of students through value based education
- To develop consultancy activities for industrial sectors
- To endeavour for constant up gradation of technical expertise of students to cater to the needs of the society

- **PROGRAMME OUTCOMES: (POS)**

- **PO1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and

synthesis of the information to provide valid conclusions.

- **PO5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- **PO8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **PO9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO11. Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **PO12. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Credit Requirement for the Course Categories

Sl. No.	Category of Courses	Credits to be earned Min.
01	A. Foundation Courses (FC)	65
	i. Humanities and Sciences (English and Management Courses)	12
	ii. Basic Sciences (Maths, Physics and Chemistry Courses)	24
	iii. Engineering Sciences (Basic Engineering Courses)	29
02	B. Core courses (CC) relevant to the chosen Programme of study.	49
03	C. Elective Courses (EC)	30
	i. Programme Specific (Class Room or Online)	18
	ii. Open Elective (Class Room or Online)	12
04	D. Project + Internship + Industry Electives (P + I + D)	15
	i. Project	9
	ii. Internship	3
	iii. Industry Supported Courses	3
05	**E. Employability Enhancement Courses + Co - Curricular Courses + Extra Curricular Courses	Non Credit
	i. Employability Enhancement Courses (Personality Development Training, Participation in Seminars, Professional Practices, Summer Project, Case Study etc.)	Non Credit
	ii. Co - Curricular Courses (NCC, NSS, Sports, Games, Drills and Physical Exercises)	Non Credit
	iii. Extra Curricular Courses	Non Credit
Minimum Credits to be earned		159
** - Mandatory, Credits would be mentioned in Mark sheets but not included for CGPA Calculations. For overall CGPA calculations, a student has to earn minimum 159 credits in Categories A to D.		

CATEGORY A – FOUNDATION COURSES - HSS, BS AND ES COURSES - CREDITS (65)									
(i) HUMANITIES AND SCIENCES (ENGLISH AND MANAGEMENT SUBJECTS) - CREDITS (12)									
SL. NO	CODE	COURSE	OFFERING DEPT.	CATEGORY	L	T	P	C	PREREQUISITE
1.	17EGHS01	TECHNICAL ENGLISH	ENGLISH	FC (HSS)	3	0	0	3	NIL
2.	17EGHS02	ENGLISH LANGUAGE LAB	ENGLISH	FC (HSS)	0	0	4	2	NIL
3.	17EGHS81	BUSINESS ENGLISH	ENGLISH	FC (HSS)	3	0	0	3	NIL
4.	17MBHS01	ENGINEERING STARTUPS AND ENTREPRENEURIAL MANAGEMENT	MANAGEMENT	FC (HSS)	3	0	0	3	NIL
5.	17EGHS82	PROFESSIONAL COMMUNICATION AND PERSONALITY DEVELOPMENT	ENGLISH	FC (HSS)	0	0	2	1	NIL
6	17YMHS82	YOGA AND MEDITATION	PHYSICAL EDUCATION	FC (HSS)	0	0	4	2	NIL
(iii) BASIC SCIENCES (BASIC ENGINEERING COURSES) - CREDITS (24)									
1.	17MABS01	ENGINEERING MATHEMATICS	MATHEMATICS	FC (BS)	2	2	0	3	NIL
2.	17MABS09	MATHEMATICS FOR COMPUTER ENGINEERS	MATHEMATICS	FC (BS)	2	2	0	3	NIL
3.	17MABS14	NUMERICAL METHODS AND NUMBER THEORY	MATHEMATICS	FC (BS)	2	2	0	3	NIL
4.	17MABS15	PROBABILITY AND QUEUING THEORY	MATHEMATICS	FC (BS)	2	2	0	3	NIL
5.	17MABS22	MATHEMATICS FOR MACHINE LEARNING	MATHEMATICS	FC (BS)	2	2	0	3	ENGINEERING MATHEMATICS
6.	17MABS23	MATHEMATICS FOR DATA SCIENCE	MATHEMATICS	FC (BS)	2	2	0	3	ENGINEERING MATHEMATICS
7.	17MABS24	STATISTICAL FOUNDATION	MATHEMATICS	FC (BS)	2	2	0	3	ENGINEERING MATHEMATICS
8.	17PCBS02	PHYSICAL SCIENCES PART A. ENGINEERING PHYSICS PART B. ENGINEERING CHEMISTRY	PHYSICS & CHEMISTRY	FC (BS)	4	0	0	4	NIL
9.	17PHBS05	SMART MATERIALS	PHYSICS	FC (BS)	3	0	0	3	NIL
10.	17PCBS81	PHYSICAL SCIENCES LAB PART A. REAL AND VIRTUAL LAB IN PHYSICS PART B. ENGINEERING CHEMISTRY LAB	PHYSICS & CHEMISTRY	FC (BS)	0	0	4	2	NIL
(iii) ENGINEERING SCIENCES (BASIC ENGINEERING COURSES) - CREDITS (29)									

1.	17EES03	BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING	EEE & ECE	FC(ES)	4	0	0	4	NIL
2.	17CMES02	BASICS OF CIVIL AND MECHANICAL ENGINEERING	CIVIL & MECH	FC(ES)	4	0	0	4	NIL
3.	17CSES01	ESSENTIALS OF COMPUTING	CSE	FC(ES)	3	0	0	3	NIL
4.	17CSES05	PROGRAMMING IN PYTHON	CSE	FC(ES)	3	0	0	3	NIL
5.	17CSES83	PROGRAMMING IN PYTHON LAB	CSE	FC(ES)	0	0	4	2	NIL
6.	17EES82	ENGINEERING SKILLS PRACTICES LAB A. BASIC ELECTRICAL ENGINEERING B. BASIC ELECTRONICS ENGINEERING	EEE & ECE	FC(ES)	0	0	4	2	NIL
7.	17CMES81	ENGINEERING SKILLS PRACTICE LAB A.BASIC CIVIL ENGINEERING B.BASIC MECHANICAL ENGINEERING	CIVIL & MECH	FC(ES)	0	0	4	2	NIL
8.	17MEES84	ENGINEERING GRAPHICS (THEORY + PRACTICE)	MECH	FC(ES)	1	0	4	3	NIL
9.	17CSES06	PROGRAMMING IN C	CSE	FC(ES)	3	0	0	3	NIL
10.	17CSES85	PROGRAMMING IN C LAB	CSE	FC(ES)	0	0	4	2	NIL

CURRICULUM

**B.E / B.Tech. – COMPUTER SCIENCE AND ENGINEERING (CYBER
SECURITY)**

**SEMESTER
I TO VIII**

B.E/ B.TECH.
COMPUTER SCIENCE AND ENGINEERING (CYBER SECURITY)
SEMESTER I TO VIII

CATEGORY B – CORE COURSES RELEVANT TO THE PROGRAMME - CREDITS (49)

SL. NO	CODE	COURSE	OFFERING DEPT.	CATEGORY	L	T	P	C	PREREQUISITE
1.	17CSCC01	DATA STRUCTURES	CSE	CC	3	0	4	3	NIL
2.	17CSCC20	DATA STRUCTURES LAB	CSE	CC	0	0	4	2	NIL
3.	17CSCC04	COMPUTER ARCHITECTURE	CSE	CC	3	0	0	3	NIL
4.	17CSCC02	OBJECT ORIENTED PROGRAMMING	CSE	CC	3	0	4	3	NIL
5.	17CSCC21	OBJECT ORIENTED PROGRAMMING lab							
6.	17CSCC06	DESIGN AND ANALYSIS OF ALGORITHM	CSE	CC	3	0	4	3	DATA STRUCTURES
7.	17CSCC23	ALGORITHM LAB	CSE	CC	0	0	4	2	DATA STRUCTURES
8.	17AICC01	PROBLEM SOLVING USING PYTHON PROGRAMMING (Theory + Practice)	CSE	CC	3	0	2	4	NIL
9.	17CSCC03	DATABASE MANAGEMENT SYSTEM	CSE	CC	3	0	4	3	NIL
10.	17CSCC22	DATABASE MANAGEMENT SYSTEM LAB	CSE	CC	0	0	4	2	NIL
11.	17CSCC09	JAVA PROGRAMING	CSE	CC	3	0	4	3	NIL
12.	17CSCC26	JAVA PROGRAMING LAB	CSE	CC	0	0	4	2	NIL
13.	17CSCC07	OPERATING SYSTEM	CSE	CC	3	0	4	3	NIL
14.	17CSCC24	OPERATING SYSTEM LAB	CSE	CC	0	0	4	2	NIL
15.	17CSCC08	COMPUTER NETWORKS	CSE	CC	3	0	0	3	NIL
16.	17CSCC25	COMPUTER NETWORKS LAB	CSE	CC	0	0	4	2	NIL
17.	17CSCC18	RICH INTERNET APPLICATION	CSE	CC	3	0	0	3	JAVA PROGRAMMING
18.	17CSCC31	RICH INTERNET APPLICATION DEVELOPMENT LAB	CSE	CC	0	0	4	2	JAVA PROGRAMMING LAB
19.	17CSCC16	CLOUD COMPUTING	CSE	CC	3	0	0	3	COMPUTER NETWORKS
20.	17AICC02	INFORMATION SECURITY	CSE	CC	3	0	0	3	COMPUTER NETWORKS
21.	17CSCC15	C# AND .NET APPLICATION DEVELOPMENT	CSE	CC	3	0	0	3	JAVA PROGRAMMING
22.	17CSCC30	C# AND .NET APPLICATION DEVELOPMENT lab	CSE	CC	3	0	0	3	JAVA PROGRAMMING
23.	17CYCC01	UNIX INTERNALS	CSE	CC	3	0	0	3	NIL
24.	17CSCC19	INTERNET OF THINGS	CSE	CC	3	0	0	3	NIL
25.	17CYCC02	INTRODUCTION TO ARTIFICIAL INTELLIGENCE	CSE	CC	3	0	0	3	NIL

26.	17CSCC17	CYBER SECURITY	CSE	CC	3	0	0	3	INFORMATION SECURITY
27.	17CYCC03	NETWORK SECURITY AND MANAGEMENT	CSE	CC	3	0	0	3	COMPUTER NETWORKS
28.	17CYCC04	NETWORK SECURITY LAB	CSE	CC	0	0	4	2	COMPUTER NETWORKS
29.	17CYCC05	ETHICAL HACKING	CSE	CC	3	0	0	3	CYBER SECURITY
30.	17CYCC06	ETHICAL HACKING LAB	CSE	CC	0	0	4	2	CYBER SECURITY
31.	17CSCC13	DATA WAREHOUSING AND DATA MINING	CSE	CC	3	0	0	3	DATABASE MANAGEMENT SYSTEM
32.	17AICC09	FOUNDATION OF DATA SCIENCE	CSE	CC	3	0	0	3	NIL
33.	17AICC10	BIG DATA ANALYTICS	CSE	CC	3	0	0	3	DATABASE MANAGEMENT SYSTEM
34.	17AICC11	BIG DATA ANALYTICS LAB	CSE	CC	0	0	4	2	DATA WAREHOUSING AND DATA MINING
35.	17AICC12	DATA ANALYTICS USING PYTHON	CSE	CC	3	0	4	5	PROGRAMMING IN PYTHON

B.E/ B.TECH. COMPUTER SCIENCE AND ENGINEERING (CYBER SECURITY) SEMESTER I TO VIII									
CATEGORY C – ELECTIVE COURSES - CREDITS (30)									
(i) PROGRAMME SPECIFIC (CLASS ROOM OR ONLINE) - CREDITS (18)									
SL. NO	CODE	COURSE	OFFERING DEPT.	CATEGORY	L	T	P	C	PREREQUISITE
1.	17CYEC01	DIGITAL FORENSICS	CSE	EC(PS)	3	0	0	4	CYBER SECURITY
2.	17CYEC02	CYBER CRIMES AND LAWS	CSE	EC(PS)	3	0	2	3	CYBER SECURITY
3.	17CYEC03	INTRUSION DETECTION AND PREVENTION SYSTEM	CSE	EC(PS)	3	0	0	4	NETWORK SECURITY AND MANAGEMENT
4.	17CYEC04	PENETRATION TESTING	CSE	EC(PS)	3	0	2	4	ETHICAL HACKING
5.	17CYEC05	MOBILE COMMUNICATION SECURITY	CSE	EC(PS)	3	0	2	4	CYBER SECURITY
6.	17CYEC06	BIGDATA SECURITY	CSE	EC(PS)	3	0	0	3	BIG DATA ANALYTICS
7.	17CYEC07	CLOUD COMPUTING SECURITY	CSE	EC(PS)	3	0	2	4	DATA WAREHOUSING AND DATA MINING
8.	17CYEC08	DATA VISUALIZATION TECHNIQUES	CSE	EC(PS)	3	0	0	3	CLOUD COMPUTING
9.	17CYEC09	DATA CENTRE VIRTUALIZATION	CSE	EC(PS)	3	0	0	3	DATABASE MANAGEMENT SYSTEM
10.	17CYEC10	DISTRIBUTED COMPUTING	CSE	EC(PS)	3	0	0	3	COMPUTER NETWORKS
11.	17CYEC11	AGILE METHODOLOGIES	CSE	EC(PS)	3	0	2	4	NIL
12.	17CYEC12	BIO METRICS	CSE	EC(PS)	3	0	0	3	INFORMATION SECURITY
13.	17CYEC13	OPEN SOURCE SYSTEMS	CSE	EC(PS)	3	0	0	3	NIL
14.	17CYEC14	KNOWLEDGE BASED DECISION SUPPORT SYSTEM	CSE	EC(PS)	3	0	0	3	NIL
15.	17CYEC15	INFORMATION RETRIEVAL TECHNIQUES	CSE	EC(PS)	3	0	0	3	DATA MINING AND DATA WAREHOUSING
16.	17CYEC16	IT INFRASTRUCTURE MANAGEMENT	CSE	EC(PS)	3	0	0	3	NIL
17.	17CYEC17	VIRTUALIZATION TECHNIQUES	CSE	EC(PS)	3	0	0	3	NIL
18.	17CYEC18	USER INTERFACE DESIGN	CSE	EC(PS)	3	0	0	3	NIL
19.	17CYEC19	OPTIMIZATION TECHNIQUES	CSE	EC(PS)	3	0	0	3	NIL
20.	17CYEC20	MACHINE LEARNING	CSE	EC(PS)	3	0	0	3	ARTIFICIAL INTELLIGENCE
21.	17CYEC21	DATA ANALYTICS	CSE	EC(PS)	3	0	0	3	NIL
22.	17CYEC22	PROBLEM IDENTIFICATION AND DESIGN THINKING	CSE	EC(PS)	3	0	0	3	NIL

**COMPUTER SCIENCE AND ENGINEERING (CYBER SECURITY)
SEMESTER I TO VIII**

(ii) OPEN ELECTIVE CREDITS(CLASS ROOM OR ONLINE) - (12)

SL. NO	CODE	COURSE	OFFERING DEPT.	CATEGORY	L	T	P	C	PREREQUISITE
1.	17MBHS04	TOTAL QUALITY MANAGEMENT	MANAGEMENT	EC(OE)	3	0	0	3	NIL
2.	17MBHS03	ENGINEERING MANAGEMENT AND ETHICS	MANAGEMENT	EC(OE)	3	0	0	3	NIL
3.	17MBHS05	MARKETING TECHNIQUES FOR ENGINEERS	MANAGEMENT	EC(OE)	3	0	0	3	NIL
4.	17CVEC07	DISASTER MITIGATION AND MANAGEMENT	CIVIL	EC(OE)	3	0	0	3	NIL
5.	17EEEC22	SCADA	EEE	EC(OE)	3	0	0	3	NIL
6.	17EEEC03	COMPUTER AIDED DESIGN OF ELECTRICAL APPARATUS	EEE	EC(OE)	3	0	0	3	NIL
7.	17EEEC21	NON CONVENTIONAL ENERGY SOURCES	EEE	EC(OE)	3	0	0	3	NIL
8.	17MEPI04	NON DESTRUCTIVE TESTING	MECHANICAL	EC(OE)	3	0	0	3	NIL
9.	17MESE17	MODERN MANUFACTURING METHODS	MECHANICAL	EC(OE)	3	0	0	3	NIL
10.	17ECCC07	MICROCONTROLLERS & ITS APPLICATIONS	ECE	EC(OE)	3	0	0	3	NIL
11.	17MBHS02	FINANCE AND ACCOUNTING FOR ENGINEERS	MANAGEMENT	EC(OE)	3	0	0	3	NIL
12.	17MBHS09	INTELLECTUAL PROPERTY RIGHTS AND ALTERNATE DISPUTE RESOLUTION	MANAGEMENT	EC(OE)	3	0	0	3	NIL
13.	17ATEC14	COMPUTER CONTROLLED VEHICLE SYSTEMS	AUTOMOBILE	EC(OE)	3	0	0	3	NIL
14.	17CVSE55	REMOTE SENSING AND GIS FOR ENVIRONMENTAL APPLICATION	CIVIL	EC(OE)	3	0	0	3	NIL
15.	17CVEC03	GEOGRAPHICAL INFORMATION SYSTEM	CIVIL	EC(OE)	3	0	0	3	NIL
16.	17CVSE02	ENTERPRISE WIDE INFORMATION SYSTEMS	CIVIL	EC(OE)	3	0	0	3	NIL
17.	17CVSE47	ICT BASED CITY AND INFRASTRUCTURE PLANNING	CIVIL	EC(OE)	3	0	0	3	NIL
18.	17EESE03	ARTIFICIAL INTELLIGENCE APPLICATION	EEE	EC(OE)	3	0	0	3	NIL
19.	17BMCC03	BIOSENSORS AND TRANSDUCERS	BME	EC(OE)	3	0	0	3	NIL
20.	17BMEC06	APPLIED NEURAL NETWORKS AND	BME	EC(OE)	3	0	0	3	NIL

		FUZZY LOGIC SYSTEMS IN MEDICINE							
21.	17BMSE17	BRAIN COMPUTER INTERFACE	BME	EC(OE)	3	0	0	3	NIL
22.	17BMSE18	ROBOTICS & AUTOMATION IN MEDICINE	BME	EC(OE)	3	0	0	3	NIL
23.	17ECCC04	SIGNALS AND SYSTEMS	ECE	EC(OE)	3	0	0	3	NIL
24.	17ECCC01	SEMICONDUCTOR DEVICES	ECE	EC(OE)	3	0	0	3	NIL
25.	17ECCC15	ANALOG & DIGITAL COMMUNICATION	ECE	EC(OE)	3	0	0	3	NIL
26.	17EEEC20	MATHEMATICAL MODELLING AND SIMULATION	EEE	EC(OE)	3	0	0	3	NIL
27.	17BMSE16	WEARABLE TECHNOLOGY	BME	BM(OE)	3	0	0	3	NIL
28.	17ECSE21	WIRELESS SENSOR NETWORKS AND IOT	ECE	EC(OE)	3	0	0	3	NIL
29.	17ECSE22	WIRELESS TECHNOLOGIES FOR IOT	ECE	EC(OE)	3	0	0	3	NIL
30.	17ECSE07	SOFTWARE TECHNOLOGY FOR EMBEDDED SYSTEMS	ECE	EC(OE)	3	0	0	3	NIL
31.	17MECC12	COMPUTER INTEGRATED MANUFACTURING	MECH	EC(OE)	3	0	0	3	NIL
32.	17BTSE05	INDUSTRIAL WASTE MANAGEMENT	BTE	EC(OE)	3	0	0	3	NIL
33.	17BMEC04	MEMS AND ITS BIOMEDICAL APPLICATIONS	BME	EC(OE)	3	0	0	3	NIL
34.	17CVEC14	AIR POLLUTION MANAGEMENT	CIVIL	EC(OE)	3	0	0	3	NIL
35.	17BTPI05	INDUSTRIAL BIOSAFETY	BTE	EC(OE)	3	0	0	3	NIL
36.	17BTEC29	GREEN BUILDING AND SUSTAINABLE ENVIRONMENT	BTE	EC(OE)	3	0	0	3	NIL

B.E/ B.TECH. COMPUTER SCIENCE AND ENGINEERING (CYBER SECURITY) SEMESTER I TO VIII									
CATEGORY D – PROJECT + INTERNSHIP + INDUSTRY ELECTIVES (P + I + I)- CREDITS (15)									
(i) PROJECT - CREDITS (9)									
(i) INTERNSHIP + INDUSTRY ELECTIVES - CREDITS (6)									
SL. NO	CODE	COURSE	OFFERING DEPT.	CATEGORY	L	T	P	C	PREREQUISITE
1.	17CSPI01	PROJECT WORK	CSE	PI	0	0	18	9	NIL
2.	17CSPI02	INTERNSHIP	CSE	PI	0	0	0	3	NIL
3.	17CSPI03	BUSINESS INTELLIGENCE AND ITS APPLICATIONS	CSE	PI	3	0	0	3	NIL
4.	17CSPI04	BUILDING ENTERPRISE APPLICATIONS	CSE	PI	3	0	0	3	NIL
5.	17CSPI05	INTERNET AND WEB TECHNOLOGY	CSE	PI	3	0	0	3	NIL
6.	17CSPI06	LEARNING IT ESSENTIALS BY DOING	CSE	PI	3	0	0	3	NIL
7.	17CSPI07	ESSENTIALS OF INFORMATION TECHNOLOGY	CSE	PI	3	0	0	3	NIL
8.	17CSPI08	INTRODUCTION TO MAIN FRAMES	CSE	PI	3	0	0	3	NIL
9.	17CSPI09	MOBILE APPLICATION DEVELOPMENT	CSE	PI	3	0	0	3	NIL

B.E / B.TECH. – ARTIFICIAL INTELLIGENCE & DATA SCIENCE - SEMESTER I TO VIII									
CATEGORY E – EMPLOYABILITY ENHANCEMENT COURSES, CO - CURRICULAR COURSES AND EXTRA CURRICULAR COURSES (EEC)** - CREDITS (9) (** - MANDATORY, CREDITS WOULD BE MENTIONED IN MARK SHEETS BUT NOT INCLUDED FOR CGPA CALCULATIONS.)									
(i) EMPLOYABILITY ENHANCEMENT COURSES (EEC) (3)									
SL. NO	CODE	COURSE	OFFERING DEPT.	CATEGORY	L	T	P	C	PREREQUISITE
1.	17APEE01	PERSONALITY SKILLS DEVELOPMENT - I	MATHS	EE	2 WEEKS OF TRAINING			1	NIL
2.	17APEE02	PERSONALITY SKILLS DEVELOPMENT - II	ENGLISH & MANAGEMENT	EE	2 WEEKS OF TRAINING			1	NIL
3.	17CSEE01	APPLICATION SOFTWARE AND SYSTEM SOFTWARE INSTALLATION	CSE	EE	3	0	0	3	NIL
4.	17CSEE02	WEB DESIGNING	CSE	EE	3	0	0	3	NIL
5.	17CSEE03	DIGITAL MARKETING	CSE	EE	3	0	0	3	NIL
6.	17CSEE04	MOBILE APPLICATION DEVELOPER	CSE	EE	3	0	0	3	NIL
(ii) CO - CURRICULAR COURSES (CCC) (3)									
1.	17APEE03	NCC	NCC	EE	2 WEEKS OF TRAINING IN NCC CAMP			1	NIL
2.	17APEE04	NSS	NSS	EE	2 WEEKS OF SOCIAL IN NSS CAMP			1	NIL
3.	17APEE05	SPORTS AND GAMES (INTER – UNIVERSITY LEVEL)	PHYSICAL EDUCATION	EE				1	NIL
4.	17APEE06	SPORTS AND GAMES (INTRA- UNIVERSITY LEVEL)	PHYSICAL EDUCATION	EE				2	NIL
5.	17APEE07	SPORTS AND GAMES (STATE AND NATIONAL LEVELS)	PHYSICAL EDUCATION	EE				2	NIL
(iii) EXTRA CURRICULAR COURSES (ECC) - (MOOC / SWAYAM / NPTEL) (3)									
1.	17CSEE05	EXTRA CURRICULAR COURSES – I		EE					NIL
2.	17CSEE06	EXTRA CURRICULAR COURSES – II		EE					NIL
3.	17CSEE07	EXTRA CURRICULAR COURSES – III		EE					NIL
4.	17CSEE08	EXTRA CURRICULAR COURSES -IV		EE					NIL
5.	17CSEE09	EXTRA CURRICULAR COURSES –V		EE					NIL
6.	17CSEE10	EXTRA CURRICULAR COURSES – VI		EE					NIL

B.E/ B.TECH. COMPUTER SCIENCE AND ENGINEERING – CYBER SECURITY SEMESTER I TO VIII									
CATEGORY F - MANDATORY COURSES - Non Credit									
SL. NO	CODE	COURSE	OFFERING DEPT.	CATEGORY	L	T	P	C	PREREQUISITE
1.	17CHBS01	ENVIROMENTAL SCIENCES	CHEMISTRY	MC	–	–	–	0	NIL
2.	17MBHS11	ESSENCE OF INDIAN KNOWLEDGE TRADITION / INDIAN CONSTITUTION	MBA	MC	–	–	–	0	NIL

B.E/ B.TECH. COMPUTER SCIENCE AND ENGINEERING – CYBER SECURITY SEMESTER I TO VIII	
INDUCTION PROGRAM	
INDUCTION PROGRAM (MANDATORY)	3 Weeks Duration
Induction program for students to be offered right at the start of the first year.	<ul style="list-style-type: none"> • Physical activity • Creative Arts • Universal Human Values • Literary • Proficiency Modules • Lectures by Eminent People • Visits to local Areas • Familiarization to Dept./Branch & Innovations

17EGHS01	TECHNICAL ENGLISH										Category	L	T	P	Credit
											HSS	3	0	2	4
PREAMBLE															
Technical English is a life skill course necessary for all students of Engineering and Technology. It aims at developing communication skills in English, essential for understanding and expressing the ideas of different professional context. The outcome of the course is to help the students acquire the language skills of Listening, Speaking, Reading and Writing competency in English language and thereby making the students competent and employable in the globalised scenario.															
PREREQUISITE: NIL															
COURSE OBJECTIVES															
1	To enable students to develop LSRW skills in English. (Listening, Speaking, Reading, and Writing.)														
2	To make them to become effective communicators														
3	To ensure that learners use Electronic media materials for developing language														
4	To aid the students with employability skills.														
5	To motivate students continuously to use English language														
6	To develop the students communication skills in formal and informal situations														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Listen, remember and respond to others in differentscenario												Remember			
CO2. Understand and speak fluently and correctly with correct pronunciation in different situation.												Understand			
CO3. To make the students experts in professional writing												Apply			
CO4. . To make the students in proficient technical communicator												Apply			
CO5. To make the students good communicators at the work place and to be theoretically strong.												Apply			
CO6 To make the students recognize the role of technical writing in their careers in business, technical and scientific field												Analyze			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	M			M	M	S		L	S	L	S	S	S	M
CO2		M		L	M	M	S		L	S	S	S	S		
CO3		L	L	M				L	L	M	S	S	S	S	M
CO4		M				M	M		L	S		S	S		
CO5	M	M		M	M	M	S	M	L	S	M	S	S	S	M
CO6	M		M			M					S	M	S	S	M
S- Strong; M-Medium; L-Low															

SYLLABUS

LISTENING

Self introduction - Simulations using E Materials - Whatsapp, Face book, Hiker, Twitter- Effective Communication with Minimum Words - Interpretation of Images and Films - Identify the different Parts of Speech- Word formation with Prefixes and suffixes -Common Errors in English - Scientific Vocabulary (definition and meaning) - Listening Skills- Passive and Active listening, Listening to Native Speakers - Characteristics of a good listener.

SPEAKING

Articles - Phonetics (Vowels, Consonants and Diphthongs) - Pronunciation Guidelines -Listening to Indian speakers from different regions, intrusion of mother tongue - Homophones – Homonyms - Note taking and Note making - Difference between Spoken and Written English- Use of appropriate language - Listening and Responding to Video Lectures (Green India, environment, social talks) - Extempore.

REPORTING WRITING

Tense forms- Verbal and Non verbal Communication - Describing objects - Process Description- Speaking Practice - Paragraph Writing on any given topic (My favourite place, games / Hobbies / School life, etc.) -Types of paragraphs - Telephone Etiquettes - Telephonic conversation with dialogue.

READING

Impersonal Passive Voice - Conditional Sentences - Technical and Non technical Report Writing (Attend a technical seminar and submit a report) - News Letters and Editing - Skimming- Scanning - How to Improve Reading Speed - Designing Invitations and Poster Preparation.

WRITING

Sentence Pattern (SVOCA) - Statement of Comparison - Transcoding (Flow Chart, Bar Chart and Pie Chart) - Informal letters - Resume Writing- Difference between Bio data, Resume and Curriculum Vitae.

TEXT BOOK

1. English for Engineers- Faculty of English – VMKV Engineering College, Salem and AVIT, Chennai

REFERENCE BOOKS

1. English for Effective Communication, Department of English, VMKV & AVIT, SCM Publishers, 2009.
2. Practical English Usage- Michael Swan (III edition), Oxford University Press
3. Grammar Builder- I, II, III, and Cambridge University Press.
- 4 Pickett and Laster. Technical English: Writing, Reading and Speaking, New York: Harper and Row Publications, 2002.

Course Designers:

S.No	Name of the Faculty	Designation	Department	Mail ID
1	Dr.P.Saradha	Associate Professor	English	saradhap@vmkvec.edu.in
2	Mr.S.K.Prem Kishor	Assistant Professor	English	Prem.english@avit.ac.in

17EGHS02		ENGLISH LANGUAGE LAB						Category		L	T	P	Credit		
								HSS		0	0	4	2		
PREAMBLE															
English Language Laboratory provides technological support to students. It acts as a platform for learning, practicing and producing language skills through interactive lessons and communicative mode of teaching.															
PREREQUISITE: NIL															
COURSE OBJECTIVES															
1		To understand communication nuisances in the corporate sector.													
2		To understand the role of mother tongue in second language learning and to avoid interference of mother tongue.													
3		To communicate effectively through different activities													
4		To understand and apply the telephone etiquette													
5		Case study to understand the practical aspects of communication													
6		To improve the oral skills of the students													
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Give best performance in group discussion and interview											Understand				
CO2. Best performance in the art of conversation and public speaking.											Apply				
CO3. Give better job opportunities in corporate companies											Apply				
CO4. Better understanding of nuances of English language through audio-visual experience and group activities											Apply				
CO5. Speaking skills with clarity and confidence which in turn enhances their employability skills											Apply				
CO6. Acquire strategic competence to use both spoken and written language in a wide range of communication strategies											Apply				
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	S	M	S	-	L	-	-	S	S	M	-	-	-	S
CO2	M	-	-	-	-	-	-	-	M	S	-	M	S	M	S
CO3	M	-	-	-	-	-	-	-	-	S	-	M	S	S	S
CO4	M	-	-	-	-	-	-	-	-	M	-	-	M	S	S
CO5	M	-	-	S	-	-	-	-	-	M	-	-	M	S	S
CO6	-	M	M	-	-	-	-	-	-	M	-	-	M	M	S
S- Strong; M-Medium; L-Low															

SYLLABUS

MODULE I: Ice Breaker, Grouping, Listening- (Hearing and listening)- Active Listening- Passive Listening – Listening to a song and understanding- (fill in the blanks) Telephone Conversation

MODULE II: Influence of mother tongue, videos, understanding nuances of English language (video) puzzle to solve, Activity.

MODULE III: Why is English important, Communication skills, TED (video) Communication in different scenario – a case study, ingredients of success, Activity – chart, speak the design, feedback on progress, Group wise, Individual.

MODULE IV: Telephone Etiquette, Dining Etiquette, Meeting Etiquette.

MODULE V: Case study of Etiquette in different scenario.

TEXT BOOKS:

1. English for Engineers- Faculty of English – VMKV Engineering College, Salem and AVIT, Chennai

REFERENCES:

1. English for Effective Communication, Department of English, VMKV & AVIT, SCM Publishers, 2009.
2. Practical English Usage- Michael Swan (III edition), Oxford University Press
3. Grammar Builder- I, II, III, and Cambridge University Press.
4. Pickett and Laster. Technical English: Writing, Reading and Speaking, New York: Harper and Row Publications., 2002.

COURSE DESIGNERS

S.No.	Name of the Faculty	Designation	Department	Email ID
1	Dr.P.Saradha	Associate Professor	English / VMKVEC	saradhap@vmkvec.edu.in
2	Mr.S.K.Prem Kishor	Assistant Professor	English / AVIT	Prem.english@avit.ac.in

17EGHS81		BUSINESS ENGLISH									Category	L	T	P	Credit
											HSS	3	0	4	5
PREAMBLE Language is one of the most valued possessions of men. It acts as a repository of wisdom. Among all other languages English, the international language plays a vital role as a propeller for the advancement of knowledge in different fields and as a telescope to view the dream of the future.															
PREREQUISITE: NIL															
COURSE OBJECTIVES															
1	To impart and enhance corporate communication.														
2	To enable learners to develop presentation skills														
3	To build confidence in learners to use English in Business context														
4	To make them experts in professional writing														
5	To assist students understand the role of thinking in all forms of communication														
6	To equip students with employability and job searching skills														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Communicate with a range of formal and informal context												Understand			
CO2. Students will undergo in activities, demonstrating interaction skills and consider how own communication is adjusted in different scenario												Apply			
CO3. Strengthening of oral and written skills in the business context												Apply			
CO4. Create interest among the students about a topic by exploring thoughts and ideas												Apply			
CO5. Make the students to start with pleasing note and make them to give different ideas												Apply			
CO6. Make them in better performance in the art of communication												Apply			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M		L		L	S	S		M	S		S	M		
CO2		M	S	M		M	M		L	S		S	S		
CO3	L	M				M		L		S	L	M		S	M
CO4		L	M	M			L	M	M	S	L	M	S		
CO5				M				M	L	S		L	M		M
CO6		L		M		L	L			S		S		S	
S- Strong; M-Medium; L-Low															
SYLLABUS															
SUBJECT AND VERB AGREEMENT: Subject and Verb Agreement (concord) - Preposition and Relative Pronoun - Cause and effect - Phrasal Verbs-Idioms and phrases-Listening Comprehension -Listening to Audio Files and Answering Questions- Framing Questions-Negotiation Skills-Presentation Skills and Debating Skills.															
STRESS: Stress (Word Stress and Sentence Stress) Intonation- Difference between British and American English Vocabulary-Indianism-Compound Words (including Technical Terminology).															

READING SKILLS: Reading Skills-Understanding Ideas and making Inferences-Group Discussion-Types of Interviews – FAQs – E - Mail Netiquette - Sample E – mails - Watching Documentary Films and Responding to Questions.

CORPORATE COMMUNICATION: Corporate Communication -Recommendation-Instruction-Check List- Circulars- Inter Office Memo- Minutes of Meeting and Writing Agenda - Discourse Markers - Rearranging Jumbled Sentences - Technical Articles - Project Proposals-Making Presentations on given Topics -Preparing Power Point Presentations

CRITICAL READING: Critical Reading-Book Review-Finding Key Information and Shifting Facts from Opinions- Business Letters (Calling for Quotation, Placing Orders and Complaint Letters) - Expansion of an Idea-Creative Writing.

TEXT BOOK

1. English for Effective Communication - Faculty of English – VMKV Engineering College, Salem and AVIT, Chennai

REFERENCE BOOKS

1. Grammar Builder – I, II, III – Cambridge University Press.
2. Technical English – Writing, Reading and Speaking – Pickett and Lester, Harper and Row

Course Designers:

S.No	Name of the Faculty	Designation	Department	Mail ID
1	Dr.P.Saradha	Associate Professor	English	saradhap@vmkvec.edu.in
2	Mr.S.K.Prem Kishor	Assistant Professor	English	Prem.english@avit.ac.in

17MBHS01	ENGINEERING STARTUPS AND ENTREPRENEURIAL MANAGEMENT				Category	L	T	P	Credit						
					HSS	3	0	0	3						
PREAMBLE: A startup means company initiated by individual innovator or entrepreneurs to search for a repeatable and scalable business model. More specifically, a startup is a newly emerged business venture that aims to develop a viable business model to meet a marketplace needs or wants in an optimum manner.															
PREREQUISITE: NIL															
COURSE OBJECTIVES:															
1. To understand the basics of Startups Management and components.															
2. To analyze the startups fund management practices															
3. To practice the various kinds of stocks and employment considerations in startups.															
4. To apply the importance of intellectual property rights and its procedures.															
5. To explore the entrepreneurial mindset and culture.															
COURSE OUTCOMES:															
After successful completion of the course, students will be able to															
CO1: Explain the concept of engineering startups, objectives and functions and its components.										Understand					
CO2: Analyze the startups funding issues and remuneration practices instartups business.										Analyse					
CO3: Analyze the various kinds of stocks and employment opportunities and consideration in startups business.										Analyse					
CO4: Compare and contrast the various forms of intellectual property protectionand practice.										Analyse					
CO5: Explore the entrepreneurial mindset and culture that has been developing in companies of all sizes and industries.										Evaluate					
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	-	-	-	-	M	M	S	-	M	-	M	-	L	-
CO2	S	S	M	M	M	L	-	-	-	-	-	M	-	-	M
CO3	S	S	S	M	M	M	-	-	-	-	-	M	-	L	-
CO4	S	S	S	M	M	M	-	-	-	-	-	M	-	M	-
CO5	S	S	-	M	M	M	-	-	-	-	-	M	-	-	-
S- Strong; M-Medium; L-Low															

SYLLABUS:

Elements of a successful Start up: Create Management Team and Board of Directors – Evaluate market and Target Customers – Define your product or service – Write your Business Plan

Funding Issues and Remuneration Practices: Funding Issues: Investment Criteria – Looking for seed cash – Seed, Startup, and subsequent Funding Rounds – Milestone Funding - Remuneration Practices for your Start-up : Salaries – Headhunters – Equity Ownership – Form of Equity incentive vehicles – Other compensation – Employment Contracts

Stock Ownership & startup Employment Considerations: Stock ownership: Risk-Reward Scale – Ownership Interest over time – Common and preferred stock – Authorized and outstanding shares – Acquiring stock – Restricted Stock Grants – Future Tax Liability on Restricted Shares - Compensation and startup Employment Considerations : Entrepreneurs Need Insurance – Do Fringe benefits – outsourcing your benefits work – Life Insurance – Health Insurance – Disability Insurance

Protecting Intellectual Property: Protecting your intellectual property: Copyrights - patents – Trade secrets – Trademarks - The Legal Form of your Startup: Corporation – Partnership – Limited Liability Company – Sole Proprietorship - – Making the startup decision: commitment – Leaving a current employer - stay fit.

Entrepreneurship: Entrepreneurship - Introduction to Technology Entrepreneurship and Technology Ventures – Engineers as Entrepreneurs, The Mindset of the Entrepreneurial Leader, Creating and Selling the Entrepreneurial Value Proposition - Essentials of Successful Entrepreneurs – Social environment in entrepreneurial development – Economic environment in entrepreneurial development.

Text Book:

1. James A. Swanson & Michael L. Baird, “Engineering your start-up: A Guide for the High-Tech Entrepreneur” 2nd ed, Professional Publications, Inc
2. Donald F Kuratko, “Entrepreneurship – Theory, Process and Practice”, 9th Edition, Cengage Learning 2014.

Reference Books:

1. Hisrich R D, Peters M P, “Entrepreneurship” 8th Edition, Tata McGraw-Hill, 2013.
2. Mathew J Manimala, “Entrepreneurship theory at cross roads: paradigms and praxis” 2nd Edition Dream tech, 2005.
3. Rajeev Roy, ‘Entrepreneurship’ 2nd Edition, Oxford University Press, 2011.
4. EDII “Faulty and External Experts – A Hand Book for New Entrepreneurs Publishers: Entrepreneurship Development”, Institute of India, Ahmadabad, 1986.

COURSE DESIGNERS:

S.No	Name of the Faculty	Designation	Department	Mail ID	
1	Dr. G. Murugesan	Professor	Management Studies	murugesan@vmkvec.edu.in	

2	Mr. T. Thangaraja	Assistant Professor	Management Studies	thangaraja@avit.ac.in	
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17EGHS82	PROFESSIONAL COMMUNICATION AND PERSONALITY DEVELOPMENT						Category	L	T	P	Credit				
							HSS	3	0	0	3				
PREAMBLE															
To develop students with good presentation and writing skills (Professionally & technically). Articulate and enunciate words and sentences clearly and effectively. Develop proper listening skills. Understand different writing techniques and styles based on the communication being used.															
PREREQUISITE: NIL															
COURSE OBJECTIVES															
1.	To develop communication and personality skills.														
2.	To improve Aptitude skills, train to improve self-learning / researching abilities, presentation skills & technical writing.														
3.	To improve students employability skills.														
4.	To develop communication and problem solving skills.														
5.	To develop professional with idealistic, practical and moral values.														
6.	To produce cover letters, resumes and job application strategies.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Improve students their vocabulary and use them in appropriate situation										Understand					
CO2. Demonstrate effective use of team work skills to complete given tasks.										Apply					
CO3. Speaking with clarity and confidence thereby enhancing employability skills of the students.										Apply					
CO4. Train the students in organized and professional writing										Apply					
CO5. Develop students reading skills that could be adopted while reading text										Apply					
CO6. Improve communication and personality skills.										Apply					
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	M	-	-	-	M	M	-	M	S	-	-	M	M	S
CO2	M	-	-	-	-	-	-	-	S	M	-	-	S	M	S
CO3	-	-	-	-	-	-	M	-	S	S	-	-	S	S	-
CO4	S	-	-	-	-	-	-	-	-	-	-	M	-	M	M
CO5	-	-	-	-	-	-	-	-	-	-	-	-	M	M	-
CO6	S	-	-	-	-	-	-	-	M	S	-	M	S	-	M
S- Strong; M-Medium; L-Low															

SYLLABUS:

COMMUNICATION AND SELF DEVELOPMENT: Basic Concepts of Communication; Barriers in Communication; How to Overcome Barriers to Communication.

GRAMMAR & SYNTAX: Subject verb concord, tenses, Homophones, Homonyms, Spotting errors.

READING AND WRITING SKILLS: Reading Comprehension; and suggesting title for given passage Back office job for organizing a conference / seminar (member of organizing committee and submit a report); Jumbled sentences, respond to real time advertisement and prepare a covering letter with CV.

SPEAKING SKILLS: Hard and soft Skills; Feedback Skills; Skills of Effective Speaking; Component of an effective Talk; how to make an effective oral presentation

TECHNICAL REPORT, RESEARCH CASE STUDY & REPORTING: Types and Structure of Reports; Collecting Data; Technical Proposals; Visual Aids; General Tips for Writing Reports. Research Case Study and reporting, how to make an effective power point presentation

TEXT BOOK

1. The Functional Aspects of Communication Skills, Prajapati Prasad and Rajendra K.Sharma, S. K Kataria & Sons, New Delhi, Rep''nt 2007

REFERENCE BOOKS

1. Business Communication, Sinha K. K. S. Chand, New Delhi.
2. Business Communication, Asha Kaul, Prentice Hall of India
3. Business Correspondence and Report Writing A Practical Approach to Business and Technical Communication, Sharma, R.C.and Krishna Mohan, Tata Mc Graw – Hill.

COURSE DESIGNERS:

S.No	Name of the Faculty	Designation	Department	Email ID
1.	Dr.P.Saradha	Associate Professor	English	saradhap@vmkvec.edu.in
2.	Mr.S.K.Prem Kishor	Assistant Professor	English	Prem.english@avit.ac.in

17MABS01	ENGINEERING MATHEMATICS	Category	L	T	P	Credit
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		BS	2	2	0	3									
PREAMBLE															
The driving force in Engineering Mathematics is the rapid growth of technology and is designed to provide the basic tools of calculus mainly for the purpose of modelling the engineering problems mathematically and obtaining solutions. This is a foundation course which mainly deals with topics such as single variable and multivariable calculus and plays an important role in the understanding of science, engineering, economics and computer science, among other disciplines.															
PREREQUISITE : NIL															
COURSE OBJECTIVES															
1	To identify the characteristics of a linear system with Eigen values and Eigen vectors.														
2	To improve their ability in solving geometrical applications of differential calculus														
3	To find a maximum or minimum value for a function of several variables subject to a given constraint.														
4	To understand the integration techniques for evaluating surface and volume integrals.														
5	Incorporate the knowledge of vector calculus to support their concurrent and subsequent engineering studies														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Able to understand the system of linear equations arising in all engineering fields using matrix methods.						Understand									
CO2. Determine the evolute and envelope for a given family of curves						Apply									
CO3. Apply differentiation to solve maxima and minima problems.						Apply									
CO4. Compute the area and volume of plane using integration						Apply									
CO5. Evaluate the surface and volume integral using Green’s, Stokes and Gauss Divergence theorems						Analyze									
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	M	M	M	--	--	--	--	--	--	M	M	M	--
CO2	S	M	M	M	M	--	--	--	--	--	--	M	M	M	--
CO3	S	M	M	M	M	--	--	--	--	--	--	M	M	M	--
CO4	S	M	M	M	M	--	--	--	--	--	--	M	M	M	--
CO5	S	M	M	M	M	--	--	--	--	--	--	M	M	M	--
S- Strong; M-Medium; L-Low															
SYLLABUS															

MATRICES: Characteristic equation – Eigen values and eigenvectors of a real matrix – Properties of eigenvalues and eigenvectors (Without proof) – Cayley-Hamilton theorem (excluding proof) – Orthogonal transformation of a symmetric matrix to diagonal form.

DIFFERENTIAL CALCULUS: Curvature – Cartesian and Parametric Co-ordinates – Centre and radius of curvature – Circle of curvature – Evolute.

FUNCTIONS OF SEVERAL VARIABLES: Partial Derivatives – Total Differentiation – Maxima and Minima constrained Maxima and Minima by Lagrangian Multiplier Method.

MULTIPLE INTEGRALS: Double integration – change of order of integration – Cartesian and polar coordinates – Area as a double integral – Triple integration.

VECTOR CALCULUS: Directional derivatives – Gradient, Divergence and Curl – Irrotational and solenoidal – vector fields – vector integration – Green’s theorem, Gauss divergence theorem and Stoke’s theorem (excluding proof).

TEXT BOOKS:

1. “Engineering Mathematics I & II”, Department of Mathematics, VMKVEC (Salem) & AVIT (Chennai), (2017).
2. Dr.A.Singaravelu, “Engineering Mathematics I & II”, 23rd Edition, Meenakshi Agency, Chennai (2016).

REFERENCES:

1. Veerarajan T., “Engineering Mathematics”, Tata McGraw Hill Education Pvt, New Delhi (2011).
2. Grewal B.S., “Higher Engineering Mathematics”, 42nd Edition, Khanna Publishers, Delhi (2012).
3. Kreyszig E., “Advanced Engineering Mathematics”, 8th Edition, John Wiley and Sons (Asia) Pvt. Ltd., Singapore (2012).
4. Kandasamy P, Thilagavathy K, and Gunavathy K., “Engineering Mathematics”, Volumes I & II (10th Edition).

COURSE DESIGNERS

S.No	Name of the Faculty	Designation	Name of the College	Mail ID
1	Dr.G.Selvam	Asso.Prof	VMKVEC	selvam@vmkvec.edu.in
2	Ms.S.Gayathri	Asst.Prof.Grade I	AVIT	gayathri@avit.ac.in

17MABS09	MATHEMATICS FOR COMPUTER ENGINEERS							Category	L	T	P	Credit			
								BS	2	2	0	3			
PREAMBLE An engineering student needs to have some basic mathematical tools and techniques to apply in diverse applications in Engineering. This emphasizes the development of rigorous logical thinking and analytical skills of the student and appraises him the complete procedure for solving different kinds of problems that occur in engineering. The Laplace transform method is a powerful method for solving linear ODEs and corresponding initial value problems as well as systems of ODEs arising in Engineering. The knowledge of transformations is to create a new domain in which it is easier to handle the problem that is being investigated.															
PREREQUISITE: NIL															
COURSE OBJECTIVES															
1	To familiarize with the applications of differential equations.														
2	To learn Laplace transform and its Inverse method to solve differential Equations and integral transforms														
3	To calculate the Fourier transforms of periodic function.														
4	To gain the knowledge in Z Transform and its applications.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Predict the suitable method to solve second and higher order differential equations													Apply		
CO2. Learn the properties of Laplace transforms techniques													Understand		
CO3. Apply Applications of Laplace transform to solve an ordinary differential equation.													Apply		
CO4. To use the Fourier transform as the tool to connect the time domain and frequency domain to evaluate the given integral													Analyze		
CO5. Solve the given difference equations using Z-transform.													Apply		
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	S	M	M	M	--	--	--	--	--	--	M	M	M	M
CO2	S	S	M	M	M	--	--	--	--	--	--	M	M	M	M
CO3	S	S	M	M	M	--	--	--	--	--	--	M	M	M	M
CO4	S	S	M	M	M	--	--	--	--	--	--	M	M	M	M
CO5	S	S	M	M	M	--	--	--	--	--	--	M	M	M	M

S- Strong; M-Medium; L-Low

SYLLABUS

ORDINARY DIFFERENTIAL EQUATIONS

Solutions of second and third order linear ordinary differential equation with constant coefficients – Method of variation of parameters – Cauchy's and Legendre's linear equations – Simultaneous first order linear equations with constant coefficients.

LAPLACE TRANSFORMS

Laplace transform – transform of elementary functions – basic properties – derivatives and integrals of transforms – transforms of derivatives and integrals – initial and final value theorems – Transform of periodic functions

INVERSE LAPLACE TRANSFORMS AND APPLICATIONS

Inverse Laplace transform – Convolution theorem – Initial and Final value theorem-Solution of linear ODE of second order with constant coefficients and first order simultaneous equation with constant coefficients using Laplace transforms.

FOURIER TRANSFORMS

Fourier transform pairs - Fourier Sine and Cosine transforms – Properties - Transforms of simple functions - Convolution theorem - Parseval's identity.

Z – TRANSFORMS

Z-Transform – Elementary Properties – Inverse Z-Transform – Convolution Theorem – Formation of Difference Equations – Solution of first and second order Difference Equations using Z-Transform.

TEXT BOOKS:

1. "Engineering Mathematics I & II ", by Department of Mathematics, VMKVEC (Salem) &AVIT (Chennai),(2017).
2. Dr.A.Singaravelu, "Engineering Mathematics I & II", 23rd Edition, Meenakshi Agency, Chennai(2016).
3. Dr.A.Singaravelu , "Transforms and Partial differential Equations", 18th Edition, Meenakshi Agency, Chennai(2013).

REFERENCES:

1. Veerarajan, T., "Engineering Mathematics I, II and III", Tata McGraw Hill Publishing Co., New Delhi(2011).
2. Grewal, B.S., "Higher Engineering Mathematics", 42nd Edition, Khanna Publishers, Delhi(2012)
3. Kreyszig, E., "Advanced Engineering Mathematics", 8th Edition, John Wiley and Sons (Asia) Pvt Ltd., Singapore(2012).
4. Kandasamy .P, Thilagavathy. K. and Gunavathy. K., "Engineering Mathematics", Volumes I & II (10th Edition), S. Chand & Co., New Delhi(2014).

COURSE DESIGNERS

S.No	Name of the Faculty	Designation	Name of the College	Mail ID
1	Dr.L.Tamilselvi	Professor	AVIT	ltamilselvi@avit.ac.in
2	Mrs.V.T.Lakshmi	Asso.Prof	VMKVEC	lakshmi@vmkvec.edu.in

17MABS14	NUMERICAL METHODS AND NUMBER THEORY						Category	L	T	P	Credit				
							BS	2	2	0	3				
PREAMBLE This course aims at developing the ability to formulate an engineering problem in a mathematical form appropriate for subsequent computational techniques and to choose an appropriate numerical approach. Number theory encodes properties of number-theoretic objects and has various applications in the field of security, memory management, authentication, coding theory and the basis behind almost all of modern cryptography.															
PREREQUISITE: NIL															
COURSE OBJECTIVES															
1	To familiar with numerical solution for the system of equations														
2	To be get exposed to finite differences and interpolation														
3	To be thorough with the numerical Differentiation and integration														
4	To give an integrated approach to Number Theory and to have the knowledge of division algorithm and fundamental theorem of arithmetic														
5	To familiar with congruences and classical theorems														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Solve the system of linear algebraic equations and single non linear equations arising in the field of Computer Science Engineering.										Apply					
CO2. Apply various numerical methods to find intermediate numerical value&Polynomial of numerical data.										Apply					
CO3. Calculate the differentiation of a polynomial and evaluate the definite integrals byusing numerical methods.										Apply					
CO4. Analyze and interpret the concepts of divisibility, greatest common divisor, prime, prime-factorization and congruence.										Analyze					
CO5. Analyze the system of linear congruences and derive some classical theorems.										Analyze					
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	S	M	M	M	--	--	--	--	--	--	M	M	M	M
CO2	S	S	M	M	M	--	--	--	--	--	--	M	M	M	M
CO3	S	S	M	M	M	--	--	--	--	--	--	M	M	M	M
CO4	S	S	M	M	M	--	--	--	--	--	--	M	S	S	M
CO5	S	S	M	M	M	--	--	--	--	--	--	M	S	S	M
S- Strong; M-Medium; L-Low															

SYLLABUS

SOLUTION OF EQUATIONS: Method of false position, Newton-Raphson method for single variable, Solutions of a linear system by Gaussian, Gauss-Jordan, Jacobian and Gauss-Seidel methods. Inverse of a matrix by Gauss-Jordan method.

INTERPOLATION AND APPROXIMATION: Interpolation with Newton's divided differences, Lagrange's polynomial, Newton forward and backward differences, central difference Formula (Stirling's and Bessel's).

NUMERICAL DIFFERENTIATION AND INTEGRATION: Numerical differentiation with interpolation polynomials, Numerical integration by Trapezoidal and Simpson's (both 1/3rd and 3/8th) rules. Romberg's rule, two and three point Gaussian quadrature formula.

DIVISIBILITY THEORY AND CANONICAL DECOMPOSITIONS : Division algorithm - Base-b Representations - Number Patterns - Prime and Composite Numbers – GCD - Euclidean Algorithm - Fundamental Theorem of Arithmetic - LCM.

CONGRUENCES AND CLASSICAL THEOREMS: Congruence's - Linear Congruence's, Chinese Remainder Theorem, Wilson's Theorem - Fermat's Little Theorem - Euler's Theorem.

TEXT BOOKS:

1. Dr.B.S.Grewal, "Numerical Methods in Engineering & Science", Khanna Publishers, 2007
2. Thomas Koshy, "Elementary Number Theory with Applications", Elsevier publications, 2002.
3. David.M.Burton. "Elementary Number theory", Tata McGraw Hill Edition, 2012.

REFERENCES:

1. T. Veerarajan, T. Ramachandran, "Numerical Methods with Programs in C and C++", Tata McGraw-Hill, 2004.
2. Niven.I, Zuckerman.H.S and Montgomery.H.L, "An Introduction to Theory of Numbers", John Wiley and sons, 2004.

COURSE DESIGNERS

S.No	Name of the Faculty	Designation	Name of the College	Mail ID
1	Dr.L.Tamilselvi	Professor	AVIT	ltamilselvi@avit.ac.in
2	Ms.M.Usha	Assistant Professor	VMKVEC	usha@vmkvec.edu.in

17MABS15	PROBABILITY AND QUEUEING THEORY							Category	L	T	P	Credit			
								BS	2	2	0	3			
PREAMBLE															
Probability is essential to science and life more generally. Starting from basic probability, the course proceeds to a thorough study of models for stochastic processes which are relevant in processing of random signals. Queueing theory is the mathematical study of waiting lines and it's a primary tool for studying the problem of congestion.															
PREREQUISITE: NIL															
COURSE OBJECTIVES															
1	To be thorough with probability concepts and random variables.														
2	To be familiar with different statistical distributions and the typical phenomena that each distribution often describes.														
3	To acquire skills in handling situations involving more than one random variable and functions of random variables.														
4	To be get exposed to the concepts of random processes and discrete time Markov chain.														
5	To study queuing models to analyze the real world systems.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Understand the concepts of random variable and probabilities associated with the distributions of random variables.														Understand	
CO2. Classify the random variables to determine the appropriate distributions.														Apply	
CO3. Apply the concepts of random variables and distributions to establish the distribution of linear combinations of independent random variables.														Apply	
CO4. Classify and apply the concepts of probability, Random Process and their applications in Probabilistic systems.														Analyze	
CO5. Derive and analyze the single and multiserver queueing system.														Analyze	
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	S	M	M	M	--	--	--	--	--	--	M	S	M	M
CO2	S	S	M	M	M	--	--	--	--	--	--	M	S	M	M
CO3	S	S	M	M	M	--	--	--	--	--	--	M	S	M	M
CO4	S	S	M	M	M	--	--	--	--	--	--	M	S	M	M
CO5	S	S	M	M	M	--	--	--	--	--	--	M	S	S	S
S- Strong; M-Medium; L-Low															
SYLLABUS															
PROBABILITY AND RANDOM VARIABLES: Probability concepts, Random variables, moments, Moment Generating function and their properties.															

STANDARD DISTRIBUTIONS: Binomial, Poisson, Geometric, Uniform, Exponential, Gamma, Weibull distributions, Functions of random variable, Chebychev inequality.

TWO-DIMENSIONAL RANDOM VARIABLES: Marginal and conditional distributions, Covariance, Correlation and regression, Transformation of random variables, Central limit theorem.

RANDOM PROCESSES, MARKOV CHAIN: Classification, Stationary process, Markov process, Binominal process, Poisson process, Birth and death process, Renewal process, Markov chain, Transition probabilities, Limiting distributions.

QUEUEING THEORY: Markovian queueing models, Little's formula, M/M/1, M/M/C – finite and infinite capacity.

TEXT BOOKS:

1. Dr.A.Singaravelu, “Probability and Queuing Theory”, Meenakshi Agency, Chennai,2012.
2. Kapur.J.N. and Saxena.H.C. “Mathematical Statistics”, S.Chand & Company Ltd. New Delhi,1997.

REFERENCES:

1. T.Veerarajan, “Probability, Statistics and Random processes” (Third Edition), Tata McGraw-Hill publishing Company Ltd., New Delhi,2008.
2. P.Kandasamy, K.Thilagavathy, K.Gunavathy “Probability, Random Variables and Random Processes” S.Chand &Company Ltd., New Delhi, 2008.
3. Allen.A.O, “Probability Statistics and Queuing theory with Computer science applications”, Academic Press, 2nd edition,1990.
4. S.C.Gupta and V.K.Kapoor, Fundamentas of Mathematical Statistics”, 11th extensively revised edition, S.Chand & Sons,2007.

COURSE DESIGNERS

S.No	Name of the Faculty	Designation	Name of the College	Mail ID
1	Ms.M.USHA	Assistant professor	VMKVEC	usha@vmkvec.edu.in
2	Dr.A.K.Thamizhsudar	Asso.Prof. grade II	AVIT	thamizhsudar@avit.ac.in

17MABS22			MATHEMATICS FOR MACHINE LEARNING						Category	L	T	P	Credit		
									BS	2	2	0	3		
PREAMBLE In this course we will study the mathematical foundations of Machine Learning, with an emphasis on the interplay between approximation theory, statistics, and numerical optimization. We will begin with a study of Statistical Learning Theory, including the concepts of Empirical Risk Minimization, Regularization and VC dimension. We will then study popular machine learning models, including deep neural networks, and analyse the underlying Optimization methods.															
PREREQUISITE: ENGINEERING MATHEMATICS															
COURSE OBJECTIVES															
1	To study about the problem of supervised learning from the point of view of function approximation, optimization, and statistics														
2	To identify the most suitable optimization and modelling approach for a given machine learning problem														
3	To analyse the performance of various optimization algorithms from the point of view of computational complexity (both space and time) and statistical accuracy														
4	To implement a simple neural network architecture and apply it to a pattern recognition task														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Understand the problem of supervised learning from the point of view of function approximation, optimization, and statistic													Understand		
CO2. Understand the most suitable optimization and modelling approach for a given machine learning problem													Understand		
CO3. Analyse the performance of various optimization algorithms from the point of view of computational complexity (both space and time) and statistical accuracy													Analyse		
CO4. To analyse a simple neural network architecture on a pattern recognition task													Analyse		
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	S	M	M	M	--	--	--	--	--	--	M	M	M	M
CO2	S	S	M	M	M	--	--	--	--	--	--	M	M	M	M
CO3	S	S	M	M	M	--	--	--	--	--	--	M	M	M	M
CO4	S	S	M	M	M	--	--	--	--	--	--	M	S	S	M
CO5	S	S	M	M	M	--	--	--	--	--	--	M	S	S	M
S- Strong; M-Medium; L-Low															

SYLLABUS

LINEAR ALGEBRA

Definition, applications, solving linear systems, linear inequalities, linear programming. Real-valued functions of two or more variables. Definition, examples, simple demos, applications

PROBABILITY

Binomial, Poisson, Geometric, Uniform, Exponential, Gamma, Weibull distributions, Functions of random variable, Chebychev inequality.

STATISTICAL LEARNING THEORY:

Binary Classification - Finite Hypothesis Sets - PAC Learning - Learning Shapes - Rademacher Complexity - The VC Dimension - The VC Inequality - General Loss Functions - Covering Numbers - Model Selection

CALCULUS

Curvature – Cartesian and Parametric Co-ordinates – Centre and radius of curvature – Circle of curvature – Evolute.

OPTIMIZATION

Overview of Optimization – Convexity – Lagrangian Duality – KKT Conditions – Support vector Machines I – Support Vector Machines II – Iterative algorithm and Gradient Descent – Convergence of Iterative Methods – Convergence of Gradient Descent – Extensions of Gradient Descent – Stochastic Gradient Descent

TEXT BOOKS:

1. M.Mohri, A. Rostamizadeh and T. Talwalkar, “Foundation of Machine Learning”, Adaptive Computation and Machine Learning series, MIT Press, 2012
2. S. Shalev Shwartz and S. ben David, Understanding Machine Learning : from theory to algorithms, Cambridge University Press, 2014

REFERENCES:

1. T. Hastie, J. Fraidman, R. Tibshirani, Elements of Statistical Learning, Volume 2, Springer, 2009.

COURSE DESIGNERS

S.No	Name of the Faculty	Designation	Name of the College	Mail ID
1	Dr.L.Tamilselvi	Professor	AVIT	ltamilselvi@avit.ac.in
2	Ms.M.Usha	Assistant Professor	VMKVEC	usha@vmkvec.edu.in

17MABS23				MATHEMATICS FOR DATA SCIENCE						Category		L	T	P	Credit
										BS		2	2	0	3
PREAMBLE															
The course is a brief overview of the basic tools from Linear Algebra and Multivariable Calculus that will be needed in subsequent courses of the program.															
PREREQUISITE: ENGINEERING MATHEMATICS															
COURSE OBJECTIVES															
1		To study the fundamental properties of matrices, their norms, and their applications													
2		To study the concepts of Differentiating/integrating multiple variable functions, and the role of the gradient and the hessian matrix.													
3		To learn about Basic properties of optimization problems involving matrices and functions of multiple variables													
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. To understand the fundamental properties of matrices, their norms, and their applications														Understand	
CO2. To understand the concepts of Differentiating/integrating multiple variable functions, and the role of the gradient and the hessian matrix.														Understand	
CO3. To learn about Basic properties of optimization problems involving matrices and functions of multiple variables														Understand	
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	S	M	M	M	--	--	--	--	--	--	M	M	M	M
CO2	S	S	M	M	M	--	--	--	--	--	--	M	M	M	M
CO3	S	S	M	M	M	--	--	--	--	--	--	M	M	M	M
S- Strong; M-Medium; L-Low															

SYLLABUS

MATRICES AND BASIC OPERATIONS, SQUARE MATRICES

Matrices and Basic Operations, interpretation of matrices as linear mappings, and some example. Square Matrices, Determinants, Properties of determinants, singular and non-singular matrices, examples, finding an inverse matrix

EIGEN FORMS AND NORMED SPACES

Characteristic Polynomial, Definition of Left/right Eigenvalues and Eigenvectors, Caley-Hamilton theorem, Singular Value Decomposition, interpretation of eigenvalues/vectors. Normed Spaces, Vector Spaces, Matrix Norms Definition of complete normed and vector spaces and some examples. Matrix norms and properties, applications to series of matrices and their convergence

NULL MATRIX AND DEFINITE MATRICES

The Range and the Null space of a Matrix. Definition and basic properties, orthogonality, Gram-Schmidt algorithm Positive-Definite Matrices and the Taylor Expansion of a two-variable function. Definition of positive-definiteness and the role of the eigenvalues. Physical meaning and importance in real-life problems

LINEAR SYSTEMS AND REAL VALUED FUNCTIONS:

Definition, applications, solving linear systems, linear inequalities, linear programming. Real-valued functions of two or more variables. Definition, examples, simple demos, applications

ANALYSIS ELEMENTS AND OPTIMIZATION PROBLEMS, INTEGRATION, CONVEX OPTIMIZATION

Distance, Limits, continuity, differentiability, the gradient and the Hessian. Optimization problems: Simple examples, motivation, the role of the Hessian, maxima and minima and related extrema conditions. Integration: Double integrals, Fubini's theorem, properties, applications. Elements of Convex Optimization: Functions of n variables. Convex sets, convex functions, convex problems, and their basic properties. Examples of convex problems, convexity versus non-convexity

REFERENCES:

1. Gilbert Strang, Linear Algebra and Its Applications, Thomson/Brooks Cole (Available in a Greek Translation) Thomas M. Apostol, Calculus, Wiley, 2nd Edition, 1991, ISBN 960-07-0067-2.
2. Michael Spivak, Calculus, Publish or Perish, 2008, ISBN 978-0914098911.
3. Ross L. Finney, Maurice D. Weir, and Frank R. Giordano, Thomas's Calculus, Pearson, 12th Edition, 2009.
4. David C. Lay, Linear Algebra and Its Applications, 4th Edition.
5. 'Yousef Saad, 'Iterative Methods for Sparse Linear Systems'

COURSE DESIGNERS

S.No	Name of the Faculty	Designation	Name of the College	Mail ID
1	Dr.L.Tamilselvi	Professor	AVIT	ltamilselvi@avit.ac.in
2	Ms.M.Usha	Assistant Professor	VMKVEC	usha@vmkvec.edu.in

17MABS24	STATISTICAL FOUNDATIONS							Category	L	T	P	Credit			
								BS	2	2	0	3			
PREAMBLE Probability is essential to science and life more generally. Starting from basic probability, the course proceeds to a thorough study of models for stochastic processes which are relevant in processing of random signals. Queueing theory is the mathematical study of waiting lines and it's a primary tool for studying the problem of congestion.															
PREREQUISITE: ENGINEERING MATHEMATICS															
COURSE OBJECTIVES															
1	To be thorough with probability concepts and random variables.														
2	To be familiar with different statistical distributions and the typical phenomena that each distribution often describes.														
3	To acquire skills in handling situations involving more than one random variable and functions of random variables.														
4	To be get exposed to the concepts of random processes and discrete time Markov chain.														
5	To study queueing models to analyze the real world systems.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Understand the concepts of random variable and probabilities associated with the distributions of random variables.													Understand		
CO2. Classify the random variables to determine the appropriate distributions.													Apply		
CO3. Apply the concepts of random variables and distributions to establish the distribution of linear combinations of independent random variables.													Apply		
CO4. Classify and apply the concepts of probability, Random Process and their applications in Probabilistic systems.													Analyze		
CO5. Derive and analyze the single and multiserver queueing system.													Analyze		
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	S	M	M	M	--	--	--	--	--	--	M	S	M	M
CO2	S	S	M	M	M	--	--	--	--	--	--	M	S	M	M
CO3	S	S	M	M	M	--	--	--	--	--	--	M	S	M	M
CO4	S	S	M	M	M	--	--	--	--	--	--	M	S	M	M
CO5	S	S	M	M	M	--	--	--	--	--	--	M	S	S	S
S- Strong; M-Medium; L-Low															
SYLLABUS															
PROBABILITY AND RANDOM VARIABLES: Probability concepts, Random variables, moments, Moment Generating function and their properties.															

STANDARD DISTRIBUTIONS: Binomial, Poisson, Geometric, Uniform, Exponential, Gamma, Weibull distributions, Functions of random variable, Chebychev inequality.

TWO-DIMENSIONAL RANDOM VARIABLES: Marginal and conditional distributions, Covariance, Correlation and regression, Transformation of random variables, Central limit theorem.

RANDOM PROCESSES, MARKOV CHAIN: Classification, Stationary process, Markov process, Binominal process, Poisson process, Birth and death process, Renewal process, Markov chain, Transition probabilities, Limiting distributions.

QUEUEING THEORY: Markovian queueing models, Little's formula, M/M/1, M/M/C – finite and infinite capacity.

TEXT BOOKS:

1. Dr.A.Singaravelu, “Probability and Queuing Theory”, Meenakshi Agency, Chennai,2012.
2. Kapur.J.N. and Saxena.H.C. “Mathematical Statistics”, S.Chand & Company Ltd. New Delhi,1997.

REFERENCES:

1. T.Veerarajan, “Probability, Statistics and Random processes” (Third Edition), Tata McGraw-Hill publishing Company Ltd., New Delhi,2008.
2. P.Kandasamy, K.Thilagavathy, K.Gunavathy “Probability, Random Variables and Random Processes” S.Chand &Company Ltd., New Delhi, 2008.
3. Allen.A.O, “Probability Statistics and Queuing theory with Computer science applications”, Academic Press, 2nd edition,1990.
4. S.C.Gupta and V.K.Kapoor, Fundamentas of Mathematical Statistics”, 11th extensively revised edition, S.Chand & Sons,2007.

COURSE DESIGNERS

S.No	Name of the Faculty	Designation	Name of the College	Mail ID
1	Ms.M.USHA	Assistant professor	VMKVEC	usha@vmkvec.edu.in
2	Dr.A.K.Thamizhsudar	Asso.Prof. grade II	AVIT	thamizhsudar@avit.ac.in

17PCBS02	PHYSICAL SCIENCES PART A - ENGINEERING PHYSICS							Category	L	T	P	Credit			
								BS	2	0	0	2			
PREAMBLE Engineering Physics is the study of advanced physics concepts and their applications in various technological and engineering domains. Understanding the concepts of laser, types of lasers, thepropagation of light through fibers, applications of optical fibers in communication and different types of non-destructive techniques will help an engineer to analyze, design and to fabricate various conceptual based devices.															
PREREQUISITE: NIL															
COURSE OBJECTIVES															
1	To recall the properties of laser and to explain principles of laser														
2	To assess the applications of laser														
3	To detail the principles of fiber optics														
4	To study the applications of fiber optics														
5	To explain various techniques used in Non-destructive testing														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Understand the principles laser, fiber optics and non-destructive testing											Understand				
CO2. Understand the construction of laser, fiber optic and Non-Destructive testing equipments											Understand				
CO3. Demonstrate the working of laser, fiber optic and Non-Destructive testing based components and devices											Apply				
CO4. Interpret the potential applications of laser, fiber optics and Non-Destructive testing in various fields.											Apply				
CO5. Differentiate the working modes of various types of laser, fiber optic and Non-Destructive testing baseddevices.											Analyze				
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	P O 1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S		M									M	M		
CO2	S		L									M			
CO3	S			M			M					M	M		
CO4	S	M		M	M	S	M					M	M		
CO5	S	M	M									M			
S- Strong; M-Medium; L-Low															

SYLLABUS

UNIT-I

LASERS: Laser characteristics - Stimulated Emission – Population Inversion - Einstein coefficients – Lasing action – Types of Laser – Nd:YAG laser, CO₂ laser, GaAs laser – Applications of Laser – Holography – construction and reconstruction of a hologram

UNIT-II

FIBRE OPTICS: Principle and propagation of light in optical fibers – numerical aperture and acceptance angle – types of optical fibers (material, refractive index, mode) – Applications: Fiber optic communication system – fiber optic displacement sensor and pressure sensor.

UNIT-III

NON-DESTRUCTIVE TESTING: Introduction – Types of NDT - Liquid penetrant method – characteristics of penetrant and developer - ultrasonic flaw detector – X-ray Radiography: displacement method – X-ray Fluoroscopy.

TEXT BOOK

1. Engineering Physics, compiled by Department of Physics, Vinayaka Mission's Research Foundation (Deemed to be University), Salem.
2. P.K. Palanisamy, Engineering Physics, Scientific Publishers, 2011.
3. Dr.M. N. Avadhanulu, Engineering Physics, S.Chand & Co, 2010.

REFERENCE BOOKS

1. Beiser, Arthur, Concepts of Modern Physics, 5th Ed., McGraw-Hill, 2009.
2. Halliday.D, Resnick.R, Walker.J, Fundamentals of Physics, Wiley & sons, 2013.
3. Gaur R. K. and Gupta S. L., Engineering Physics, DhanpatRai publishers, New Delhi, 2001.
4. Avadhanulu.M.N., Arun Murthy.T.V.S, Engineering Physics Vol. I, S.Chand, 2014.
5. Rajendran. V, Engineering Physics, Tata McGraw Hill Publication and Co., New Delhi, 2009.
6. Baldev Raj et al. Practical Non-Destructive Testing, Narosa Publications, 2017.

COURSE DESIGNERS

S.No.	Name of the Faculty	Designation	Department	Mail ID
1	Dr. C. SENTHIL KUMAR	PROFESSOR	PHYSICS	senthilkumarc@vmkvec.edu.in
2	Dr. R. SETHUPATHI	ASSOCIATE PROFESSOR	PHYSICS	sethupathi@vmkvec.edu.in
3	Dr. G. SURESH	ASSOCIATE PROFESSOR	PHYSICS	suresh.physics@avit.ac.in
4	Dr. B.DHANALAKSHMI	ASSOCIATE PROFESSOR	PHYSICS	ghanalakshmi.phy@avit.ac.in

17PCBS02	PHYSICAL SCIENCES PART B -ENGINEERING CHEMISTRY Semester I (Common to All Branches)	Category	L	T	P	C
		BS	2	0	0	2

Preamble

Objective of this course is to present a better understanding of basic concepts of chemistry and its applications on different engineering domains. It also imparts knowledge on fundamentals of Electrochemistry, Energy storage technologies, properties of water and its treatment methods, classification of fuels, Non conventional sources of Energy and various advanced Engineering materials.

Prerequisite

NIL

Course Objectives

1	To impart basic knowledge in Chemistry so that the student will understand the engineering concept
2	To familiar with electrochemistry and Battery and fuel Cells
3	To lay foundation for practical applications of water softening methods and its treatment methods in engineering aspects.
4	To inculcate the knowledge of fuels and advanced material.

Course Outcomes

After the successful completion of the course, learner will be able to

CO1.	Describe the electrochemistry, batteries and working principle of energy storage devices	Understand
CO2.	Estimate the hardness of water	Apply
CO3.	Identify suitable water treatment methods	Analyze
CO4.	Outline the important features of fuels and advanced materials	Analyze

Mapping with Programme Outcomes and Programme Specific Outcomes

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1.	S	M	-	M	-	S	S	S	-	-	L	M	M	-	M
CO2.	S	S	M	-	-	M	M	M	-	-	-	M	-	-	-
CO3.	S	S	M	-	-	M	S	M	-	-	-	M	-	-	-
CO4.	S	-	-	-	L	L	M	L	-	-	-	S	M	-	M

S- Strong; M-Medium; L-Low

SYLLABUS

Electrochemistry, Batteries and Fuel cells

Electrode potential - Nernst equation – Electrodes (SHE, Calomel and Glass) - cells - EMF measurement.

Primary battery (Daniel and dry cell) – secondary battery (lead Acid storage battery and Nickel-Cadmium battery) – Fuel cell (H_2 - O_2 fuel cell)

Water Technology and Corrosion

Sources of water – impurities – Hardness and its determination (problems to be avoided) – boiler troubles – water softening (Zeolite & Demineralisation) – Domestic water treatment – Desalination (Electrodialysis & Reverse Osmosis).

Fuels And Chemistry of Advanced Materials

Classification of Fuels (Solid, Liquid, Gaseous, Nuclear and Bio fuels) – Calorific Value of a fuel –Non Petroleum Fuels –Non conventional sources of Energy – combustion.

Basics and Applications:-Organic electronic material, shape memory alloys, polymers (PVC, Teflon, Bakelite)

TEXT BOOKS

1. Engineering Chemistry by prepared by Vinayaka Mission's Research Foundation, Salem.

REFERENCEBOOKS

1. A text book of Engineering Chemistry by S.S. Dara, S.Chand & company Ltd., New Delhi
2. Engineering Chemistry by Jain & Jain, 15th edition Dhanpatrai Publishing Company (P) Ltd., NewDelhi
3. A text book of Engineering Chemistry by Shashi Chawla, Edition 2012 Dhanpatrai & Co., NewDelhi.
4. Engineering Chemistry by Dr. A. Ravikrishnan, Sri Krishna Publications, Chennai.

CourseDesigners:

S. No	Name of the Faculty	Designation	Department	Mail ID
1.	Dr. V. Anbazhagan	Professor	Chemistry	anbu80@gmail.com
2.	Mr. A. Gilbert Sunderraj	Assistant Professor	Chemistry	asmgill80@gmail.com
3.	Dr. R. Nagalakshmi	Professor	Chemistry	nagalakshmi.chemistry@avit.ac.in
4.	Dr.K.Sanghamitra	Associate Professor	Chemistry	sanghamitra.chemistry@avit.ac.in

17PHBS05	SMART MATERIALS						Category	L	T	P	Credit				
							BS	3	0	0	3				
PREAMBLE Smart Materials gives an outlook about various types of materials having potential application in Engineering and Technology. In particular, Students learn about Smart Materials and their applications, Properties of Crystalline Materials & Nanomaterials, Characteristics of Magnetic materials. They also get a clear picture about superconducting materials.															
PREREQUISITE: NIL															
COURSE OBJECTIVES															
1	To explain the fundamental properties and classification of smart materials, crystalline materials, Nano materials, Magnetic materials and Super conducting materials.														
2	To paraphrase the basic crystalline structure and its properties.														
3	To illustrate the synthesis and fabrication of Nano materials.														
4	To predict the application of smart materials, crystalline materials, Nano materials, Magnetic materials and Super conducting materials.														
5	To analyze the various parameters of crystalline materials.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Restate the properties of various materials.											Understand				
CO2. Summarize the various structures of materials.											Understand				
CO3. Predict the applications of various materials to designing equipments.											Apply				
CO4. Illustrate the properties of materials to designing equipments.											Apply				
CO5. Calculate the crystalline parameters of the materials.											Analyze				
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	S	S	M	S				M			S			
CO2	S	M	S	M	S				M			M			
CO3	S	S	S	S	S				S			M	S	M	M
CO4	S	M	S	M	S				M			M	S	M	M
CO5	M	S	S	M	M				S			M			
S- Strong; M-Medium; L-Low															
SYLLABUS															
SMART MATERIALS: Shape Memory Alloys (SMA) – Characteristics and properties of SMA, Application, advantages and disadvantages of SMA. Metallic glasses – Preparation, properties and applications.															
CRYSTALLINE MATERIALS: Unit cell – Bravais lattice – Miller indices – Calculation of number of atoms per unit cell – atomic radius – coordination number – packing factor for SC, BCC, FCC, HCP structures.															
NANO MATERIALS: Nanophase materials – Top-down approach - Mechanical Grinding - Lithography - Bottom-up															

approach – Sol-gel method – Carbon nanotubes – Fabrication – applications.

MAGNETIC MATERIALS: Basic concepts – Classification of magnetic materials – Domain theory – Hysteresis – Soft and Hard magnetic materials.

SUPERCONDUCTING MATERIALS: Superconducting phenomena – properties of superconductors – Meissner effect – isotope effect – Type I and Type II superconductors – High T_c Superconductors – Applications of superconductors.

TEXT BOOK:

Mani P, Engineering Physics II, Dhanam Publications, 2018.

REFERENCES:

1. Pillai S.O., Solid State Physics, New Age International (P) Ltd., publishers, 2018.

2. Senthilkumar G. Engineering Physics II. VRB Publishers, 2018.

COURSE DESIGNERS

S.No.	Name of the Faculty	Designation	Department	Mail ID
1	Dr. S. MOHAMMED HARSHULKHAN	Asst.Prof	Physics	harshulkhan@vmkvec.edu.in
2	Mr. R. SAKTHI GANAPATHY	Asst.Prof	Physics	sakthiganapthy@vmkvec.edu.in
3	Dr .G. LATHA	Professor	Physics	latha.physics@avit.ac.in
4	Dr. R. N. VISWANATH	Professor	Physics	viswanath.physics@avit.ac.in

17PCBS81	PHYSICAL SCIENCES LAB: PART A – REAL AND VIRTUAL LAB IN PHYSICS	Category	L	T	P	Credit
		BS	0	0	2	1

PREAMBLE

In this laboratory, experiments are based on the calculation of physical parameters like young's modulus, rigidity modulus, viscosity of water, wavelength of spectral lines, thermal conductivity and band gap. Some of the experiments involve the determination of the dimension of objects like the size of a microparticle and thickness of a thin wire. In addition to the above real lab experiments, students gain hands-on experience in virtual laboratory.

PREREQUISITE: NIL

COURSE OBJECTIVES

1	To impart basic skills in taking reading with precision of physics experiments
2	To inculcate the habit of handling equipments appropriately
3	To gain the knowledge of practicing experiments through virtual laboratory.
4	To know the importance of units
5	To obtain results with accuracy

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO1. Recognize the importance of units while performing the experiments, calculating the physical parameters and obtaining results	Understand
CO2. Operate the equipments with precision	Apply
CO3. Practice to handle the equipments in a systematic manner	Apply
CO4. Demonstrate the experiments through virtual laboratory	Apply
CO5. Calculate the result with accuracy	Analyze

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	S													
CO2	S	S	M	M	S				M			M	M		
CO3	S														
CO4	S	S	M	M	S							S	M		
CO5	S	S													

S- Strong; M-Medium; L-Low

SYLLABUS

1. Young's modulus of a bar - Non-uniform bending
2. Rigidity modulus of a wire - Torsional Pendulum
3. Viscosity of a liquid - Poiseuille's method
4. Velocity of ultrasonic waves in liquids - Ultrasonic Interferometer
5. Particle size determination using Laser
6. Wavelength of spectral lines – grating – Spectrometer
7. Thickness of a wire - Air wedge Method
8. Thermal conductivity of a bad conductor - Lee's disc

9. Band gap determination of a thermistor - Post Office Box
10. Specific resistance of a wire –Potentiometer

LAB MANUAL

Physical Sciences Lab: Part A – Real And Virtual Lab In Physics Manual compiled by Department of Physics, Vinayaka Missions Research Foundation (Deemed to be University), Salem.

COURSE DESIGNERS

S.No.	Name of the Faculty	Designation	Department	Mail ID
1	Dr. C. SENTHIL KUMAR	PROFESSOR	PHYSICS	senthilkumarc@vmkvec.edu.in
2	Dr. R. SETHUPATHI	ASSOCIATE PROFESSOR	PHYSICS	sethupathi@vmkvec.edu.in
3	Dr. G. SURESH	ASSOCIATE PROFESSOR	PHYSICS	suresh.physics@avit.ac.in
4	Dr. B.DHANALAKSHMI	ASSOCIATE PROFESSOR	PHYSICS	dhanalakshmi.phy@avit.ac.in

17PCBS81	PHYSICAL SCIENCES PART B - ENGINEERING CHEMISTRY LAB Semester I (Common to All Branches)	Category	L	T	P	C
		BS	0	0	2	1

Preamble

The main objective of this course is to develop the intellectual and psychomotor skills of the students by imparting knowledge in water technology and quantitative analysis.

Prerequisite

NIL

Course Objectives

1	To impart basic skills in Chemistry so that the student will understand the engineering concept.
2	To inculcate the knowledge of water and electrochemistry.
3	To lay foundation for practical applications of chemistry in engineering aspects.

Course Outcomes

After the successful completion of the course, learner will be able to

CO1.	Estimate the chemical properties of water	Apply
CO2.	Determine the presence of various elements in the water	Analyze
CO3.	Calculate the strength of acids, oxidizing and reducing agents	Analyze

Mapping with Programme Outcomes and Programme Specific Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1.	S	M	M	-	L	M	M	S	-	-	-	M	-	M	M
CO2.	S	M	M	-	L	M	M	L	-	-	-	M	M	M	M
CO3.	S	S	M	-	L	M	M	M	-	-	-	M	-	M	M

S- Strong; M-Medium; L-Low

SYLLABUS

1. Determination of Hardness by EDTA method
2. Estimation of Hydrochloric acid by conductometric method
3. Acid Base titration by pH method
4. Estimation of Ferrous ion by Potentiometric method
5. Determination of Dissolved oxygen by Winkler's method
6. Estimation of Sodium by Flame photometer
7. Estimation of Copper from Copper Ore Solution
8. Estimation of Iron by Spectrophotometer

TEXTBOOKS

1. Laboratory Manual on Engineering Chemistry prepared by Vinayaka Mission's Research Foundation, Salem.

REFERENCE BOOKS

1. Laboratory Manual on Engineering Chemistry, K. Bhasin S, Dhanpat Rai Publishing Co Pvt Ltd

Course Designers:

S. No	Name of the Faculty	Designation	Department	Mail ID
1.	Dr. V. Anbazhagan	Professor	Chemistry	anbu80@gmail.com
2.	Mr. A. Gilbert Sunderraj	Assistant Professor	Chemistry	asmgill80@gmail.com
3.	Dr. R. Nagalakshmi	Professor	Chemistry	nagalakshmi.chemistry@avit.ac.in
4.	Dr.K.Sanghamitra	Associate Professor	Chemistry	sanghamitra.chemistry@avit.ac.in

17EES03	BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING A. BASIC ELECTRICAL ENGINEERING										Category	L	T	P	Credit
											ES	2	0	0	2
PREAMBLE It is a preliminary course which highlights the basic concepts and outline of Electrical engineering. The concepts discussed herein are projected to deliver explanation on basic electrical engineering for beginners of all engineering graduates.															
PREREQUISITE – NIL															
COURSE OBJECTIVES															
1	To understand the electrical inventions, basic concepts of AC and DC circuits and basic laws of electrical engineering.														
2	To gain knowledge about the working principle, construction, application of DC and AC machines and measuring instruments.														
3	To understand the fundamentals of safety procedures, Earthing and Power system.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1: Explain the evolution of electricity, name of the inventors, electrical quantities and basic laws of electrical engineering.												Remember			
CO2: Demonstrate Ohm’s and Faraday’s Law.												Apply			
CO3: Understand the basic concepts of measuring instruments, electrical machineries and its applications.												Understand			
CO4: Analyze the various types of electrical loads, power rating of electrical machineries and energy efficient equipment.												Analyze			
CO5: Explain the electrical safety and protective devices.												Understand			
CO6: Compare the various types electrical power generation systems by application of conventional and non-conventional sources.												Analyze			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	L	--	S	--	--	--	--	--	--	L	L	L	--
CO2	S	M	S	S	--	--	--	--	M	-	--	M	L	M	L
CO3	L	S	L	--	S	--	--	--	--	L	--	L	L	L	--
CO4	S	M	S	L	L	S	S	--	--	S	--	L	L	M	L
CO5	L	M	S	M	--	S	M	M	--	S	--	L	L	L	--
CO6	S	L	S	L	M	S	S	--	--	M	--	L	L	L	L
S- Strong; M-Medium; L-Low															

SYLLABUS

HISTORY OF ELECTRICITY, QUANTITIES AND CIRCUITS

Evolution of Electricity and Electrical inventions, Electrical quantities- Charge, Electric potential, voltage, current– DC & AC, power, energy, time period, frequency, phase, flux, flux density, RMS, Average, Peak, phasor & vector diagram. Electric Circuits - Passive components (RLC), Ohm's law, KCL, KVL, Faraday's law, Lenz's law. Electrical materials – Conducting and insulating materials.

MEASURING INSTRUMENT AND ENERGY CALCULATION

Measuring Instruments – Analog and Digital meters – Types and usage. AC and DC Machines & Equipment- Types, Specifications and applications.

Loads – Types of Loads- Power rating and Energy calculation – for a domestic load. Energy Efficient equipments – star ratings.

ELECTRICAL SAFETY AND INTRODUCTION TO POWER SYSTEM

Protection & Safety - Hazards of electricity - shock, burns, arc-blast, Thermal Radiation, explosions, fires, effects of electricity on the human body. Electrical safety practices, Protection devices.

Electric Power- Generation resources, Transmission types & Distribution system (levels of voltage, power ratings and statistics)- Simple layout of generation, transmission and distribution of power.

TEXT BOOKS:

1. Metha.V.K,RohitMetha,“BasicElectricalEngineering”,FifthEdition,Chand.S&Co,2012.
2. Kothari.D.PandNagrath.I.J,“BasicElectricalEngineering”,SecondEdition,TataMcGraw-Hill,2009.
3. R.K.Rajput , “Basic Electrical and Electronics Engineering”, Second Edition, Laxmi Publication,2012.
4. P. Selvam, R. Devarajan, A.Nagappan, T. Muthumanickam and T. Sheela“Basic Electrical and Electronics Engineering”, First Edition, VMRFDU, Anuradha Agencies,2017

REFERENCE BOOKS:

1. SmarajitGhosh, “Fundamentals of Electrical & Electronics Engineering”, Second Edition, PHI Learning, 2007.

COURSE DESIGNERS

S.No.	Name of the Faculty	Designation	Department	Mail ID
1	Dr. R. Devarajan	Professor	EEE/VMKVEC	devarajan@vmkvec.edu.in
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4	Mr. S. Prakash	Assistant Professor (Gr-II)	EEE/AVIT	sprakash@avit.ac.in

17EEES03	BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING B. BASIC ELECTRONICS ENGINEERING							Category	L	T	P	Credit			
								ES	2	0	0	2			
PREAMBLE The course aims to impart fundamental knowledge on electronics components, digital logics and communication engineering concepts. The course begins with classification of various active and passive components, diodes and transistors. It enables the student to design small digital logics like multiplexer, demultiplexer, encoder, decoder circuits, etc. It crafts the students to get expertise in modern communication systems.															
PRERQUISITE – NIL															
COURSE OBJECTIVES															
1	To learn and identify various active and passive components and their working principles.														
2	To understand the number conversion systems.														
3	To learn the digital logic principles and realize adders, multiplexer, etc.,														
4	To understand the application oriented concepts in the communication systems.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Interpret working principle and application of various active and passive electronic components like resistors, capacitors, inductors, diodes and transistors.												Understand			
CO2. Construct the rectifiers and regulators circuits and explore their operations.												Apply			
CO3. Execute number system conversions and compute several digital logic operations.												Apply			
CO4. Design adders, Multiplexer, De-Multiplexer, Encoder, Decoder circuits.												Apply			
CO5. Apply the modern technologies in developing application oriented gadgets like the UHD, OLED, HDR.												Apply			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	M	--	--	--	--	--	--	M	--	--	--	S	-	-
CO2	S	M	M	M	--	--	M	--	M	--	--	M	-	-	-
CO3	S	M	M	--	--	--	--	--	M	--	--	--	-	M	-
CO4	S	M	M	M	--	--	M	--	M	--	--	M	-	-	-
CO5	S	M	--	--	M	--	M	--	M	M	--	M	M	-	M
S- Strong; M-Medium; L-Low															
SYLLABUS															
SEMICONDUCTOR DEVICES Passive and Active Components - Resistors, Inductors, Capacitors, Characteristics of PN Junction Diode - Zener Diode and its Characteristics - Half wave and Full wave Rectifiers - Voltage Regulation. Bipolar Junction Transistor, JFET, MOSFET & UJT.															

DIGITAL FUNDAMENTALS

Number Systems – Binary, Octal, Decimal and Hexa-Decimal – Conversion from one to another – Logic Gates – AND, OR, NOT, XOR, Universal Gates – Adders, Multiplexer, De Multiplexer, Encoder, Decoder – Memories

COMMUNICATION AND ADVANCED GADGETS

Modulation and Demodulation – AM, FM, PM – RADAR – Satellite Communication – Mobile Communication, LED, HD, UHD, OLED, HDR & Beyond, Smart Phones – Block diagrams Only.

TEXT BOOKS:

1. R.K. Rajput, "Basic Electrical and Electronics Engineering", Laxmi Publications, Second Edition, 2012.
2. Dr.P.Selvam, Dr.R.Devarajan, Dr.A.Nagappan, Dr.T.Muthumanickam and Dr.T.Sheela, "Basic Electrical and Electronics Engineering", Department of EEE & ECE, Faculty of Engineering & Technology, VMRFDU, Anuradha Agencies, 2018.
3. Edward Hughes, "Electrical and Electronics Technology", Pearson Education Limited, Ninth Edition, 2005.

REFERENCES:

1. John Kennedy, "Electronics Communication System", Tata McGraw Hill, 2003.

COURSE DESIGNERS

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1	Dr.T.Sheela	Associate Professor	ECE	sheela@vmkvec.edu.in
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3	Mr.R.Karthikeyan	Assistant Professor (Gr-II)	ECE	rrmdkarthikeyan@avit.ac.in
4	Ms.R.Mohana Priya	Assistant Professor (Gr-II)	ECE	mohanapriya@avit.ac.in

17CMES02	BASIC CIVIL ENGINEERING(Common to CIVIL, MECHANICAL, CSE, ECE, EEE, S&AE & MECT)	Category	L	T	P	Credit
		ES	2	0	0	2

Preamble

The aim of the subject is to provide a fundamental knowledge of basic Civil Engineering

Prerequisite

Nil

CourseObjectives

1.To understand the basic concepts of surveying and construction materials.
2. To impart basic knowledge about building components.

CourseOutcomes

On the successful completion of the course, students will be able to

CO1. An ability to apply knowledge of mathematics, science, and engineering.	Apply
Co2. An ability to design and conduct experiments, as well as to analyze and interpret data .	Apply

Mapping with Programme Outcomes and Programme SpecificOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	L	-	M	S	-	-	-	-	-	-	-	-	-
CO2	S	M	L	S	M	S	-	-	-	-	-	-	-	-	-

S- Strong; M-Medium; L-Low

Syllabus

UNIT - I	SURVEYING AND CIVIL ENGINEERING MATERIALS	15 - hours
<p>Surveying: Objects – types – classification – principles – measurements of distances – angles – levelling – determination of areas – illustrative examples.</p> <p>Civil Engineering Materials: Bricks – stones – sand – cement – concrete – steel sections.</p>		
UNIT - II	BUILDING COMPONENTS AND STRUCTURES	15 - hours
<p>Foundations: Types, Bearing capacity – Requirement of good foundations.</p> <p>Superstructure: Brick masonry – stone masonry – beams – columns – lintels – roofing – flooring – plastering – Mechanics – Internal and external forces – stress – strain – elasticity – Types of Bridges and Dams – Basics of Interior Design and Landscaping.</p>		

TextBooks

- 1.“Basic Civil and Mechanical Engineering”, VMU, (2017). Company Ltd., New Delhi,2009

ReferenceBooks

1. Ramamrutham S., “Basic Civil Engineering”, Dhanpatrai Publishing Co. (P) Ltd.,2009.
2. Seetharaman S., “Basic Civil Engineering”, AnuradhaAgencies.

Course Designers:

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17CSES01	ESSENTIALS OF COMPUTING								Category	L	T	P	Credit		
									ES	3	0	0	3		
PREAMBLE This course aims to provide the fundamental concepts of Computer operations like hardware and software installation, and emphasizing principles application packages. Studying the fundamentals concepts of Algorithms, to resolve the real world application.															
PRERQUISITE – NIL															
COURSE OBJECTIVES															
1	To provide basic knowledge of hardware and software components of computers.														
2	To introduce and demonstrate various software application packages.														
3	To study Problem solving Techniques and program development cycle.														
4	To learn about various algorithm and identifying the algorithm efficiency.														
5	To learn different algorithm for various application.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. To understand the Basic knowledge on hardware and software terminologies.												Understand			
CO2. To Demonstrate the various Application Packages like MS-word, MS- Excel etc.												Apply			
CO3.To Understand Program Devolvement Cycle and apply various Problem Solving Techniques.												Apply			
CO4.To analyze the efficiency of Algorithms.												Analyze			
CO5.To Implement of Algorithms for various concepts.												Apply			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	-	-	-	-	-	-	-	-	-	-	-	S	M	-
CO2	S	M	M	-	M	-	-	-	-	-	-	M	S	M	M
CO3	S	S	S	-	M	-	-	-	-	-	-	-	S	-	M
CO4	S	S	S	-	S	-	-	-	-	-	-	-	S	M	M
CO5	S	M	M	-	M	-	-	-	-	-	-	S	S	M	M
S- Strong; M-Medium; L-Low															

SYLLABUS

BASICS OF COMPUTER AND INFORMATION TECHNOLOGY: Computer – Generations, Types of Computers, Block diagram of a computer – Components of a computer system –Hardware and software definitions – Categories of software – Booting – Installing and Uninstalling a Software –Software piracy – Software terminologies – Applications of Computer – Role of Information Technology – History of Internet – Internet Services.

SOFTWARE APPLICATIONS: Office Automation: Application Packages – Word processing (MS Word) – Spread sheet (MS Excel) – Presentation (MS PowerPoint).

PROBLEM SOLVING METHODOLOGIES: Problems Solving Techniques - Program Development Cycle – Algorithm Development – Flow chart generation –Programming Constructs (Sequential, Decision-Making, Iteration) – Types and generation of programming Languages.

INTRODUCTION TO ALGORITHMS: Implementation of Algorithms – program verification – The efficiency of algorithms – The analysis of algorithms.

IMPLEMENTATION OF ALGORITHMS: Fundamental Algorithms: Introduction – Exchanging the values of two variables – Counting – Summation of a set of Numbers – factorial computation – Generation of the Fibonacci sequence – Reversing the digits of an integer.

TEXT BOOKS:

1. “Essentials of Computer Science and Engineering”, Department of Computer Sciences, VMKVEC, Salem, Anuradha Publishers,2017.
2. Dromey.R.G, “How to Solve it by Computer”, Prentice-Hall of India,1996.

REFERENCES:

1. Aho.A.V., Hopcroft.J.E and Ullman.J.D, “The Design and Analysis of Computer Algorithms”, Pearson Education, 2004.
2. Knuth D.E., “The Art of computer programming Vol 1: Fundamental Algorithms”, 3rd Edition, Addison Wesley,1997.

COURSE DESIGNERS

S. No.	Name of the Faculty	Designation	Department	Mail ID
1	K.Karthik	Assistant Professor	CSE	karthik@avit.ac.in
2	Mrs.T.Geetha	Assistant Professor	CSE	geetha@vmkvec.edu.in

17CSES05	PROGRAMMING IN PYTHON					CATEGORY	L	T	P	CREDIT					
						ES	3	0	4	3					
PREAMBLE The purpose of this course is to introduce Python, a remarkably powerful dynamic programming language to write code for different operating systems along with application domain. Python has evolved on more popular and powerful open source programming tool															
PRERQUISITE NIL															
COURSE OBJECTIVES															
1	To provide basic knowledge on Python programming concepts.														
2	To introduce different methods in list, string, tuple, dictionary and sets.														
3	To compute different programs using python control statements.														
4	To learn about different functions in python.														
5	To compute the exception handling functions, file concepts and CSV and JSON.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Learn python statements, comments and indentation, tokens, input and output methods using various example programs.								Understand							
CO2. Apply the different methods involved in List, String, Tuples and Dictionary.								Apply							
CO3. Design solutions for complex programs using decision making and looping statements.								Apply.							
CO4. Apply the function programs with all the concepts like lambda, decorators and generators.								Apply.							
CO5. Compute the exception handling programs, file concept programs and understand the concepts of CSV and JSON.								Apply							
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	M	M	M	-	-	-	-	-	-	-	M	M	M
CO2	S	M	M	M	M	-	-	-	-	-	-	-	S	M	M
CO3	M	S	S	S	M	-	-	-	-	-	-	-	M	M	M
CO4	S	S	S	S	M	-	-	-	-	-	-	-	S	S	M
CO5	S	M	M	M	M	-	-	-	-	-	-	-	S	M	M
S- Strong; M-Medium; L-Low															

SYLLABUS

UNIT-1 INTRODUCTION

Introduction to python-Advantages of python programming-Tokens-Variables-Input/output methods-Data types-Operators

UNIT-2 DATA STRUCTURES

Strings-Lists-Tuples-Dictionaries-Sets

UNIT-3 CONTROL STATEMENTS

Flow Control-Selection control Structure-if-if-else-if-elif-else-Nested if iterative control structures-while loop, for loop and range.

UNIT-4 FUNCTIONS

Declaration-Types of Arguments-Fixed arguments, variable arguments, keyword arguments and keyword variable arguments-Recursions-Anonymous functions: lambda- Decorators and Generators.

UNIT-5 EXCEPTION HANDLING

Exception Handling-Regular Expression-Calendars and clock files:File input/output operations-Dictionary operations-Reading and writing in structured files:CSV and JSON.

TEXT BOOKS:

1. Bill Lubanovic, "Introducing Python Modern Computing in Simple Packages", 1st Edition, O'Reilly Media, 2014.
2. Programming With Python Book 'Himalaya Publishing House PvtLtd
3. "Dive Into Python"by MarkPilgrim

REFERENCES:

1. Mark Lutz, "Learning Python", 6th Edition, O'Reilly Media, 2014.
2. David Beazley, Brian K. Jones, "Python Cookbook", 3rd Edition, O'Reilly Media, 2015.
3. Mark Lutz, "Python Pocket Reference", 6th Edition, O'Reilly Media, 2015.

COURSE DESIGNERS

S.No	Name of the Faculty	Designation	Department	Mail ID
1	Mr. K.Karthik	Assistant Professor	CSE	karthik@avit.ac.in
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17CSES83	PROGRAMMING IN PYTHON LAB	Category	L	T	P	Credit
		ES	0	0	4	2

PREAMBLE

This laboratory enables the students clearly understand the basic concepts of python, control statements and file commands in python

PRERQUISITE : NIL

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO1 Learn Syntax and Semantics and create Functions in Python	Apply
CO2. Handle Strings and Files in Python.	Apply
CO3. Design solutions for complex programs using decision making and looping Statements	Apply
CO4. Understand Lists, Dictionaries in Python	Apply
CO5. Compute the exception handling programs	Analyze

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	L	-	-	-	-	-	-	-	-	-	S	M	M
CO2	S	M	L	-	-	-	-	-	-	-	-	-	S	M	-
CO3	S	M	L	-	-	-	-	-	-	-	-	-	S	M	M
CO4	S	M	L	-	-	-	-	-	-	-	-	-	S	M	-
CO5	S	S	M	-	-	-	-	-	-	-	-	-	S	M	M

S- Strong; M-Medium; L-Low

LIST OF EXPERIMENTS

1. Write a program to sum of series of N natural numbers
2. Write a program to calculate simple interest.
3. Write a program to generate Fibonacci series using for loop
4. Write a program to calculate factorial using while loop
5. Write a program to find the greatest of three numbers using if condition
6. Write a program for finding the roots of a given quadratic equation using conditional control statements
7. Write a program to find the greatest of three numbers using conditional operator
8. Write a program to compute matrix multiplication using the concept of arrays
9. Write a program to implement recursive function
10. Write a program to read and write data using file concepts

REFERENCES:

1. Mark Lutz, "Learning Python", 5th Edition, O'Reilly Media, 2013.
2. David Beazley, Brian K. Jones, "Python Cookbook", 3rd Edition, O'Reilly Media, 2013.
3. Mark Lutz, "Python Pocket Reference", 5th Edition, O'Reilly Media, 2014.

COURSE DESIGNERS

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1.	Mr. K.Karthik	Assistant Professor	CSE / AVIT	karthik@avit.ac.in
2.	Dr. K. Sasikala	Associate Professor	CSE / VMKVEC	sasikalak@vmkvec.edu.in

17EEES82	ENGINEERING SKILLS PRACTICE LAB A. BASIC ELECTRICAL ENGINEERING										Category	L	T	P	Credit	
											ES	0	0	2	1	
PREAMBLE																
It is a laboratory course which familiarizes the basic electrical wiring, measurement of electrical quantities and various types of earthing methods.																
PRERQUISITE – NIL																
COURSE OBJECTIVES																
1	To learn the residential wiring and various types of electrical wiring.															
2	To measure the various electrical quantities.															
3	To know the necessity and types of earthing and measurement of earth resistance.															
COURSE OUTCOMES																
On the successful completion of the course, students will be able to																
CO 1: Implement the various types of electrical wiring.												Apply				
CO 2: Measure the fundamental parameters of AC circuits.												Analyze				
CO 3: Measure the earth resistance of various electrical machineries.												Apply				
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES																
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	
CO1	S	M	L	--	S	--	--	--	--	--	--	L	L	M	L	
CO2	S	M	S	S	--	--	--	--	M	--	--	M	L	L	M	
CO3	L	S	L	--	S	--	--	--	--	L	--	L	--	--	--	
S- Strong; M-Medium; L-Low																
LIST OF EXPERIMENTS																
1. Residential house wiring using switches, fuse, indicator, lamp and energymeter.																
2. Fluorescent lampwiring.																
3. Stair casewiring.																
4. Measurement of electrical quantities – voltage, current, power &power factor in RLCcircuit.																
5. Measurement of energy using single phase energymeter.																
6. Measurement of resistance to earth of an electricalequipment.																
REFERENCES																
1. Laboratory Reference Manual.																
COURSE DESIGNERS																
S.No.	Name of the Faculty				Designation				Department				Mail ID			
1	Dr. R. Devarajan				Professor				EEE/VMKVEC				devarajan@vmkvec.edu.in			
2	Mr. R. Sathish				Assistant Professor				EEE/VMKVEC				sathish@vmkvec.edu.in			
3	Ms. D. Saranya				Assistant Professor (Gr-II)				EEE/AVIT				dsaranya@avit.ac.in			
4	Mr. S. Prakash				Assistant Professor (Gr-II)				EEE/AVIT				sprakash@avit.ac.in			

17CMES81	ENGINEERING SKILLS PRACTICES LAB PART B - BASIC ELECTRONICS ENGINEERING						Category	L	T	P	Credit				
							ES	0	0	2	1				
PREAMBLE This course is to provide a practical knowledge in Basic Electronics Engineering. It starts with familiarization of electronic components and electronic equipments. It enables the students to construct and test simple electronic projects.															
PRERQUISITE – NIL															
COURSE OBJECTIVES															
1	To familiarize the electronic components, basic electronic equipments and soldering techniques.														
2	To study the characteristics of Diodes, BJT and FET.														
3	To understand the principles of various digital logic gates.														
4	To understand the concept of basic modulation techniques.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Construct experiments for PN and Zener diode characteristics										Understand					
CO2. Demonstrate the fundamentals of soldering techniques.										Apply					
CO3. Classify the characteristics of Diodes, BJT and FET.										Apply					
CO4. Distinguish between amplitude and frequency modulation techniques.										Apply					
CO5. Verify the truth tables of logic gates (AND, OR, NOT, NAND, NOR, XOR).										Apply					
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	--	--	--	--	--	--	M	--	M	--	M	--	--
CO2	M	M	M	--	--	--	--	--	M	--	M	--	M	--	--
CO3	S	M	--	--	--	--	--	--	M	--	M	--	-	--	--
CO4	S	M	--	--	--	--	--	--	M	--	M	--	-	M	M
CO5	S	M	M	--	--	--	--	--	M	--	M	--	M	M	--
S- Strong; M-Medium; L-Low															
LIST OF EXPERIMENTS 1. Identifying ElectronicsComponents. 2. Practicing of Soldering andDesoldering. 3. Characteristics of PN junctionDiode. 4. Characteristics of Zenerdiode. 5. Input & Output characteristics ofBJT. 6. Transfer characteristics ofJFET.															

7. Verification of LogicGates. 8. Study of AmplitudeModulation. 9. Study of FrequencyModulation.				
COURSE DESIGNERS				
S.No	Name of the Faculty	Designation	Department	Mail ID
1	Dr.T.Sheela	Associate Professor	ECE	sheela@vmkvec.edu.in
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4	Ms.R.Mohana Priya	Assistant Professor (Gr-II)	ECE	mohanapriya@avit.ac.in

17CMES81	ENGINEERING SKILLS PRACTICE LAB PART A - BASIC CIVIL ENGINEERING
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Category	L	T	P	Credit
ES	0	0	2	1

Preamble

Engineering Skills Practice is a hands-on training practice to Mechanical, Civil and Mechatronics Engineering students. It deals with fitting, carpentry, sheet metal and related exercises. Also, it will induce the habit of selecting right tools, planning the job and its execution

Prerequisite

NIL

Course Objectives

1.To understand the basic concepts of surveying and construction materials.
2. To impart basic knowledge about building components.

Course Outcomes

On the successful completion of the course, students will be able to

CO1. Prepare the different types of fitting.	Apply
Co2. Prepare the different types of joints using wooden material	Apply

Mapping with Programme Outcomes and Programme Specific Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1.	S	L	L	L	L	L	L	L	L	L	L	L	-	-	-
CO2.	S	S	S	L	L	L	L	L	L	L	L	L	-	-	-

S- Strong; M-Medium; L-Low

Syllabus

LIST OF EXPERIMENTS:**Buildings:**

1. Study of plumbing and carpentry components of residential and industrial buildings, Safety aspects.

Plumbing Works:

2. Study of pipeline joints, its location and functions: valves, taps, couplings, unions, reducers, elbows in household fittings.
3. Study of pipe connections requirements for pumps and turbines.
4. Preparation of plumbing line sketches for water supply and sewage works.
5. Hands-on-exercise: Mixed pipe material connection – Pipe connections with different joining components.
6. Demonstration of plumbing requirements of high-rise buildings.

Carpentry using Power Tools only:

7. Study of the joints in roofs, doors, windows and furniture.
8. Hands-on-exercise: Wood work, joints by sawing, planing and cutting.

Text Books

1. “Laboratory Reference Manual

Course Designers:

S.No.	Name of the Faculty	E-Mail ID
1.	S.Supriya	jansupriyanair@gmail.com
2.	C.VAIDEVI	Vaidevi.c@avit.ac.in

17CMES81	ENGINEERING SKILLS PRACTICE LAB B. BASIC MECHANICAL ENGINEERING								Category	L	T	P	Credit		
									ES	0	0	2	1		
Preamble Workshop is a hands-on training practice to Mechanical Engineering students. It dealswith fitting, carpentry, foundry and welding related exercises. Also, it will induce the habit of selecting right tools, planning the job and its execution.															
Prerequisite –NIL															
Course Objective															
1	To perform the practice in different types of fitting processes.														
2	To utilize the different type of joints using wooden materials.														
3	To perform and acquire in depth knowledge in metal joining processes.														
4	To demonstrate the pattern using foundry processes.														
Course Outcomes: On the successful completion of the course, students will be able to															
CO1.	Identify the different types of fitting using MS plate.														Apply
CO2.	Predict the different types of joints using wooden material														Apply
CO3.	Utilize the different types of joining process in metal by Arc Welding														Apply
CO4.	Make use of different types of green sand mould														Apply
Mapping with Programme Outcomes and Programme Specific Outcomes															
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PS O3
CO1	S	M	L	L	L	-	-	-	-	-	-	-	L	-	-
CO2	S	M	L	L	L	-	-	-	-	-	-	-	L	-	-
CO3	S	M	L	L	L	-	-	-	-	-	-	-	L	-	-
CO4	S	M	L	L	L	-	-	-	-	-	-	-	L	-	-
S- Strong; M-Medium; L-Low															
Syllabus															
LIST OF EXPERIMENTS															
Tee – Fitting Vee – Fitting Preparation of a mould for a single piece pattern Preparation of a mould for a split piece pattern Half- Lap Joint in Carpentry Dove Tail Joint inCarpentry Lap Joint –Welding Butt Joint –Welding															
Text Books															
1	BASIC MECHANICAL ENGINEERING, LAB MANUAL														
Reference Books															
1	K.Venugopal, Basic Mechanical Engineering, Anuradha Publications, Chennai														
2	NR. Banapurmath, Basic Mechanical Engineering, Vikas Publications, Noida														
Course Designers															
S.No	Faculty Name		Designation		Department / Name of the College				Email id						
1	Dr. V. K. Krishnan		Associate Professor		Mech / VMKVEC				vkkrishnan@vmkvec.edu.in						
2	B.SELVA BABU		Assistant Professor		Mech/AVIT				selvababu@avit.ac.in						

17MEES84	ENGINEERING GRAPHICS (Theory & Practice)					Category	L	T	P	Credit					
						ES	1	0	4	3					
Preamble Engineering Graphics is referred as language of engineers. An engineer needs to understand the physical geometry of any object through its orthographic or pictorial projections. The knowledge on engineering graphics is essential in proposing new product through drawings and interpreting data from existing drawings. This course deals with orthographic and pictorial projections, sectional views and development of surfaces.															
Prerequisite – NIL															
Course Objective															
1	To implement the orthographic projections of points, straight lines, plane surfaces and solids.														
2	To construct the orthographic projections of sectioned solids and true shape of the sections.														
3	To develop lateral surfaces of the uncut and cut solids.														
4	To draw the pictorial projections (isometric and perspective) of simple solids.														
5	To sketch by free hand the orthographic views from the given pictorial view.														
Course Outcomes: On the successful completion of the course, students will be able to															
CO1.	To Interpret the physical geometry of any object through its orthographic or pictorial projections									UNDERSTAND					
CO2.	Apply in the form of drawing of the orthographic projections of points, straight lines, plane surfaces and solids.									Apply					
CO3.	To establish in the form of drawing of the orthographic projections of sectioned solids and true shape of the sections.									Apply					
CO4.	Develop lateral surfaces of the solid section and cut section of solids.									Apply					
CO5.	Sketch the pictorial projections (isometric and perspective) of simple solids.									Apply					
CO6.	To apply free hand sketch of the orthographic views from the given pictorial view.									Apply					
Mapping with Programme Outcomes and Programme Specific Outcomes															
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	S	L	S	L	-	-	-	-	-	-	-	L	-	
CO2	S	S	L	S	L	-	-	-	-	-	-	-	L	-	
CO3	S	S	L	S	L	-	-	-	-	-	-	-	L	-	
CO4	S	M	L	S	S	-	-	-	-	-	-	-	L	-	
CO5	S	S	L	S	L	-	-	-	-	-	-	-	L	-	
CO6	S	S	L	S	L	-	-	-	-	-	-	-	L	-	
S- Strong; M-Medium; L-Low															
Syllabus															
PLANE CURVES AND FREE HAND SKETCHING															
Conics – Construction of ellipse– First angle projection – layout views – Developing visualization skills through free hand sketching of multiple views from pictorial views of objects.															
PROJECTION OF POINTS, LINES															
Projection of points, Projection of straight lines located in the first quadrant: inclined to both planes – Determination of true lengths and true inclinations – rotating line method only.															
PROJECTION OF SOLIDS															
Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to any one reference plane by change of position method.															
SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES															
Sectioning of above solids in simple vertical position by cutting planes inclined to any one reference plane and perpendicular to the other – Obtaining true shape of section. Development of lateral surfaces of simple and truncated solids like Prisms, pyramids, cylinders and cones.															
ISOMETRIC VIEW AND PERSPECTIVE PROJECTION															

Principles of isometric View – isometric scale – isometric view of simple solids- Introduction to Perspective projection				
Text Books				
1	Natarajan K V, “Engineering Graphics”, Tata McGraw-Hill Publishing Company Ltd. New Delhi.			
2	K.Venugopal and V.Prabhu Raja, “Engineering Graphics”, New Age International Private Limited.			
3	K.R.Gopalakrishna“Engineering Drawing” (Vol. I & II), Subhas Publications, 2014.			
Reference Books				
1	N.D. Bhat and V.M. Panchal, Engineering Graphics, Charotar Publishers 2013			
2	E. Finkelstein, “AutoCAD 2007 Bible”, Wiley Publishing Inc., 2007			
3	R.K. Dhawan, “A text book of Engineering Drawing”, S. Chand Publishers, Delhi,2010.			
4	DhananjayA.Jolhe, “Engineering Drawing with an Introduction to AutoCAD”, Tata McGraw Hill Publishing Company Limited, 2008.			
5	G.S. Phull and H.S.Sandhu, “Engineering Graphics”, Wiley Publications, 2014.			
Course Designers				
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1	Prof. N.Rajan	Associate Professor	Mech / VMKVEC	rajan@vmkvec.edu.in
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17CSES06	PROGRAMMING IN C										Category	L	T	P	Credit
											ES	3	0	4	3
PREAMBLE This is a course offered in first semester for the students of Bio-Tech Engineering. This course has three credits dedicated to provide the students a strong foundation on programming concepts and its application. It also enables the students to solve problems using programmable logic.															
PREREQUISITE NIL															
COURSE OBJECTIVES															
1	To introduce Basics of C.														
2	To understand Control Structures & Arrays.														
3	To learn String concept, Structure and Union in C.														
4	To understand the concepts of Functions and Pointers.														
5	To understand Memory and File management concepts in C.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1: Understand the basics of C Data types, scope of variables, different types of Operators												Understand			
CO2: Apply the concept of Input/ Output functions, Decision making and Loop structures in C programming												Apply			
CO3: Demonstrate the C programs for string, arrays, union & structure.												Apply			
CO4: Develop C programs for functions and pointers												Apply			
CO5: Apply the file management concept to develop the C programs.												Apply			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	S	M	-	S	-	-	-	M	-	S	M	S	M	-
CO2	S	M	M	-	S	-	-	-	M	-	S	S	S	M	M
CO3	S	M	M	-	S	-	-	-	M	-	S	S	S	M	M
CO4	S	M	M	-	S	-	-	-	M	-	S	S	S	M	M
CO5	S	M	M	-	S	-	-	-	M	-	S	S	S	M	M
S- Strong; M-Medium; L-Low															

SYLLABUS

BASICS OF C

Identifiers, variables, expression, keywords, data types, constants, scope of variables. Operators: arithmetic, logical, relational, conditional and bitwise operators – Special operators: size of () & comma (,) operator – Precedence and associativity of operators – Type conversion in expressions.

CONTROL STRUCTURES

Basic input/output and library functions: Single character input/output i.e. getch(), getchar(), getche(), putchar() – Formatted input/output: printf() and scanf() – Library functions (mathematical and character functions). Decision Making and Branching – Looping statements.

ARRAYS, STRING, STRUCTURE & UNION

Arrays – Initialization – Declaration – One dimensional and two dimensional arrays. Strings: Declaration – Initialization and string handling functions. Structure and Union: structure declaration and definition – Accessing a Structure variable – Structure within a structure – Union.

FUNCTIONS AND POINTERS

Function – Function Declaration – function definition – Pass by value – Pass by reference – Recursive function – Pointers – Definition – Initialization

MEMORY AND FILE MANAGEMENT

Static and dynamic memory allocation – Storage class specifier – Preprocessor directives. File handling concepts – File read – write – Functions for file manipulation: fopen, fclose, gets, puts, fprintf, fscanf, getw, putw, fputs, fgets, fread, fwrite.

TEXT BOOKS

1. Balaguruswami. E, “Programming in C”, TMH Publications, 1997

REFERENCES

1. Behrouz A. Forouzan & Richard F. Gilberg, “Computer Science A Structured Programming using C”, Cengage Learning, 3rd Edition, 2007.
2. Gottfried, “Programming with C”, schaums outline series, TMH publications, 1997.
3. Mahapatra, “Thinking in C”, PHI publications, 2nd Edition, 1998.
4. Subbura. R, “Programming in C”, Vikas publishing, 1st Edition, 2000

COURSE DESIGNERS

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17CSES85	PROGRAMMING IN C LAB										Category	L	T	P	Credit
											ES	0	0	4	2
PREAMBLE															
This course is designed to complement the course Problem Solving using Computer. The purpose of this laboratory course is to give hands on training to the students in understanding and practicing the programming concepts and algorithms. This will improve the problem solving capability of the students.															
PREREQUISITE NIL															
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1 Write, compile, debug, link and execute C program for the given specification/application												Apply			
CO2. Design and implement algorithms involving decision structures, loops, arrays and pointers.												Apply			
CO3. Use different data structures for solving the given problem using computer												Apply			
CO4. Create/update data files.												Apply			
CO5. Analyze the implementation complexity of algorithm by modularizing the problem into small modules for the given problem												Analyze			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	-	-	-	S	-	-	-	M	-	-	M	S	M	S
CO2	S	M	M	M	S	-	-	-	S	-	M	M	S	S	M
CO3	S	M	M	M	S	-	-	-	S	-	M	M	S	S	M
CO4	S	M	M	M	S	-	-	-	S	-	M	M	S	M	M
CO5	S	S	M	M	S	-	-	-	S	-	M	M	S	M	M
S- Strong; M-Medium; L-Low															

LIST OF EXPERIMENTS

1. Basic programs to understand different types of data, operators and expressions.
2. Programs using control structures
 - i) Factorial of a number
 - ii) Fibonacci series
 - iii) Generating prime numbers
 - iv) Generating Armstrong numbers
 - v) Greatest common divisor
3. Programs using arrays
 - i) Merging of arrays
 - ii) Array order reversal
 - iii) Selection sort
 - iv) Bubble sort
 - v) Insertion sort
4. Programs using strings
 - i) Palindrome checking
 - ii) String sorting
 - iii) Linear pattern search
 - iv) Text line editing
5. Programs using functions
6. Programs using pointers
7. Programs using structures
8. Programs using file structure

COURSE DESIGNERS

S.No.	Name of the Faculty	Designation	Department	Mail ID
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17CSCC01	DATA STRUCTURES					CATEGORY	L	T	P	CREDIT					
						CC	3	0	4	3					
PREAMBLE This course aims at understanding the basic concepts in programming structures, linear structures and non linear structures															
PRERQUISITE NIL															
COURSE OBJECTIVES															
1.	To remember and understand the basic concepts in linear structures														
2.	To learn about tree structures.														
3.	To understand about balanced trees														
4.	To learn about hashing and sets.														
5.	To learn and understand about graphs														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Remember the basic concepts in linear structures										Understand					
CO2. Learn about tree structures and tree traversals										Apply					
CO3. Understand about balanced trees										Apply					
CO4. Learn about hashing and sets.										Apply					
CO5. Learn and understand about graphs										Apply					
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	M	-	-	-	-	-	-	-	-	M	S	S	S
CO2	S	M	M	M	M	-	-	-	-	-	-	M	S	S	S
CO3	S	M	L	M	M	-	-	-	-	-	-	M	S	S	M
CO4	S	M	M	M	M	-	-	-	-	-	-	L	S	S	M
CO5	S	M	L	M	M	-	-	-	-	-	-	M	S	S	M
S- Strong; M-Medium; L-Low															
SYLLABUS															
Linear Structures															
Abstract Data Types (ADT) – List ADT – array-based implementation – linked list implementation – cursor-based linked lists – doubly-linked lists – applications of lists –Stack ADT – Queue ADT – circular queue implementation – Applications of stacks and queues.															
Tree Structures															
Tree ADT – tree traversals – left child right sibling data structures for general trees and graphs.															
Balanced Trees															
AVL Trees – Splay Trees – B-Tree - heaps – binary heaps – applications of binary Heaps .															

Hashing and Set

Hashing – Separate chaining – open addressing – rehashing – extendible hashing -Disjoint Set ADT – dynamic equivalence problem – smart union algorithms – path compression – applications of Set.

Graphs

Definitions – Topological sort – breadth-first traversal - shortest-path algorithms –minimum spanning tree – Prim's and Kruskal's algorithms – Depth-first traversal – bi-connectivity – Euler circuits – applications of graphs.

TEXT BOOKS:

1. Mark A. Weiss, “Data Structures and Algorithm Analysis in C (2nd Edition), Pearson Education.

REFERENCES:

1. A. V. Aho, J. E. Hopcroft, and J. D. Ullman, “Data Structures and Algorithms”, Pearson Education, First Edition Reprint.
2. R. F. Gilberg, B. A. Forouzan, “Data Structures”, Second Edition, Thomson India, Edition

COURSE DESIGNERS

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17CSCC20	DATA STRUCTURES LAB							Category	L	T	P	Credit			
								CC	0	0	4	2			
PREAMBLE This laboratory enables the students clearly understand the concepts of data structures. Also students can implement the searching and sorting algorithms.															
PRERQUISITE NIL															
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Develop algorithms for the concepts of data structures.												Apply			
CO2. Able to Apply searching and sorting techniques												Apply			
CO3. Construct implementations for Abstract Data Types (ADT) using appropriate Data Structures												Apply			
CO4. Assess the suitability of a data structure to solve a problem, based on the time and space complexities of different operations on the data structure												Analyze			
CO5. Implement algorithms which use sorting, searching and/or selection as sub-procedures.(CO5)												Apply			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	M	M	M	-	-	-	-	-	-	-	-	M	M	M
CO2	M	M	M	M	-	-	-	-	-	-	-	-	M	M	M
CO3	M	M	S	M	-	-	-	-	-	-	-	-	M	M	M
CO4	S	M	M	M	-	-	-	-	-	-	-	-	M	M	S
CO5	S	M	M	M	-	-	-	-	-	-	-	-	M	M	S
S- Strong; M-Medium; L-Low															
LIST OF EXPERIMENTS: 1. Exercises using Objects, Classes, Inheritance 2. Operator Overloading and Polymorphism 3. Array implementation of List Abstract Data Type (ADT) 4. Linked list implementation of List ADT 5. Cursor implementation of List ADT 6. Array implementations of Stack ADT 7. Linked list implementations of Stack ADT 8. Queue ADT 9. Search Tree ADT - Binary Search Tree 10. Heap Sort 11. Quick Sort															

REFERENCES:

1. Laboratory Reference Manual.
2. Balaguruswami. E, “Programming in C”, TMH Publications, 1997
3. Gottfried, “Programming with C”, schaums outline series, TMH publications, 1997.
4. Mahapatra , “Thinking in C”, PHI publications, 2nd Edition, 1998.
5. Subbura.R , “Programming in C”, Vikas publishing, 1st Edition, 2000.

COURSE DESIGNERS

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17CSCC04	COMPUTER ARCHITECTURE	Category	L	T	P	Credit
		CC	3	0	0	3

PREAMBLE:

This course is dedicated to number system, logic design, and memory and processing. This is the only course that is concerned with the hardware of a computer, its logic design and organization. It aims at making the student familiar with digital logic and functional design of arithmetic and logic unit that is capable of performing floating point arithmetic operations.

PREREQUISITE: NIL

COURSE OBJECTIVES

1	To learn about the design of the processors.
2	To learn about the data transfer.
3	Understand the functional units of a computers, bus structures and addressing modes.
4	Apply the knowledge of algorithms to solve arithmetic problems.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO1 Explain about computer organization components.	Understand
CO2 Compute simple arithmetic operations for fixed-point and floating-point addition, subtraction, multiplication & division.	Apply
CO3 Design combinational and sequential digital functions.	Analyse
CO4 Construct an instruction set capable of performing a specified set of operations.	Analyze
CO5 Demonstrate a memory system for a given set of specifications	Analyze
CO6 Explain pipelining concepts	Understand

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	-	M	-	-	-	-	-	-	-	L	M	M	-
CO2	M	M	M	M	-	-	-	-	-	-	-	L	M	M	-
CO3	M	M	S	M	-	-	-	-	-	-	-	-	S		-
CO4	S	M	M		-	-	-	-	-	-	-	-	S	M	-
CO5	S	-	M	L	-	-	-	-	-	-	-	-	S		-
CO6	M	M	M	S	-	-	-	-	-	-	-	L	M	M	-

S- Strong; M-Medium; L-Low

SYLLABUS

INTRODUCTION

Computer Organization- Main memory – CPU operation – Interrupt concept – I/ O techniques – Bus concept – Computer performance factors – System performance measurement- High performance techniques – Comparison of Architecture and Organization – Study of Salient features and architectures of Advanced processors (80286, 80386, 80486, Pentium).

PROCESSOR DESIGN AND CONTROL UNIT

Goals – Design process –Data path organization – Main memory interface – Data path for single instructions- Floating point unit data path – Role of control unit – Reset sequence – Interrupt recognition and servicing – Abnormal situation handling – Hardwired control unit – Micro programmed control unit.

MEMORY DESIGN & MEMORY MANAGEMENT

Memory types – Functional and usage modes – Memory allocation- Multiple memory decoding – Memory hierarchy – Instruction pre fetch – Memory interleaving – Write buffer – Cache memory –Virtual memory – Associative memory.

INTRA SYSTEM COMMUNICATION AND I/O

I/O controller & driver- Case study: Hard disk controller in IBM PC – I/O ports and bus concepts – Case study: Keyboard interface – Bus cycle – Asynchronous and Synchronous Transfer – Interrupt handling in PC – I/O techniques in PC – Case Study : RS 232 interface – Modern serial I/O interface – Bus arbitration techniques – Hard disk interface in PC.

ADVANCED ARCHITECTURE

Classification of parallelism – Multiple functional units – Pipelining – Vector computing – array processors –High performance architecture – RISC systems – Super scalar architecture – VLIW architecture – EPIC architecture – Multiprocessor systems – Cache coherence problem – Fault tolerance.

TEXT BOOKS:

1. William Stallings, “Computer Organization And Architecture – Designing For Performance”, Sixth Edition, Pearson Education, 2007.

REFERENCES:

2. Govindarajulu, “Computer Architecture and Organization – Design principles and applications” ,Tata McGraw Hill publications, New Delhi.
3. David A. Patterson And John L. Hennessy, “Computer Organization And Design: The Hardware/Software Interface”, Fifth Edition, Morgan Kaufmann, 2013.
4. John P. Hayes, “Computer Architecture and Organization”, Third Edition, Tata McGraw Hill, 1998.
5. A.K.Ray & K.M.Bhurchandi, “Advanced Microprocessors and peripherals- Architectures, Programming and Interfacing”, McGraw-Hill Education (India), 2013 reprint.

COURSE DESIGNERS

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17CSCC02	OBJECT ORIENTED PROGRAMMING	Category	L	T	P	Credit
		CC	3	0	4	3

PREAMBLE

This syllabus is intended for the Computer science students and enables them to learn Object Oriented Programming and the design of computer solutions in a precise manner. The syllabus emphasizes on OOP concepts, Functions, Polymorphism, Inheritance and I/O. The intention is to provide sufficient depth in these topics to enable candidates to apply Object Oriented Programming approach to programming. The modules in the syllabus reflect solving general problems via programming solution. Thus, modules collectively focus on programming concepts, strategies and techniques; and the application of these toward the development of programming solutions.

PREREQUISITE

NIL

COURSE OBJECTIVES

1.	To learn about the syntax and semantics of C++ programming language
2.	To learn about the concepts of object oriented programming.
3.	To determine how to reuse the code, Constructors and member functions
4.	To Analyse how to reduce the coding by applying overloading concepts
5.	To Analyse how to reuse the code, how to verify and validate the coding

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO1. Construct object-oriented programs for a given scenario using the concepts of abstraction, encapsulation, message-passing and modularity	Apply
CO2. Construct object-oriented programs for a given application by using constructors	Apply
CO3. Develop object-oriented programs for a given application using the concepts of compile-time and run-time polymorphism	Analyze
CO4. Develop object-oriented applications through inheritance concepts	Analyze
CO5. Construct object-oriented applications for a given scenario using files, Sting handling and to handle exceptions	Analyze

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	M	M	M	M	-	-	-	-	-	M	L	M	M	M
CO2	M	M	M	M	M	-	-	-	-	-	M	L	M	M	M
CO3	M	M	S	M	S	-	-	-	-	-	M	L	S	M	M
CO4	S	M	M	M	S	-	-	-	-	-	M	L	S	M	S
CO5	S	M	M	M	M	-	-	-	-	-	M	L	M	M	S

S- Strong; M-Medium; L-Low

SYLLABUS

INTRODUCTION TO FUNDAMENTAL CONCEPTS OF OOP

Object Oriented Paradigm: Elements of Object Oriented Programming – Working with classes, Classes and Objects-Class specification- accessing class members- defining member functions - Passing and returning objects – Array of objects - inline functions - accessing member functions within class - Static members.

OBJECT INITIALIZATION AND FRIEND FUNCTION

Constructors - Parameterized constructors - Constructor overloading. Copy constructor, Destructors, Default arguments - new, delete operators - “this” pointer, friend classes and friend functions.

OVERLOADING AND GENERIC PROGRAMMING

Function overloading – Operator overloading- Non-over loadable operators- unary operator overloading- operator keyword- limitations of increment/decrement operators- binary operator overloading- Generic programming with templates-Function templates- class templates.

INHERITANCE AND VIRTUAL FUNCTION

Inheritance-Base class and derived class relationship-derived class declaration-Forms of inheritance- inheritance and member accessibility, abstract class, virtual functions, pure virtual function.

EXCEPTION HANDLING AND STREAMS

Exception handling - Try Catch Throw Paradigm - Uncaught Exception- Files and Streams-Opening and Closing a file- file modes- file pointers and their manipulation, sequential access to a file-random access to a file-Reading and Writing – Exception handling. String Objects.

TEXT BOOKS:

1. B. Trivedi, “Programming with ANSI C++”, Oxford University Press, 2007.
2. K. R. Venugopal, Rajkumar, T. Ra vishankar, Mastering C++, 4th Edition, Tata McGraw 2. Hill,2008.
3. Budd T., An Introduction to Object-oriented Programming, Addison-Wesley 3rd 4. Edition,2008.
4. Bjarne stroustrup, The C++ programming Language, Addison Wesley, 3rd edition2008.
5. Harvey M. Deitel and Paul J. Deitel, C++ How to Program, 7th edition, Prentice Hall, 2010.
6. Tony Gaddis, Starting Out with Java: From Control Structures through Objects, 4/E, Addison-Wesley,2009.

REFERENCES:

1. H.M. Deitel and P.J. Deitel, C How to program Introducing C++ and Java, Fourth Edition, Pearson Prentice Hall, 2005.
2. B. Stroustrup, “The C++ Programming language”, Third edition, Pearson Education,2004.

COURSE DESIGNERS

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1.	Dr. K. Sasikala	Associate Professor	CSE	sasikalak@vmkvec.edu.in
2.	Mr.S. Muthuselvan	Assistant Professor Gr. II	CSE	muthuselvan@avit.ac.in

17CSCC21	OBJECT ORIENTED PROGRAMMING LAB						Category	L	T	P	Credit					
							CC	0	0	4	2					
PREAMBLE With a dynamic learn-by-doing focus, this laboratory course encourages students to understand the use of object oriented way of problem solving. This course challenges students to exercise their creativity in both programming and analysis.																
PRERQUISITE NIL																
COURSE OBJECTIVES																
1.	To be capable of explaining procedure as well as object oriented programming concepts & their differences.															
2.	To be able to implement inline and friend function very well.															
3.	To be familiar with how to make programs using function overloading & operator overloading															
4.	To get the capability to implement the different types of inheritance & done problems related to them															
COURSE OUTCOMES																
On the successful completion of the course, students will be able to																
CO1. Construct object-oriented programs for a given scenario using the concepts of abstraction, encapsulation, message-passing and modularity.												Analysis				
CO2. Develop object-oriented programs for a given application using the concepts of compile-time and run-time polymorphism.												Apply				
CO3. Construct object-oriented programs for a given application by demonstrating the inter-relationship between classes using inheritance and aggregation.												Apply				
CO4. Develop object-oriented applications that can handle exceptions..												Apply				
CO5. Construct object-oriented applications for a given scenario to persist data using files and object-serialization.												Apply				
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES																
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	
CO1	M	M	M	M	S	-	-	-	-	-	-	-	M	M	M	
CO2	M	M	M	M	M	-	-	-	-	-	-	-	M	M	M	
CO3	M	M	S	M	S	-	-	-	-	-	-	-	M	M	M	
CO4	S	M	M	M	M	-	-	-	-	-	-	-	M	M	S	
CO5	S	M	M	M	M	-	-	-	-	-	-	-	M	M	S	
S- Strong; M-Medium; L-Low																

LIST OF EXPERIMENTS

1. Write a program to illustrate function overloading feature
2. Write a program to illustrate the overloading of various operators Ex. Binary operators, Unary operators, New and Delete operators.
3. Write a program to illustrate the use of following functions: a) Friend functions b) Inline functions c) Static Member functions d) Function with default arguments
4. Write a program to illustrate the use of destructor and the various types of constructors (no arguments, constructor, constructor with arguments, copy constructor etc).
5. Write a program to illustrate the various forms of inheritance: Ex. Single, Multiple, multilevel, hierarchical inheritance etc.
6. Write a program having student as an abstract class and create many derived classes such as Engg. Science, Medical, etc. from student's class. Create their objects and process them.
7. Write a program to illustrate the use of virtual functions.
8. Write a program to illustrate the use of virtual base class.
9. Write a program to illustrate file handling operations: Ex. a) Copying a text file b) Displaying the contents of the file etc.
10. Write a program to illustrate how exceptions are handled (ex: division-by-zero, overflow and underflow in stack etc).

REFERENCES:

1. H.M. Deitel and P.J. Deitel, C How to program Introducing C++ and Java, Fourth Edition, Pearson Prentice Hall, 2010.
2. B. Stroustrup, "The C++ Programming language", Third edition, Pearson Education, 2004.
3. B. Trivedi, "Programming with ANSI C++", Oxford University Press, 2007.
4. K. R. Venugopal, Rajkumar, T. Ra vishankar, Mastering C++, 4th Edition, Tata McGraw 2. Hill, 2008.
5. Budd T., An Introduction to Object-oriented Programming, Addison-Wesley 3rd 4. edition, 2008.
6. Bjarne stroustrup, The C++ programming Language, Addison Wesley, 3rd edition 2008.
7. Harvey M. Deitel and Paul J. Deitel, C++ How to Program, 7th edition, Prentice Hall, 2010.
8. Tony Gaddis, Starting Out with Java: From Control Structures through Objects, 4/E, Addison-Wesley, 2009.

COURSE DESIGNERS

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17CSCC06	DESIGN AND ANALYSIS OF ALGORITHMS	Category	L	T	P	Credit
		CC	3	0	4	3

PREAMBLE:

This subject introduces students the concepts of design and analysis of algorithms. On completion of this course students will be able to:

- Learn the algorithm analysis techniques.
- Become familiar with the different algorithm design techniques
- Construct efficient algorithms for solving engineering problems by using appropriate algorithm design paradigms and data structures.

PREREQUISITE: DATA STRUCTURES

COURSE OBJECTIVES

1.	To familiarize the student with good programming design methods, particularly Top- Down design.
2.	To develop algorithms for manipulating stacks, queues, linked lists, trees, graphs
3.	To create the data structures for implementing the above algorithms
4.	To construct the recursive algorithms as they apply to trees and graphs
5.	To familiarize the student with the issues of Time complexity and examine various algorithms from this perspective

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO1. Analyse the correctness of algorithms using induction and loop invariants.	Analyze
CO2. Analyse the worst-case, best-case and average-case running time of algorithms using asymptotic.	Analyze
CO3. Analyse the performance of a sequence of operations using amortized analysis techniques like potential method and accounting method.	Analyze
CO4. Construct algorithms using design paradigms like divide and conquer, greedy and dynamic programming for a given problem.	Analyze
CO5. Infer when a design scenario requires the application of the different algorithm design paradigms.	Apply
CO6. Analyse how the performance of an algorithm is affected based on the choice of data structures the algorithm uses.	Analyze

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	M	-	-	-	-	-	-	-	-	-	S	M	M
CO2	S	M	M	-	-	-	-	-	-	-	-	-	S	S	M
CO3	M	M	S	-	-	-	-	-	-	-	-	-	S	M	M
CO4	S	M		-	-	-	-	-	-	-	-	-	S	S	M
CO5	M	M	M	-	-	-	-	-	-	-	-	-	S	M	S
CO6	M	M	M	-	-	-	-	-	-	-	-	-	S	M	M

S- Strong; M-Medium; L-Low

SYLLABUS

INTRODUCTION TO ALGORITHMS

The role of algorithms in computing, Growth of functions, Asymptotic notations, Designing and Analyzing algorithms-an Introduction using insertion sort. Review on the Math needed for algorithm design and analysis.

DIVIDE AND CONQUER

Solving recurrences – The Substitution method, Recurrence Tree method and Master’s method, Multiplying large integers, Binary Search, Sorting [Merge Sort and Quick Sort], Selection in linear time [Expected and Worst-case], Strassen’s algorithm for Matrix Multiplication, The maximum sub-array problem.

GREEDY ALGORITHMS

Characteristics of Greedy algorithms, The problem of making change, Greedy algorithms for Scheduling, Minimum Spanning Trees – Kruskal’s Algorithm and Prim’s Algorithm, Greedy Algorithms for finding the shortest paths in a Graph, The Knapsack problem Amortized Analysis: The accounting method, The potential method.

DYNAMIC PROGRAMMING

Calculating the binomial co-efficient, The problem of making change, The Knapsack problem, Chained matrix multiplication, Finding the shortest paths in a Graph, Reformulating Dynamic programming algorithms using recursion and memory functions.

GRAPH ALGORITHMS

Depth-first search & Breadth-First Search, Flow Networks, Topological sort, Strongly connected components Computational Complexity: Classes P and NP, Polynomial reductions, Classes NP-Complete and NP-Hard. Heuristics: Graph Coloring problem, Travelling Sales Person problem.

TEXT BOOKS:

1. Charles E. Leiserson, “Thomas H. Cormen, Ronald L. Rivest, Clifford Stein – Introduction to Algorithms”, Third edition, PHI, 2010

REFERENCES:

1. Gilles Brassard and Paul Bratley, “Fundamentals of Algorithmic”, PHI, 2000.
2. Sara Baase - Computer algorithms: Introduction to Design and Analysis –, Addison Wesley publication, 1998.

COURSE DESIGNERS

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2.	Mr. M. Annamalai	Assistant Professor	CSE	annamalai@vmkvec.edu.in

17CSCC23	ALGORITHM LAB								Category	L	T	P	Credit		
									CC	0	0	4	2		
PREAMBLE The objective of this laboratory course is to enable students to solve algorithmic problems by appropriately modeling the problem, choosing and/or designing efficient data structures and algorithms to meet the problem constraints and implementing the algorithm in C/C++.															
PREREQUISITE Data Structures Lab (17CSCC20)															
COURSE OBJECTIVES															
1.	To understand concepts about searching and sorting techniques.														
2.	To understand basic concepts about stacks, queues, lists, trees and graphs.														
3.	To understanding about writing algorithms and step by step approach in solving problems with the help of fundamental data structures.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Develop efficient algorithms and implementation schemes for solving a given problem using appropriate data structures and design techniques like divide and conquer, greedy, branch and bound and dynamic programming.												Apply			
CO2. Compare the suitability of several candidate data structures, algorithms and implementation schemes to solve a problem, based on the time , space complexities and problem constraints imposed.												Analyze			
CO3. Model, implement and evaluate the algorithms designed using a high – level programming language.												Analyze			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	M	S	M	-	-	-	-	-	-	-	-	M	M	S
CO2	M	M	M	M	-	-	-	-	-	-	-	-	M	M	M
CO3	M	M	M	M	-	-	-	-	-	-	-	-	M	M	S
S- Strong; M-Medium; L-Low															

17AICC01	PROBLEM SOLVING USING PYTHON PROGRAMMING (Theory + Practice)							Category	L	T	P	Credit			
								CC	3	0	2	4			
PREAMBLE: This course is designed to introduce basic problem solving and program design skills that are used to create computer programs using python programming skills. It gives engineering students an introduction to python programming and developing analytical skills to use in their subsequent course work and professional development. It presents several techniques using computers to solve problems, including the use of program design strategies and tools, common algorithms used in computer program and elementary programming techniques.															
PREREQUISITE: NIL															
COURSE OBJECTIVES															
1.	To study algorithmic solutions to simple computational problems.														
2.	To study programs using simple Python statements and expressions.														
3.	To study an explain control flow and functions concept in Python for solving problems														
4.	To study and use Python data structures – lists, tuples & dictionaries for representing compound data														
5.	To study and explain files, exception, modules and packages in Python for solving problems.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. To understand and develop algorithmic solutions to simple computational problem.												Analyze			
CO2 To explain programs using simple Python statements and expressions.												Analyze			
CO3. To explain control flow and functions concept in Python for solving problems												Analyze			
CO4. Construct algorithms using design paradigms like divide and conquer, greedy and dynamic programming for a given problem.												Analyze			
CO5. To use Python data structures – lists, tuples & dictionaries for representing compound data												Apply			
CO6. To use Explain files, exception, modules and packages in Python for solving problems.												Analyze			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	L	-	-	L	-	-	-	-	-	L	M	M	M
CO2	S	M	L	-	M	L	-	-	-	-	-	L	S	M	M
CO3	S	M	L	-	M	L	-	-	-	-	-	L	M	M	M
CO4	S	M	L	-	M	L	-	-	-	-	-	L	S	S	M
CO5	M	M	L	L	M	L	-	-	-	-	-	L	S	M	M
CO6	M	M	L	-	M	L	-	-	-	-	-	L	M	M	M
S- Strong; M-Medium; L-Low															

SYLLABUS

UNIT-1 INTRODUCTION

Introduction to python-Advantages of python programming-Tokens-Variables-Input/output methods-Data types-Operators

UNIT-2 DATA STRUCTURES

Strings-Lists-Tuples-Dictionaries-Sets

UNIT-3 CONTROL STATEMENTS

Flow Control-Selection control Structure-if-if-else-if-elif-else-Nested if iterative control structures-while loop, for loop and range.

UNIT-4 FUNCTIONS

Declaration-Types of Arguments-Fixed arguments, variable arguments, keyword arguments and keyword variable arguments-Recursions-Anonymous functions: lambda- Decorators and Generators.

UNIT-5 EXCEPTION HANDLING

Exception Handling-Regular Expression-Calendars and clock files:File input/output operations-Dictionary operations-Reading and writing in structured files:CSV and JSON.

TEXT BOOKS:

4. Bill Lubanovic, "Introducing Python Modern Computing in Simple Packages", 1st Edition, O'Reilly Media,2014.
5. Programming With Python Book 'Himalaya Publishing House PvtLtd
6. "Dive Into Python"by MarkPilgrim

REFERENCES:

4. Mark Lutz, "Learning Python", 6th Edition, O'Reilly Media, 2014.
 5. David Beazley, Brian K. Jones, "Python Cookbook", 3rd Edition, O'Reilly Media, 2015.
- Mark Lutz, "Python Pocket Reference", 6th Edition, O'Reilly Media,2015.

COURSE DESIGNERS

S. No.	Name of the faculty	Designation	Department	Email Id
1.	Mr. K.Karthik	Assistant Professor	CSE	karthik@avit.ac.in
2.	T.Narmadha	Assistant Professor	CSE	Narmadha@vmkvec.edu.in

17CSCC03					DATABASE MANAGEMENT SYSTEM					Category		L	T	P	Credit	
										CC		3	0	4	3	
PREAMBLE: This course aims at facilitating the student to understand the various concepts and functionalities of Database Management Systems, the method and model to store data and how to manipulate them through query languages, the effective designing of relational database and how the system manages the concurrent usage of data in multiuser environment.																
PREREQUISITE: NIL																
COURSE OBJECTIVES																
1		Describe a relational database and object-oriented database.														
2		Create, maintain and manipulate a relational database using SQL.														
3		Describe ER model and normalization for database design.														
4		Examine issues in data storage and query processing and can formulate appropriate solutions.														
5		Design and build database system for a given real world problem.														
COURSE OUTCOMES																
On the successful completion of the course, students will be able to																
CO1. Illustrate the database design for applications and use of ER Diagram.												Understand				
CO2. Build and manipulate the relational database using Structured Query Language and relational languages.												Apply				
CO3. Develop a normalized database for a given application by incorporating various constraints like integrity and value constraints.												Apply				
CO4. Apply concurrency control & recovery mechanism for database problems.												Apply				
CO5. Construct data structures like indexes and hash tables for the fast retrieval of data.												Apply				
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES																
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	
CO1	S	M	M	M	M	-	-	-	-	-	M	S	S	M	S	
CO2	M	M	M	L	M	-	-	-	-	-	M	M	S	M	S	
CO3	M	M	S	M	M	-	-	-	-	-	M	L	S	M	S	
CO4	S	M	M	M	L	-	-	-	-	-	M	M	S	S	S	
CO5	S	M	M	M	M	-	-	-	-	-	M	M	S	M	S	
S- Strong; M-Medium; L-Low																

SYLLABUS

INTRODUCTION

Database System Applications - Views of data - Data Models - Database Languages -Modification of the Database - Database System Architecture - Database users and Administrator- Introduction to relational databases - Structure of Relational Databases - Entity-Relationship model (E-R model) - E-R Diagrams.

RELATIONAL APPROACH

The relational Model - Additional & Extended Relational - Types of Keys - Relational Algebra - Null Values - Domain Relational Calculus - Tuple Relational Calculus - Fundamental operations - Additional Operations- SQL fundamentals - Structure of SQL Queries - SQL Data Types and Schemas - Nested Sub queries - Complex Queries - Integrity Constraints - Triggers - Security - Advanced SQL Features - Embedded SQL- Dynamic SQL- Views - Introduction to Distributed Databases and Client/Server Databases..

DATABASE DESIGN

Overview of the Design Process - Functional Dependencies - Non-loss Decomposition - Functional Dependencies - Normalization and its Types - Dependency Preservation - Boyce/Codd Normal Form- Decomposition Using Multi-valued Dependencies and Fourth Normal Form - Join Dependencies and Fifth Normal Form - Entity Sets and its Types.

TRANSACTION & CONCURRENCY CONTROL

Transaction Concepts - Transaction State - Transaction Recovery - ACID Properties - System Recovery - Media Recovery - Two Phase Commit - SQL Facilities for recovery -Advanced Recovery Techniques - Buffer Management - Remote Backup Systems - Concurrency Control - Need for Concurrency - Locking Protocols -Two Phase Locking - Internet Locking - Deadlock Handling - Serializability - Recovery Isolation Levels - SQL Facilities forConcurrency.

STORAGE STRUCTURE

Introduction to Storage and File Structure - Overview of Physical Storage Media - Magnetic Disks - RAID - Tertiary storage - File Organization - Organization of Records in Files - Indexing and Hashing - Ordered Indices - B+ tree Index Files - B- tree Index Files - Bitmap Indices - Static Hashing - Dynamic Hashing -Query Processing - Catalogue Information for Cost Estimation – Selection Operation - Sorting - Join Operation - Query optimization - Database Data Analysis.

TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, Sixth Edition, McGraw-Hill Education; 6 edition,2010).

REFERENCES:

1. Ramez Elmasri, Shamkant B. Navathe, “Fundamentals of Database Systems”, Pearson India; 7th edition, 2017, 2017).
2. Raghu Ramakrishnan and Johannes Gehrke, “Database Management Systems”, Third Edition, McGraw Hill, 2002.
3. Carlos Coronel, Steven Morris , “Database Systems – Design, Implementation and Management, 13th Edition, Cengage Learning; 13th edition, 2018).

COURSE DESIGNERS

S. No.	Name of the faculty	Designation	Department	Mail Id
1	Mr. S. SenthilKumar	Assistant Professor	CSE	senthilkumar@vmkvec.edu.in
2	Mr. S. Muthuselvan	Assistant Professor Gr. II	CSE	muthuselvan@avit.ac.in

17CSCC22		DATABASE MANAGEMENT SYSTEM LAB								Category	L	T	P	Credit		
										CC	0	0	4	2		
PREAMBLE																
This course aims at facilitating the student to apply the effective designing of relational database for Real-world applications, perform many operations related to creating, manipulating and maintaining databases using DBMS tools and manipulate data using other languages through ODBC and JDBC.																
PRERQUISITE NIL																
COURSE OBJECTIVES																
1.		To demonstrate the basic fundamentals of Structured Query Language (SQL).														
2.		To employ the conceptual and relational models to design large database systems.														
3.		To design and build database system for a given real world problems.														
COURSE OUTCOMES																
On the successful completion of the course, students will be able to																
CO1. On the successful completion of the course, students will be able to Build and manipulate relational databases using simple and complex queries in Structured Query Language.												Apply				
CO2. Develop normalized and demoralized databases for a given application using various constraints like integrity and value constraints.												Apply				
CO3. Construct and make use of database objects such as indices, sequences, synonyms using Structured Query Language.												Analysis				
CO4. Develop objects using PL/SQL and manipulate databases through these objects.												Analysis				
CO5. Construct and make use of composite data types using PL/SQL (CO5) Develop a complete database application in a high level language using Java Database Connectivity.												Analysis				
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES																
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	
CO1	M	M	M	M	-	-	-	-	-	-	-	-	M	M	M	
CO2	M	M	M	M	-	-	-	-	-	-	-	-	M	M	M	
CO3	M	M	S	M	-	-	-	-	-	-	-	-	M	M	M	
CO4	S	M	M	M	-	-	-	-	-	-	-	-	M	M	S	
CO5	S	M	M	M	-	-	-	-	-	-	-	-	M	M	S	
S- Strong; M-Medium; L-Low																

LIST OF EXPERIMENTS

1. Write a program to illustrate the creation of a database and writing SQL queries to retrieve information from the database
2. Write a program to perform Insertion, Deletion, Modifying, Altering, Updating and Viewing records based on conditions
3. Write a program to illustrate Simple SQL Queries
4. Write a program to analyze and model a database application
5. Write a program to illustrate the creation and Modification of Tables without normalization
6. Write a program to illustrate the creation and Modification of Tables with normalization
7. Write a program to illustrate Integrity Constraints enforcement
8. Write a program to illustrate Complex SQL Queries
9. Write a program to illustrate the creation and usage of other database objects
10. Write a program to illustrate the creation of Procedures, Functions and Package with Cursor
11. Write a program to illustrate the creation of Triggers.
12. Write a program to illustrate the creation of composite data types in PL/SQL

REFERENCES:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", Fourth Edition, Tata McGraw Hill, 2012.
2. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", Fourth Edition, Addison Wesley, 2002.
3. Raghu Ramakrishnan, "Database Management Systems", Third Edition, McGraw Hill, 2002.
4. Peter Rob and Carlos Coronel, "Database Systems – Design, Implementation and Management, Fifth Edition, Thompson Learning, Course Technology, 2003.

COURSE DESIGNERS

S. No	Name of the faculty	Designation	Department	Email Id
1.	Mr. S. SenthilKumar	Assistant Professor	CSE / VMKVEC	senthikumars @vmkvec.edu.in
2.	Mr.S.Muthuselvan	Assistant Professor (G II)	CSE / AVIT	muthuselvan@avit.ac.in

17CSCC09	JAVA PROGRAMMING										Category	L	T	P	Credit
											CC	3	0	4	3
PREAMBLE This course of study builds on the skills gained by students in Java Fundamentals and helps to advance Java programming skills. Students will design object-oriented applications with Java and will create Java programs using hands-on, engaging activities.															
PREREQUISITE NIL															
COURSE OBJECTIVES															
1.	Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.														
2.	Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.														
3.	Be aware of the important topics and principles of software development.														
4.	Understand Event Handling and Swing Components.														
5.	Understand Generic Programming.														
COURSE OUTCOMES															
On successful completion of the course, students will be able to															
CO1.Knowledge of the structure and model of the Java programming language												Understand			
CO2.Use the Java programming language for various programming technologies												Understand			
CO3. Develop software in the Java programming language												Apply			
CO4.Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements												Analyze			
CO5.Choose an engineering approach to solving problems, Starting from the acquired knowledge of programming and knowledge of operating systems.												Apply			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	M	-	S	-	-	-	-	-	-	-	S	M	-
CO2	S	M	M	-	M	-	-	-	-	-	-	-	M	M	M
CO3	S	M	L	L	M	-	-	-	-	-	-	-	M	M	M
CO4	S	M	M	L	M	-	-	-	-	-	-	-	M	M	-
CO5	S	M	L	L	S	-	-	-	-	-	-	-	S	M	M
S- Strong; M-Medium; L-Low															

SYLLABUS

BASICS OF JAVA

Object oriented programming concepts – objects – classes – methods and messages – abstraction and encapsulation – inheritance – abstract classes – polymorphism.- Objects and classes in Java – defining classes – methods - access specifiers – static members – constructors – finalizemethod.

ARRAYS, STRINGS & OBJECTS

Arrays – Strings - Packages – Java-Doc comments -- Inheritance – class hierarchy – polymorphism – dynamic binding – final keyword – abstract classes - The Object class – Reflection – interfaces – object cloning – inner classes – proxies.

EVENTS & GRAPHICS PROGRAMMING

I/O Streams - Filter and pipe streams – Byte Code interpretation - Basics of event handling – event handlers – adapter classes – actions – mouse events – AWT event hierarchy – Graphics programming – Frame – Components – working with 2D shapes.

SWING & GENERIC PROGRAMMING

Introduction to Swing – Model-View-Controller design pattern – buttons – layout management – Swing Components – exception handling – exception hierarchy – throwing and catching exceptions - Motivation for generic programming – generic classes – generic methods – generic code and virtual machine – inheritance and generics – reflection and generics.

THREADS & SOCKET PROGRAMMING

Multi-threaded programming – interrupting threads – thread states – thread properties – thread synchronization – Executors – synchronizers – Socket Programming – UDP Datagram – Introduction to JavaBeans.

TEXT BOOKS:

1. Cay S. Horstmann and Gary Cornell, “Core Java: Volume I – Fundamentals”, Eighth Edition, Sun Microsystems Press, 2008.
2. Elliotte Rusty Harold, “Java Network Programming”, O’Reilly publishers, 2000.
3. Ed Roman, “Mastering Enterprise Java Beans”, John Wiley & Sons Inc., 1999.

REFERENCES:

1. K. Arnold and J. Gosling, “The JAVA programming language”, Third edition, Pearson Education, 2000.
2. Timothy Budd, "Understanding Object-oriented programming with Java", Updated Edition, Pearson Education, 2000.
3. C. Thomas Wu, "An introduction to Object-oriented programming with Java", Fourth Edition, Tata McGraw-Hill Publishing company Ltd., 2006.

COURSE DESIGNERS

S. No.	Name of the Faculty	Designation	Department	Mail ID
1.	Mrs. R. Shobana	Assistant Professor (GII)	CSE	shobana@avit.ac.in
2.	Dr.K.Sasikala	Associate Professor	CSE	sasikalak@vmkvec.edu.in

17CSCC26	JAVA PROGRAMMING LAB									Category	L	T	P	Credit	
										CC	0	0	4	2	
PREAMBLE The goal of this course is to provide students with the ability to write programs in Java and apply concepts described in the Object-Oriented Programming course. The course is designed to accommodate students with diverse programming backgrounds, consequently Java is taught from first principles in a practical class setting where students can work at their own pace from a course handbook. Each practical class will culminate in an assessed exercise.															
PREREQUISITE Object Oriented Programming Lab (17CSCC02)															
COURSE OBJECTIVES															
1.	Gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc.														
2.	Understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods etc and exception handling mechanisms.														
3.	Understand the principles of inheritance, packages and interfaces.														
COURSE OUTCOMES															
On successful completion of the course, students will be able to															
CO1. Create Java programs that solve simple business problems.											Apply				
CO2. Validate user input.											Apply				
CO3. Construct a Java class based on a UML class diagram.											Apply				
CO4. Perform a test plan to validate a Java program.											Apply				
CO5. Document a Java program.											Apply				
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	M	M	M	S	-	-	-	-	-	-	-	M	M	M
CO2	M	M	M	M	S	-	-	-	-	-	-	-	M	M	M
CO3	M	M	S	M	S	-	-	-	-	-	-	-	M	M	M
CO4	S	M	M	M	S	-	-	-	-	-	-	-	M	M	S
CO5	S	M	M	M	M	-	-	-	-	-	-	-	M	M	S
S- Strong; M-Medium; L-Low															

LIST OF EXPERIMENTS.

1. Write a JAVA program to search the largest element from the given array.
2. Write a JAVA program to sort the strings in an alphabetical order.
3. Write a JAVA program to extract a portion of a character string and to print the extracted portion and the remaining portion of the string. Assume that m characters are extracted, starting with the nth character.
4. Write a JAVA program for illustrating overloading and overriding methods in JAVA.
5. Write a JAVA program which illustrates the implementation of multiple inheritance using interfaces in JAVA.
6. Write a JAVA program to create your package for basic mathematical operations such as add, subtract, multiply. Demonstrate the use of this package in another class.
7. Write a JAVA program that counts the number of digits in a given number. If an alphabet is entered instead of a number, the program should not terminate. Instead it should display appropriate error message. (Exception Handling).
8. Write a JAVA program to move the text “JAVA PROGRAMMING LAB” diagonally using Applet.
9. Write a JAVA program to create an Applet with a label “Do you know car driving?” and two buttons Yes, NO. When the user clicks “Yes” button, the message “Congrats” must be displayed. When the user clicks “NO” button, “Regrets” must be displayed.
10. Write a JAVA program to animate the face image using Applet.
11. Write a JAVA program to create four Text fields for the name, street, city and pin code with suitable Labels. Also add a button called “My Details”. When you click the button, your name, street, city, and pin code must appear in the Text fields.

COURSE DESIGNERS

S. No.	Name of the Faculty	Designation	Department	Mail ID
1.	Dr. K. SASIKALA	Associate Professor	CSE / VMKVEC	sasikalak@vmkvec.edu.in
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17CSCC07	OPERATING SYSTEM							Category	L	T	P	Credit			
								CC	3	0	4	3			
PREAMBLE The student will be able to understand the concepts of operating system to distributed environment like cloud computing, mobile computing etc. This course also includes set of case studies that provides insight into some existing distributed operatingsystems.															
PREREQUISITE NIL															
COURSE OBJECTIVES															
1.	To be aware of the evolution of operating systems.														
2.	To learn what processes are, how processes communicate, how process synchronization is done and how to manage processes.														
3.	To have an understanding of the main memory and secondary memory management techniques.														
4.	To understand the I/O Subsystem.														
5.	To have an exposure to the role of operating system in cloud and mobile environment operating systems.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. To learn the concepts of operating system to an evolution of operating systems and identify the features specific to operating systems											Apply				
CO2. To Understand the process synchronization concepts for the given scenario in operating systems environment.											Apply				
CO3.Illustrate the different techniques of management of memory (the main memory and secondary memory management techniques).											Understand				
CO4.Apply the I/O Subsystem concepts for a given scenario.											Apply				
CO5. Identify the role of operating system in cloud and mobile environment.											Analyze				
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	S	M	M	-	-	-	-	-	-	-	-	S	S	-
CO2	S	S		M	-	-	-	-	-	-	-	-	S	M	-
CO3	S	S		M	-	-	-	-	-	-	-	-	S	M	-
CO4	S	M	L	M	-	-	-	-	-	-	-	-	S	L	M
CO5	S	M	L	L	-	-	-	-	-	-	-	-	S	M	-
S- Strong; M-Medium; L-Low															

SYLLABUS

OPERATING SYSTEM

6hrs

Introduction & Structure: Basics, OS Architecture, OS Operations, System calls.

PROCESSES & SYNCHRONIZATION

13hrs

Process concept – Process scheduling – Operations on processes – Cooperating processes – Inter process communication – Communication in client-server Systems. Case study: IPC in Linux. Threads: Multi-threading models – Threading issues. Case Study: Threads library– Clock Synchronization – Event Ordering – Mutual Exclusion – Deadlock Modelling – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection and Recovery - Election Algorithms.

STORAGE MANAGEMENT

11hrs

Background – Swapping – Contiguous memory allocation – Paging – Segmentation – Segmentation with paging. Virtual Memory: Background–Demand paging – Process creation – Page replacement – Allocation of frames – Thrashing. Case Study: Memory management in Linux.

I/O SYSTEMS

10hrs

I/O Systems – I/O Hardware – Application I/O interface – kernel I/O subsystem – streams – performance. Mass-Storage Structure: Disk scheduling – Disk management – Swap-space management – RAID – disk attachment – stable storage – tertiary storage. Case study: I/O in Linux.

CLOUD OS & MOBILE OS

5hrs

Introduction to Cloud Computing, Features of Cloud OS, Case Studies. - Introduction to Mobile Computing Features of Mobile OS, Case Studies.

TEXT BOOKS:

1. Silberschatz, Galvin, and Gagne, “Operating System Concepts”, 8th Edition, Wiley India Pvt. Ltd, 2008.

REFERENCES:

1. Andrew S. Tanenbaum, “Modern Operating Systems”, Second Edition, Pearson Education, 2004.
2. Gary Nutt, “Operating Systems”, Third Edition, Pearson Education, 2004.
3. Harvey M. Deital, “Operating Systems”, Third Edition, Pearson Education, 2004.
4. Fundamentals Of Mobile Computing, Patnaik, Prasant, Kumar, Mall, Rajib, PHI, 2012.
5. Mobile Computing - Technology, Applications, and Service Creation – 1st edition, Asoke K Talukder, Roopa Yavagal, McGraw-Hill, 2006.
6. The Practice of Cloud System Administration: Designing and Operating Large Distributed Systems, Thomas A. Limoncelli, Strata R. Chalup, Christina J. Hogan, Addison-Wesley Professional; 1st Edition, 2014.
7. Cloud Computing: Concepts, Technology & Architecture, Thomas Erl, Ricardo Puttini, Zaigham Mahmood, Prentice Hall; 1st Edition, 2013.

COURSE DESIGNERS

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17CSCC24		OPERATING SYSTEMS LAB								Category	L	T	P	Credit	
										CC	0	0	4	2	
PREAMBLE This laboratory course encourages students to understand the behaviour and implementation of computer operating systems, and these experiments for acquiring skill in writing concurrent programs use of operating system experiments with UNIX commands and C Programs.															
PREREQUISITE S NIL															
COURSE OBJECTIVES															
1.	To learn shell programming and the use of filters in the UNIX environment.														
2.	To learn to program in C using system calls.														
3.	To learn to use the file system related system calls.														
4.	To provide knowledge about processes creation and processes communication.														
5.	To learn how process synchronization is done using semaphores.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Familiar with the language and terms of the UNIX/LINUX operating system											Apply				
CO2. Delineate the commands and procedures needed to carry out basic operations on the UNIX/LINUX operating system											Apply				
CO3. Design, develop and evaluate CPU burst time, arrival time, waiting time and average turnaround time for different types of scheduling											Apply				
CO4. Design solutions for Inter Process communication and memory management Schemes											Apply				
CO5. Design, develop and implement a software solution to a given problem which employs operating systems tools											Apply				
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	M	M	M	S	-	-	-	-	-	-	-	M	M	M
CO2	M	M	M	M	S	-	-	-	-	-	-	-	M	M	M
CO3	M	M	S	M	S	-	-	-	-	-	-	-	M	M	M
CO4	S	M	M	M	S	-	-	-	-	-	-	-	M	M	S
CO5	S	M	M	M	S	-	-	-	-	-	-	-	M	M	S
S- Strong; M-Medium; L-Low															

LIST OF EXPERIMENTS.

1. Execute Basic UNIX commands.\
2. Write C programs to simulate UNIX commands like ls, grep, etc.
3. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time. (2sessions).
4. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Priority and Round robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time. (2sessions).
5. Developing Application using Inter Process communication (using shared memory, pipes or message queues).
6. Implement the Producer – Consumer problem using semaphores.
7. Implement some memory management schemes – I.
8. Implement some memory management schemes – II.
9. Implement any file allocation technique (Linked, Indexed or Contiguous)

REFERENCES:

1. Silberschatz, Galvin, and Gagne, “Operating System Concepts”, Sixth Edition, Wiley India Pvt Ltd, 2003.
2. Andrew S. Tanenbaum, “Modern Operating Systems”, Second Edition, Pearson Education, 2004.\
3. Gary Nutt, “Operating Systems”, Third Edition, Pearson Education, 2004.
4. Harvey M. Deital, “Operating Systems”, Third Edition, Pearson Education, 2004.

COURSE DESIGNERS

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17CSCC08	COMPUTER NETWORKS									Category	L	T	P	Credit	
										CC	3	0	0	3	
PREAMBLE The purpose of this course is to understand the concepts of data communication and computer networks. Identify the components required to build different types of networks. Choose the required functionality at each layer for given application. Identify the solution for each functionality for each layer. Trace the flow of information from one node to another node in thenetwork.															
PREREQUISITE NIL															
COURSE OBJECTIVES															
1.	To provide basic knowledge in networking concepts.														
2.	To introduce and demonstrate various bridges, switches and Ethernets.														
3.	To introduce different methodologies in routing.														
4.	To learn about transmission protocols and QOS.														
5.	To provide knowledge about different application protocols.														
COURSE OUTCOMES															
On successful completion of the course, students will be able to															
CO1.Learn the fundamentals of networks and different types of OSI Layers.												Understand			
CO2.Learn the different Ethernet, wireless networks, switching and bridging concepts												Understand			
CO3.Design solutions for complex routing methods and different multicast routing techniques.												Evaluate			
CO4.Learn the concepts of different protocols for transmission purpose and study the quality of service for TCP protocol.												Understand			
CO5.Learn different types of application protocols and its architecture.												Understand			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	M	-	-	-	-		-	-	-		S	M	-
-CO2	S	M	M	-	-	-	-	-	-	-	-	-	S	M	-
CO3	S	M	S	M	-	-	-	-	-	-	-	-	S	M	M
CO4	S	M	M	-	-	-	-	-	-	-	-	-	S	M	-
CO5	S	M	M	-	-	-	-	-	-	-	-	-	S	M	-
S- Strong; M-Medium; L-Low															

SYLLABUS

FUNDAMENTALS OF OSI LAYERS

Building a network – Requirements - Layering and protocols - Internet Architecture – Network software – Performance ; Link layer Services - Framing - Error Detection - Flow control.

MEDIA ACCESS & INTERNETWORKING

Media access control - Ethernet (802.3) - Wireless LANs – 802.11 – Bluetooth - Switching and bridging – Basic Internetworking (IP, CIDR, ARP, DHCP, ICMP).

ROUTING

Routing (RIP, OSPF, metrics) – Switch basics – Global Internet (Areas, BGP, IPv6) - Multicast – addresses – multicast routing (DVMRP, PIM).

TRANSPORT LAYER

Overview of Transport layer - UDP - Reliable byte stream (TCP) - Connection management - Flow control - Retransmission – TCP Congestion control - Congestion avoidance (DECbit, RED) – QoS – Application requirements.

APPLICATION LAYER

Traditional applications -Electronic Mail (SMTP, POP3, IMAP, MIME) – HTTP – Web Services – DNS –SNMP.

TEXT BOOKS:

1. Behrouz A. Foruzan, “Data communication and Networking”, Seventh Edition, Tata McGraw-Hill, 2017.
2. Andrew S. Tannenbaum, David J. Wetherall “Computer Networks”, Pearson Education, Eighth Edition, 2016.

REFERENCES:

1. William Stallings, “Data and Computer Communication”, Eighth Edition, Pearson Education.
2. Knuth, D.E., “Computer Communication and Networks”, Sixth Edition, McGraw-Hill, 2016.

COURSE DESIGNERS

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17CSCC25	COMPUTER NETWORKS LAB								Category	L	T	P	Credit		
									CC	0	0	4	2		
PREAMBLE The purpose of this course is to understand the concepts of data communication and computer networks. Identify the components required to build different types of networks. Choose the required functionality and solution at each layer for given application. Trace the flow of information from one node to another node in the network.															
PREREQUISITE NIL															
COURSE OBJECTIVES															
1.	To provide basic knowledge in networking concepts.														
2.	To introduce and demonstrate various bridges, switches and Ethernets.														
3.	To introduce different methodologies in routing														
4.	To learn about transmission protocols and QOS														
5.	To provide knowledge about different application protocols.														
COURSE OUTCOMES															
On successful completion of the course, students will be able to															
CO1.Learn the fundamentals of networks and different types of OSI Layers											Understand				
CO2.Learn the different Ethernet, wireless networks, switching and bridging concepts											Understand				
CO3. Design solutions for complex routing methods and different multicast routing techniques.											Apply				
CO4. Learn the concepts of different protocols for transmission purpose and study the quality of service for TCP protocol.											Apply				
CO5. Learn different types of application protocols and its architecture.											Apply				
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	M	M	M	S	-	-	-	-	-	-	-	M	M	M
CO2	M	M	M	M	S	-	-	-	-	-	-	-	M	M	M
CO3	M	M	S	M	S	-	-	-	-	-	-	-	M	M	M
CO4	S	M	M	M	S	-	-	-	-	-	-	-	M	M	S
CO5	S	M	M	M	S	-	-	-	-	-	-	-	M	M	S
S- Strong; M-Medium; L-Low															

LIST OF EXPERIMENTS.

1. Implementation of Stop and Wait Protocol and Sliding Window Protocol.
2. Study of Socket Programming and Client – Server model
3. Write a code simulating ARP / RARP protocols.
4. Write a code simulating PING and TRACEROUTE commands
5. Create a socket for HTTP for web page upload and download.
6. Simple Tcp/Ip Client Server Communication
7. UDP Echo Client Server Communication
8. Half Duplex Chat Using TCP/IP
9. Full Duplex Chat Using TCP/IP
10. Implementation Of File Transfer Protocol
11. Remote Command Execution Using UDP
12. ARP Implementation Using UDP

COURSE DESIGNERS

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17CSCC18	RICH INTERNET APPLICATION										Category	L	T	P	Credit
											CC	3	0	0	3
PREAMBLE															
Uses of web sites and portals have become common for knowledge sharing and business. Thecourse focuses on the fundamentals of CGI, SCRIPTING LANGUAGES, WebApplications.															
PREREQUISITE: JAVA PROGRAMMING															
COURSE OBJECTIVES															
1.	To learn CGI Concepts & CGI Programming														
2.	To Study DHTML, XML,AJAX														
3.	To Study On-Line web application & Internet Concepts														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1: To understand the basic concept of HTML and Scripting Language												Understand			
CO2: To learn the HTML, Common Gateway Interface.												Apply			
CO3: To learn the Java Script and AJAX												Apply			
CO4: To learn the Server side programming												Apply			
CO5: To learn the database connectivity.												Apply			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	M	M	M	-	-	-	-	-	-	-	-	M	M	M
CO2	M	M	M	M	-	-	-	-	-	-	-	-	M	M	M
CO3	M	M	S	M	-	-	-	-	-	-	-	-	M	M	M
CO4	S	M	M	M	-	-	-	-	-	-	-	-	M	M	S
CO5	S	M	M	M	-	-	-	-	-	-	-	-	M	M	S
S- Strong; M-Medium; L-Low															

SYLLABUS

INTRODUCTION			
Internet Principles – Basic Web Concepts – Client/Server model – retrieving data from Internet – HTML and Scripting Languages – Standard Generalized Mark –up languages – Next Generation – Internet –Protocols and Applications			
COMMON GATEWAY INTERFACE PROGRAMMING			
HTML forms – CGI Concepts – HTML tags Emulation – Server – Browser Communication – E-mail generation – CGI client Side applets – CGI server applets – authorization and security. Introduction to PERL			
SCRIPTING LANGUAGES			
Java Script Programming-Dynamic HTML-Cascading style sheets-Object model and Event model- Filters and Transitions-Active X Controls-Multimedia-Client side script.- Traditional webapplication vs AJAX application –creating full scale AJAX application - Forms – Scripting Object			
SERVER SIDE PROGRAMMING			
Dynamic Web content – cascading style sheets – DHTML – XML – Server side includes – communication – Active and Java Server Pages - Ruby enabled applications			
ONLINE			
Simple applications – on-line databases – monitoring user events – plug-ins –database connectivity – Internet Information Systems – MICROSOFT IIS - EDI application in business – Internet Commerce – Customization of Internet Commerce.			
TEXT BOOK			
<ol style="list-style-type: none"> 1. Jason Hunter, William Crawford, “Java Servlet Programming”, O’ Reilly Publications,1999. 2. Ravi Kalakota and Andrew B Whinston, “Frontiers of Electronic Commerce”, Addison Wesley, 1996 3. Eric Ladd, Jim O’ Donnel, “Using HTML 4, XML and Java”, Prentice Hall of India –QUE,1999 4. Paul JDeitel and Harvey M Deitel, "AJAX, Rich Internet appliactions and web development", Prentice Hall,2008. 			
REFERENCES			
<ol style="list-style-type: none"> 1. Jeffy Dwight, Michael Erwin and Robert Niles, “Using CGI”, Prentice Hall of India QUE,2010. 2. Scot Johnson, Keith Ballinger, Davis Chapman, “Using Active server Pages”, Prentice Hall of India,1999. 3. Ted coombs, Jason coombs , Brewer, “ Active X source book”, John wiley,1999 4. Evangelos Petroutsos , “ Mastering Visual Basic 6”, BPB Publications,1998 			

COURSE DESIGNERS			
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Dr.R.Jaichandran	Professor	CSE	rjaichandran@avit.ac.in
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17CSCC31	RICH INTERNET APPLICATION DEVELOPMENT LAB										Category	L	T	P	Credit
											CC	0	0	4	2
PREAMBLE															
This course provides to study Internet programming and Web application development. Students will learn basic principles and techniques for building Internet applications. It provides students with the basic Web page development technologies and an introduction to dynamic Web page development using client-side scripting. Topics include introduction to HTTP protocol and client side programming, XHTML, Cascading Style Sheets, JavaScript DOM, XML, Namespace, DTD, Schema and AJAX.															
PREREQUISITE – JAVA PROGRAMMING LAB(17CSCC26)															
COURSE OBJECTIVES															
1.	To learn CGI Concepts & CGI Programming														
2.	To Study DHTML, XML,AJAX														
3.	To Study On-Line web application & Internet Concepts														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1 Understand Ajax Web application model and compare with traditional Web Application model (JS,XML,PHP,CSS)												Understand			
CO2. Develop Rich Internet Applications using JavaScript, XML, PHP, DOM to communicate with Web Server												Apply			
CO3. Develop dynamic Web pages using CSS, validating input data, wrapping applications into a single PHP script												Apply			
CO4. Implement Server-Side script to serve client-side requests												Apply			
CO5. Develop dynamic web pages using Ajax												Apply			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	M	M	M	L	-	-	-	-	-	-	-	M	M	M
CO2	M	M	M	M	S	-	-	-	-	-	-	-	M	M	S
CO3	M	M	S	M	S	-	-	-	-	-	-	-	M	M	S
CO4	S	M	M	M	M	-	-	-	-	-	-	-	M	M	M
CO5	S	M	M	M	S	-	-	-	-	-	-	-	M	M	S
S- Strong; M-Medium; L-Low															

SYLLABUS

LIST OF EXPERIMENTS

1. Use HTML5 markup tags for structuring web page
2. Use HTML5 with appropriate CSS properties and elements for styling, formatting, and enhancing web pages
3. Construct and validate web pages using HTML5 and CSS3
4. Implement client-side application logic using JavaScript
5. Define XML related concepts and languages
6. Compare and contrast between HTML and XML
7. Validate XML documents for correctness.
8. Create JSON in JavaScript and insert JSON data into HTML
9. Implement Server-Side script to serve client-side requests
10. Develop dynamic web pages using Ajax technology

TEXT BOOK

1. Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, , "Internet and World Wide Web", Prentice Hall; 5 edition (2011-11)

Course Designers:

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1.	Dr.K.Sasikala	Associate Professor	CSE / VMKVEC	sasikalak@vmkvec.edu.in
2.	Mr. S.Muthuselvan	Assistant Professor (G II)	CSE / AVIT	muthuselvan@avit.ac.in

17CSCC16	CLOUD COMPUTING	Category	L	T	P	Credit
		CC	3	0	0	3
PREAMBLE To study and understand the concepts in cloud computing and apply them practically.						
PREREQUISITE : COMPUTER NETWORKS						
COURSE OBJECTIVES						
1.	To understand cloud computing concepts.					
2.	To study various cloud services.					
3.	To apply cloud computing in collaboration with other services.					

4.	To Apply cloud computing services.														
5.	To apply cloud computing online.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1: Able to Understand basics in Cloud Computing													Understand		
CO2: Able to apply cloud computing concepts in real time													Apply		
CO3: Able to develop cloud computing projects													Apply		
CO4: Able to apply cloud services													Apply		
CO5: Able to collaborate cloud services with other applications													Apply		
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	M	M	M	-	-	-	-	-	-	-	-	M	M	M
CO2	M	M	M	M	-	-	-	-	-	-	-	-	M	M	M
CO3	M	M	S	M	-	-	-	-	-	-	-	-	M	M	M
CO4	S	M	M	M	-	-	-	-	-	-	-	-	M	M	S
CO5	S	M	M	M	-	-	-	-	-	-	-	-	M	M	S
S- Strong; M-Medium; L-Low															

SYLLABUS

INTRODUCTION
Cloud Computing – History of Cloud Computing – Cloud Architecture – Cloud Storage –Why Cloud Computing Matters – Advantages of Cloud Computing – Disadvantages of Cloud Computing – Companies in the Cloud Today – Cloud Services.
DEVELOPING CLOUD SERVICES
Web-Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service – Platform as a Service – Web Services – On-Demand Computing – Discovering Cloud Services Development Services and Tools – Amazon Ec2 – Google App Engine – IBM Clouds.
CLOUD COMPUTING FOR EVERYONE
Centralizing Email Communications – Collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation.
USING CLOUD SERVICES
Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing - Collaborating on Databases – Storing and Sharing Files.
COLLABORATING ONLINE
Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services –Evaluating Web Conference Tools – Collaborating via Social Networks and Groupware –Collaborating via Blogs and Wikis.
TEXT BOOKS

1. Rajkumar Buyya, James Broberg, Andzej M.Goscinski, “Cloud Computing –Principles and Paradigms”,John Wiley & Sons,2010.
2. Michael Miller, “Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online”, Que Publishing, August 2008.

REFERENCES

1. Haley Beard, “Cloud Computing Best Practices for Managing and Measuring. Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs”, Emereo Pty Limited, July 2008.

COURSE DESIGNERS

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1.	Dr.R.Jaichandran	Professor	CSE	rjaichandran@avit.ac.in
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17AICC02	INFORMATION SECURITY	Category	L	T	P	Credit									
		CC	3	0	0	3									
PREAMBLE To provide an introduction to the need for Information Security in real time and to study techniques involved in it.															
PREREQUISITE: COMPUTER NETWORKS															
COURSE OBJECTIVES															
1.	To study foundational theory behind informationsecurity														
2.	To study basic principles and techniques whendesigning a secure system														
3.	To study the attacks and defenses work in practice														
4.	To learn about the threats for their significance														
5.	To learn about the protections and limitations providedby today's technology														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. To understand the foundational theory behind informationsecurity						Understand									
CO2. To understand the basic principles and techniques whendesigning a secure system						Understand									
CO3. To learn how today's attacks and defenses work in practice						Understand									
CO4. To learn how to assess threats for their significance						Understand									
CO5. To infer the protections and limitations providedby today's technology						Understand									
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1.	M	M	M	M	-	-	-	-	-	-	-	-	M	M	M
CO2.	M	M	M	M	M	-	-	-	-	-	-	-	M	M	M
CO3.	M	M	S	M	M	-	-	-	-	-	-	-	M	M	M
CO4.	S	M	M	M		-	-	-	-	-	-	-	M	M	S
CO5.	S	M	M	M	S	-	-	-	-	-	-	-	M	M	S
S- Strong; M-Medium; L-Low															

SYLLABUS

INTRODUCTION

An Overview of Computer Security, Access Control Matrix, Policy-Security policies, Confidentiality policies, Integrity policies and Hybrid policies.

INFORMATION SECURITY MANAGEMENT

Cryptography- Key management – Session and Interchange keys, Key exchange and generation, Cryptographic Key Infrastructure, Storing and Revoking Keys, Digital Signatures, Cipher Techniques

SECURITY DESIGN AND ACCESS CONTROL MECHANISMS

Systems: Design Principles, Representing Identity, Access Control Mechanisms, Information Flow and Confinement Problem.

SECURITY ATTACKS FOR CLIENT/ SERVER SYSTEMS

Malicious Logic, Vulnerability Analysis, Auditing and Intrusion Detection

INFORMATION SECURITY RISK MANAGEMENT

Network Security, System Security, User Security and Program Security

TEXT BOOK

1. Matt Bishop, “Computer Security art and science”, Second Edition, Pearson Education

REFERENCE BOOKS

1. Mark Merkow, James Breithaupt “ Information Security : Principles and Practices” First Edition, Pearson Education,
2. Whitman, “Principles of Information Security”, Second Edition, Pearson Education
3. William Stallings, “Cryptography and Network Security: Principles and Practices”, Third Edition, Pearson Education.
4. “Security in Computing”, Charles P.Pfleeger and Shari Lawrence Pfleeger, Third Edition.

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17CSCC15	C# AND .NET APPLICATION DEVELOPMENT									Category	L	T	P	Credit	
										CC	3	0	0	3	
PREAMBLE To provide an introduction to the .NET framework and enable the student to program in C#.															
PREREQUISITE: JAVA PROGRAMMING															
COURSE OBJECTIVES															
1.	To study basic and advanced features of the C# language														
2.	To create form based and web based applications														
3.	To study the internals of the .NET framework														
4.	To learn about ADO.Net														
5.	To learn about different web services														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. To learn the basics of .net Frame work and C# language												Understand			
CO2. To learn C# elements and OOPS concepts												Apply			
CO3. To learn interface and inheritance concepts in C# language												Analyze			
CO4. To learn fundamentals of window application programming and create a window application												Apply			
CO5. To develop web applications and learn advanced												Apply			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1.	S	M	M	M	M	-	-	-	-	-	-	-	M	-	-
CO2.	S	M	M	L	L	-	-	-	-	-	-	-	M	M	M
CO3.	S	M	S		M	-	-	-	-	-	-	-	M	M	M
CO4.	S	M	L		M	-	-	-	-	-	-	-	M	M	-
CO5.	S	M	L	L	M	-	-	-	-	-	-	-	S	M	-
S- Strong; M-Medium; L-Low															

SYLLABUS

INTRODUCTION:

Overview Of .Net-Advantages Of .Net Over Other Languages-Assemblies-.Net Architecture-The Role of C# In The .Net Enterprise Architecture-The Common Language Runtime-C# Basics-Objects And Types-Inheritance –Arrays

OBJECT ORIENTED ASPECTS OF C#:

Operators and Casts: Operators - Type Safety - Operator Overloading - User-Defined Casts. Delegates and Events: Delegates – Events. Strings and Regular Expressions: System.String -Regular Expressions. Collections: Collection Interfaces and Types – Lists - Queues – Stacks -Linked Lists - Sorted Lists – Dictionaries – Hash Set - Bit Arrays – Performance-Indexers

I/O AND NETWORKPROGRAMMING:

Tracing and events - threading and synchronization - .Net security – localization –Manipulating XML - Managing the file system – basic networkprogramming.

ADO.NET: #:

Data Access: ADO.NET Overview - Using Database Connections – Commands - Fast Data Access: The Data Reader - Managing Data and Relationships: The DataSet Class – XML Schemas: Generating Code with XSD – Working with ADO.NET. Windows Forms: Creating a Windows Form Application - Control Class - Standard Controls and Components – Forms. Data Binding: The Data Grid View Control - Data Grid View Class Hierarchy - Data Binding - Visual Studio .NET and Data Access.

ASP.NET AND WEB SERVICES:

ASP.NET Pages: ASP.NET Introduction - ASP.NET Web Forms - ADO.NET and Data Binding.ASP.NET Development: User and Custom Controls - Master Pages - Site Navigation – Security –Themes- Web Parts. ASP.NET AJAX: What Is Ajax - What Is ASP.NET AJAX - Using ASP.NET AJAX.

TEXT BOOK

1. Christian Nagel, Bill Evjen, Jay Glynn, Morgan Skinner, Karli Watson, Professional C# 2008, Wiley Publishing, Inc., 2008. ISBN:978-8-126-51627-8.

REFERENCE BOOKS

1. Andrew Troelsen, “C# and the .NET Platform”, A! Press,2005.
2. Herbert Schildt, “The Complete Reference: C#”, Tata McGraw-Hill,2004.
3. Kevin Hoffman, “Visual C# 2005”, Pearson Education,2006.

COURSE DESIGNERS

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17CSCC30	C# AND .NET APPLICATION DEVELOPMENT LAB	Category	L	T	P	Credit
		CC	0	0	4	2

PREAMBLE

To gain programming knowledge in C#&.Net Framework.

PREREQUISITE : JAVA PROGRAMMING LAB(17CSCC26)

COURSE OBJECTIVES

1.	Distinguish between by value, by ref, and out parameter types.
2.	Call class methods using by value, by ref, and out parameters.
3.	To be able to define and use global named constants
4.	To be able to debug a program of syntax and logic errors
5.	Introduce to .Net IDE Component Framework.
6.	Programming concepts in .Net Framework.
7.	Creating website using ASP.Net Controls.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO1. Create Simple application using web controls	Understand
CO2. Work with States of ASP.NET Pages & Adrotator Control	Apply
CO3. Use of calendar control, Tree view control & Validation controls	Analyze
CO4. Query textbox and Displaying records & Display records by using database	Apply
CO5. Data list link control & Data binding using drop downlist control	Apply

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1.	M	M	M	M	S	-	--	-	-	-	-	-	M	M	S
CO2.	M	M	M	M	M	-	--	-	-	-	-	-	M	M	M
CO3.	M	M	S	M	M	-	--	-	-	-	-	-	M	M	M
CO4.	S	M	M	M	M	-	--	-	-	-	-	-	M	M	M
CO5.	S	M	M	M	M	-	--	-	-	-	-	-	M	M	M

S- Strong; M-Medium; L-Low

SYLLABUS

INTRODUCTION

General Review of the System-History-System structure-User Perspective-Operating System Services- Assumptions About Hardware. Introduction to the Kernel-Architecture System Concepts-Data Structures- System Administration

DISK BLOCKS

The Buffer Cache-Headers-Buffer Pool-Buffer Retrieval-Reading and Writing Disk Blocks - Advantages and Disadvantages. Internal Representation of Files-Inodes- Structure-Directories-Path Name to Inode- Super Block-Inode Assignment-Allocation of Disk Blocks -Other File Types

FILE SYSTEM

System Calls for the File System-Open-Read-Write-Lseek-Close-Create-Special files Creation -Change Directory and Change Root-Change Owner and Change Mode-Stat- Fstat-Pipes-Dup-Mount-Unmount-Link-Unlink-File System Abstraction-Maintenance.

PROCESS MANAGEMENT

The System Representation of Processes-States-Transitions-System Memory-Context of a Process-Saving the Context-Manipulation of a Process Address Space-Sleep Process Control-signals-Process Termination-Awaiting-Invoking other Programs-The Shell-System Boot and the INITProcess.

MEMORY MANAGEMENT

Memory Management Policies-Swapping-Demand Paging-a Hybrid System-I/O Subsystem-Driver Interfaces-Disk Drivers-Terminal Drivers.

TEXT BOOKS

1. Maurice J. Bach, "The Design of the Unix Operating System", Pearson Education 2002.

REFERENCES

1. UreshVahalia, "UNIX Internals: The New Frontiers", Prentice Hall, 2000.
2. John Lion, "Lion's Commentary on UNIX", 6th edition, Peer-to-Peer Communications,2004.
3. Daniel P. Bovet & Marco Cesati, "Understanding the Linux Kernel", O'REILLY, Shroff Publishers &Distributors Pvt. Ltd,2000.
4. M. Beck et al, "Linux KernelProgramming

COURSE DESIGNERS

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17CSCC19	INTERNET OF THINGS								Category	L	T	P	Credit		
									CC	3	0	0	3		
PREAMBLE															
To study and understand the technologies involved in Internet of Things (IoT) and apply them practically.															
PREREQUISITE :NIL															
COURSE OBJECTIVES															
1.	To understand the basic concepts of IOT														
2.	To study the methodology of IOT														
3.	To Develop IOT applications using Raspberry PI														
4.	To Develop IOT applications using Arduino and Intel Edison														
5.	To apply cloud concepts in IOT														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1: Able to understand basics in IOT												Understand			
CO2: Able to understand Methodology in IOT												Apply			
CO3: Able to design IOT applications using Raspberry												Analyze			
CO4: Able to design IOT applications using Aurdino and Intel Edison												Analyze			
CO5: Able to apply Cloud computing in IOT												Apply			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	M	M	M	-	-	-	-	-	-	-	-	M	M	M
CO2	M	M	M	M	-	-	-	-	-	-	-	-	M	M	M
CO3	M	M	S	M	-	-	-	-	-	-	-	-	M	M	M
CO4	S	M	M	M	-	-	-	-	-	-	-	-	M	M	S
CO5	S	M	M	M	-	-	-	-	-	-	-	-	M	M	S
S- Strong; M-Medium; L-Low															

SYLLABUS

INTRODUCTION
Introduction-Characteristics-Physical design - Protocols – Logical design – Enabling technologies – IoT Levels – Domain Specific IoTs – IoT vs M2M.
IOT METHODOLOGY
IoT systems management – IoT Design Methodology – Specifications Integration and Application Development.
IOT WITH RASPBERRY
Basics of Raspberry PI, Physical device – Raspberry Pi Interfaces – Programming – APIs / Packages – Web services
IOT WITH ARDUINO AND INTEL EDISON
Basics of Arduino, Intel Edison with Arduino- Interfaces - Arduino IDE – Programming - APIs and Hacks
APPLICATIONS
Real time applications of IoT- Connecting IoT to cloud – Cloud Storage for IoT – Data Analytics for IoT– Software & Management Tools for IoT.
TEXT BOOKS
<ol style="list-style-type: none">1. Arshdeep Bahga, Vijay Madisetti, “Internet of Things – A hands-on approach”, Universities Press,2015.2. Manoel Carlos Ramon, “Intel® Galileo and Intel® Galileo Gen 2: API Features and Arduino Projects for Linux Programmers”, Apress,2014.
REFERENCES
<ol style="list-style-type: none">1. Marco Schwartz, “Internet of Things with the Arduino Yun”, Packt Publishing, 2014

COURSE DESIGNERS				
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17CYCC02	INTRODUCTION TO ARTIFICIAL INTELLIGENCE									Category	L	T	P	Credit	
										CC	3	0	0	3	
PREAMBLE															
This syllabus is intended for the Engineering students and enables them to lean about Artificial Intelligence. This syllabus contains intelligent agent, Knowledge Representation and Machine learning, and application. This is useful to how represent knowledge and in machine learning contain some important prediction method. Thus, this syllabus focuses on to know about AI and its concepts, application.															
PREREQUISITE :NIL															
COURSE OBJECTIVES															
1.	To identify the kind of problems that can be solved using AI technique: to know the relation between AI and other areas of computer science.														
2.	To have knowledge of generic problem-solving methods in AI..														
3.	To design software agents to solve a problem.														
4.	Apply the knowledge of algorithms to solve arithmetic problems.														
5.	Assemble an efficient code for engineering problems.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1:. Identify the different agent and its types to solve the problems												Understand			
CO2: know about the problem solving technique in Artificial Intelligence.												Apply			
CO3: Construct the normal form and represent the knowledge.												Apply			
CO4: to know about extension of condition probability and how to apply in the real time environment.												Apply			
CO5:To lean about Information Retrieval and Speech Recognition												Understand			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	M	M	M	M	-	-	-	-	-	-	M	S	M	-
CO2	M	M	L	M	L	-	-	-	-	-	M	M	S	M	M
CO3	M		S	M	M	-	-	-	-	-	-	M	S	-	M
CO4	S	M	M	M	M	-	-	-	-	-	-	M	S	M	M
CO5	S	M	M	M	M	-	-	-	-	-	-	M	S	M	-
S- Strong; M-Medium; L-Low															

SYLLABUS

INTRODUCTION

Introduction-Definition-History of Artificial Intelligence-Intelligent Agents-Types Of Agents-Problem Solving Approach To AI Problems-Problem Formulation

PROBLEM SOLVING

Problem Solving Methods-Search Strategies-Uninformed Search Strategies-Comparison of Uninformed Search Algorithms-Informed Search Strategies-Local Search Algorithms-Searching With Partial Information-Constraint Satisfaction Problem

KNOWLEDGE REPRESENTATION

Propositional Logic-First Order Predicate Logic-Prolog Programming-Unification-Forward Chaining- Backward Chaining-Ontological Engineering-Categories and Objects-Events-Mental Events and Mental Objects.

MACHINE LEARNING

Conditional Probability-Joint probability, Prior Probability- Bayes Rule and Its Applications-Bayesian Networks-Inferences in Bayesian Networks- Markov chain, Hidden Markov Models- Learning from Observation-Supervised Learning.

APPLICATION

AI Applications-Language Models-Information Retrieval-Information Extraction-Natural Language Processing-Machine Translation-Speech Recognition

TEXT BOOKS

1. S. Russell and P. Norvig, "Artificial Intelligence – A Modern Approach", Second Edition, Pearson Education, 2015
2. Bratko, I., Prolog Programming For Artificial Intelligence (International Computer Science Series), Addison-Wesley Educational Publishers Inc; 4th Edition, 2011..

REFERENCES

1. David Poole, Alan Mackworth, Randy Goebel, "Computational Intelligence: A Logical Approach", Oxford University Press, 2004.
2. G. Luger, "Artificial Intelligence: Structures and Strategies For Complex Problem Solving", Fourth Edition, Pearson Education, 2002.
3. J. Nilsson, "Artificial Intelligence: A New Synthesis", Elsevier Publishers, 1998.

COURSE DESIGNERS

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2.	Dr.Nithya	Professor	CSE	Nithya@vmkvec.ac.in

17CSCC17	CYBER SECURITY	Category	L	T	P	Credit
			3	0	0	3

PREAMBLE

This course provides basic knowledge on cyber security concepts. Students able to understand different types of attacks and preventive measures.

PREREQUISITE : COMPUTER NETWORKS

COURSE OBJECTIVES

1.	To understand the fundamentals of cyber security
2.	To understand and prevent different types of attacks
3.	To understand and prevent exploitations in cyber space
4.	To detect and prevent Malicious codes
5.	Defend against cyber attacks

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO1: Able to understand basics concepts in cyber security	Understand
CO2: Able to understand and apply techniques in preventing real time attacks	Understand and Apply
CO3: Able to prevent exploitations in web applications	Apply
CO4: Able to analyze, identify and prevent malicious activity.	Analyze and Apply
CO5: Able to defend against cyber attacks	Apply

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	M	M	M	-	-	-	-	-	-	-	-	M	M	M
CO2	M	M	M	M	M	-	-	-	-	-	-	-	M	M	M
CO3	M	M	S	M	M	-	-	-	-	-	-	-	M	M	M
CO4	S	M	M	M		-	-	-	-	-	-	-	M	M	S
CO5	S	M	M	M	S	-	-	-	-	-	-	-	M	M	S

S- Strong; M-Medium; L-Low

SYLLABUS:

UNIT I- INTRODUCTION	10 Hours
Network and security concepts – basic cryptography – Symmetric encryption – Public key Encryption – DNS – Firewalls – Virtualization – Radio Frequency Identification – Microsoft Windows security Principles.	
UNIT II - ATTACKER TECHNIQUES	8 Hours
Antiforensics – Tunneling techniques – Fraud Techniques - Threat Infrastructure.	
UNIT III - EXPLOITATION	8 Hours
Techniques to gain a foot hold – Misdirection, Reconnaissance, and disruption methods.	
UNIT IV - MALICIOUS CODE	9 Hours
Self Replication Malicious code – Evading Detection and Elevating privileges – Stealing Information and Exploitation.	
UNIT V - DEFENSE AND ANALYSIS TECHNIQUES	10 Hours
Memory Forensics – Honeypots – Malicious code naming – Automated malicious code analysis systems – Intrusion detection systems – Defense special file investigation tools.	
TEXT BOOKS	
1. James Graham, Richard Howard and Ryan Olson, “Cyber Security Essentials”, CRC Press, Taylor & Francis Group, 2011. 2. By Dan Shoemaker, Ph.D., William Arthur Conklin, Wm Arthur Conklin, “Cyber security: The Essential Body of Knowledge”, Cengage Learning, 2012.	
REFERENCES	
1. Ali Jahangiri, “Live Hacking: The Ultimate Guide to hacking Techniques & Counter measures for Ethical Hackers & IT Security Experts”, 2009.	

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17CYCC03	NETWORK SECURITY AND MANAGEMENT									Category	L	T	P	Credit	
											3	0	0	3	
PREAMBLE															
This course provides basic knowledge on network security and management concepts. Students will learn about cryptography algorithms, hash functions, digital signatures and user authentications.															
PREREQUISITE: Computer Networks															
COURSE OBJECTIVES															
1	To understand the concepts in network security and management														
2	To study public key crypto systems														
3	To study about hash functions														
4	To study MAC codes and digital signatures														
5	To study user authentication														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1: Understand network security and management concepts												Remember and Understand			
CO2: Understand and apply public key cryptography												Understand and apply			
CO3: Understand and apply hash functions												Understand and apply			
CO4: Understand and apply MAC codes & digital signatures												Understand and apply			
CO5: Apply user authentication techniques												Apply			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	-	-	-	-	S	-	-	-	M	M	M	S	M
CO2	M	M	S	M	-	-	-	-	-	-	L	M	S	-	-
CO3	M	M	M	M	-	M	-	L	-	-	L	-	S	M	S
CO4	M	S	M	-	-	M	-	-	-	M	-	M	-	M	-
CO5	M	M	-	-	S	M	-	L	-	-	M	M	-	-	M
S- Strong; M-Medium; L-Low															

SYLLABUS:

UNIT I - INTRODUCTION	11 Hours
Definitions & challenges of security, OSI security architecture, attacks & services. Firewalls, Types of Firewalls, Cryptography & cryptanalysis. Classical encryption techniques, substitution techniques, transposition techniques. Block ciphers, DES, AES structure, multiple encryption-triple DES	
UNIT II - PUBLIC KEY CRYPTO SYSTEMS	11 Hours
Number theory fundamentals, principles of public key crypto systems, RSA algorithm, Strength of RSA, Diffie-Hellman key exchange, Elliptic curve cryptography. Symmetric key distribution using symmetric and asymmetric encryptions, distribution of public keys, X.509 Certificates	
UNIT III - HASH FUNCTIONS	8 Hours
Cryptographic hash functions, applications, security requirements, hash function based on block chaining, Secure Hash Algorithm (SHA).	
UNIT IV - MAC CODES AND DIGITAL SIGNATURES	7 Hours
MAC, security requirements, HMAC, CMAC, key wrapping, Digital signatures	
UNIT V - USER AUTHENTICATION	8 Hours
Remote user authentication, symmetric and asymmetric encryptions for user authentications, Kerberos, identity management & verification.	
TEXT BOOKS	
<ol style="list-style-type: none">1. William Stallings, Cryptography & Network Security-Principles and Practices, Sixth Edition, Pearson Publishers, 2014.2. Christof Paar & Jan Pelzl, Understanding cryptography, Heidelberg, Springer 2014.	
REFERENCES	
<ol style="list-style-type: none">1. Bragg et al., Network security –The complete reference, Tata Mc Graw Hill, 2012.	

COURSE DESIGNERS			
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10. Setup Honey Pot and monitor honeypot using KF sensor or any other equivalent software.

REFERENCES:

1. NMAP Network Scanning by Gordon Fyodor Lyon, Published by Insecure.com LLC.
2. Wireshark network analysis, second edition, by Laura Chappell,
3. <https://www.vmware.com/in/products/workstation-pro/workstation-pro-evaluation.html>
4. <https://nmap.org/>
5. <https://www.systemtools.com/somarsoft/index.html?somarsoft.com>
6. <http://www.netstumbler.com/downloads/>
7. <https://www.cryptool.org/de/jcryptool>
8. <https://www.snort.org/>
9. <http://www.keyfocus.net/kfsensor/>

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SYLLABUS:

UNIT I – INTRODUCTION		8 Hours
Introduction to Hacking, Types of Hacking, Hacking Process, Security – Basics of Security- Elements of Security, Penetration Testing, Scanning, Exploitation- Web Based Exploitation. Simple encryption and decryption techniques implementation.		
UNIT II - HACKING TECHNIQUES		10 Hours
Building the foundation for Ethical Hacking, Hacking Methodology, Social Engineering, Physical Security, Hacking Windows, Password Hacking, and Privacy Attacks, Hacking the Network, Hacking Operating Systems- Windows & Linux, Application Hacking, Foot printing, Scanning, and Enumeration. Implementing System Level Hacking- Hacking Windows & Linux.		
UNIT III - WEB SECURITY		11 Hours
Evolution of Web applications, Web application security, Web Application Technologies- Web Hacking, Web functionality, How to block content on the Internet, Web pages through Email, Web Messengers, Unblocking applications, Injecting Code- Injecting into SQL, Attacking Application Logic. Check authentication mechanisms in simple web applications. Implementation of Web Data Extractor and Web site watcher. Implementation of SQL Injection attacks in ASP.NET.		
UNIT IV - WIRELESS NETWORK HACKING		9 Hours
Introduction to Wireless LAN Overview, Wireless Network Sniffing, Wireless Spoofing, Port Scanning using Netcat, Wireless Network Probing, Session Hijacking, Monitor Denial of Service (DoS) UDP flood attack, Man-in-the-Middle Attacks, War Driving, Wireless Security Best Practices, Software Tools, Cracking WEP, Cracking WPA & WPA-II. Implementation- Locate Unsecured Wireless using Net-Stumbler/ Mini-Stumbler.		
UNIT V- APPLICATIONS		7 Hours
Safer tools and services, Firewalls, Filtering services, Firewall engineering, Secure communications over insecure networks, Case Study: Mobile Hacking- Bluetooth-3G network weaknesses, Case study: DNS Poisoning, Hacking Laws. Working with Trojans using NetBus.		
TEXT BOOKS		
1. Kali Linux cook book by Corey P.Schultz, Bob Perciaccante, Second Edition, Packt Publishing, 2017. 2. Stuart McClure, Joel Scambray, George Kurtz, “Hacking Exposed 6: Network Security Secrets & Solutions”, Seventh edition, McGraw-Hill Publisher, 2012. 3. Kevin Beaver, “Hacking for Dummies” Second Edition, Wiley Publishing, 2007. 4. Dafydd Stuttard and Marcus Pinto, “The Web Application Hacker’s Handbook: Discovering and Exploiting Security Flaws” Wiley Publications, 2007. 5. Ankit Fadia, “An Unofficial Guide to Ethical Hacking” Second Edition, Macmillan publishers India Ltd, 2006.		
REFERENCES		
1. Hossein Bidgoli, “The Handbook of Information Security” John Wiley & Sons, Inc., 2005.		

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3. https://static.packt-cdn.com/downloads/KaliLinux2AssuringSecuritybyPenetrationTesting_thirdEdition_ColorImages.pdf
4. <https://www.vmware.com/in/products/workstation-pro/workstation-pro-evaluation.html>

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17CSCC13	DATA WAREHOUSING AND DATA MINING	Category	L	T	P	Credit
		CC	3	0	0	3

PREAMBLE

Data warehousing and data mining is one of the most advanced fields of computer science which involves use of Mathematics, Statistics, Information Technology and information Sciences in discovering new information and knowledge from large databases It is a new emerging interdisciplinary area of research and development which has created interest among scientists of various disciplines.

PREREQUISITE: DATABASE MANAGEMENT SYSTEM

COURSE OBJECTIVES

1. Distinguish a data warehouse from an operational database system, and appreciate the needs for developing a data warehouse for large corporation.
2. Describe the problems and processes involved in the development of a data warehouse
3. To explain the process of data mining and its importance.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO1: To understand the basics of data warehousing and mining	Understand
CO2: To learn the data preprocessing, language, architectures, concept description.	Apply
CO3: To learn the association rules and its algorithms.	Apply
CO4: To learn the classification and clustering rules and the respective algorithms	Apply
CO5: To know the latest trends about the data warehousing and mining	Understand

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	L		M	-	-	-	-	-	-	-	-	M	M	M
CO2	S	M	M	M	-	-	-	-	-	-	-	-	M	M	M
CO3	S	L		L	-	-	-	-	-	-	-	-	M	M	M
CO4	S	M	M	M	-	-	-	-	-	-	-	-	M	M	S
CO5	S	M	M	L	-	-	-	-	-	-	-	-	M	M	S

S- Strong; M-Medium; L-Low

SYLLABUS

INTRODUCTION AND DATA WAREHOUSING

Introduction, Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Implementation, Further Development, Data Warehousing to Data Mining.

DATA PREPROCESSING, LANGUAGE, ARCHITECTURES, CONCEPT DESCRIPTION

Why Preprocessing, Cleaning, Integration, Transformation, Reduction, Discretization, Concept Hierarchy Generation, Data Mining Primitives, Query Language, Graphical User Interfaces, Architectures, Concept Description, Data Generalization, Characterizations, Class Comparisons, Descriptive Statistical Measures.

ASSOCIATION RULES

Association Rule Mining, Single-Dimensional Boolean Association Rules from Transactional Databases, Multi-Level Association Rules from Transaction Databases.

CLASSIFICATION AND CLUSTERING

Classification and Prediction, Issues, Decision Tree Induction, Bayesian Classification, Association Rule Based, Other Classification Methods, Prediction, Classifier Accuracy, Cluster Analysis, Types of data, Categorization of methods, Partitioning methods, Outlier Analysis.

RECENT TRENDS

Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Databases, Multimedia Databases, Time Series and Sequence Data, Text Databases, World Wide Web, Applications and Trends in Data Mining.

TEXT BOOK

1. J. Han, M. Kamber, "Data Mining: Concepts and Techniques", Harcourt India / Morgan Kauffman, 2001.

REFERENCES

1. Margaret H.Dunham, "Data Mining: Introductory and Advanced Topics", Pearson Education 2004.
2. Sam Anahory, Dennis Murry, "Data Warehousing in the real world", Pearson Education 2003.
3. David Hand, Heikki Manila, Padhraic Symth, "Principles of Data Mining", PHI 2004.
4. W.H.Inmon, "Building the Data Warehouse", 3rd Edition, Wiley, 2003.
5. Alex Bazon, Stephen J.Smith, "Data Warehousing, Data Mining & OLAP", McGraw-Hill Edition, 2001.
6. Paulraj Ponniah, "Data Warehousing Fundamentals", Wiley-Interscience Publication, 2003.

COURSE DESIGNERS

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17AICC09	FOUNDATIONS OF DATA SCIENCE	Category	L	T	P	Credit
		CC	3	0	0	3

PREAMBLE

Data Science is about drawing useful conclusions from large and diverse data sets through exploration, prediction, and inference. Exploration involves identifying patterns in information. Prediction involves using information we know to make informed guesses about values we wish we knew. Inference involves quantifying our degree of certainty. The primary tools for exploration are visualizations and descriptive statistics, for prediction are machine learning and optimization, and for inference are statistical tests and models. Through understanding a particular domain, the students learn to ask appropriate questions about their data and correctly interpret the answers provided by inferential and computational tools.

PREREQUISITE

NIL

COURSE OBJECTIVES

1.	To obtain a Comprehensive knowledge of various tools and techniques for Data transformation and visualization
2.	To learn the probability and probabilistic models of data science
3.	To learn the basic statistics and testing hypothesis for specific problems
4.	To learn about the prediction models

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO1: To understand how to apply pre-processing techniques to convert raw data so as to enable further analysis	Understand
CO2: To understand and apply exploratory data analysis and create insightful visualizations to identify patterns	Understand
CO3: To understand how to derive the probability density function of transformations of random variables and use these techniques to generate data from various distributions	Understand
CO4: To understand the statistical foundations of data science and analyze the degree of certainty of predictions using statistical test and models	Understand
CO5: To introduce machine learning algorithms for prediction and to derive insights	Understand

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	-	-	M	-	-	-	-	-	-	-	-	M	M	M
CO2	S	M	M	M	-	-	-	-	-	-	-	-	M	M	M
CO3	S	-	-	-	-	-	-	-	-	-	-	-	M	M	M
CO4	S	M	M	M	-	-	-	-	-	-	-	-	M	M	S
CO5	S	M	M	-	-	-	-	-	-	-	-	-	M	M	S

S- Strong; M-Medium; L-Low

COURSE DESIGNERS

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SYLLABUS

INTRODUCTION: What is Data Science? Big Data and Data Science – Datafication, Current Landscape of perspective, Credit - Skill sets needed; Matrices - Matrices to represent relations between data, and necessary linear algebraic operations on matrices -Approximately representing matrices by decompositions (SVD and PCA); Statistics: Descriptive Statistics:																
PREAMBLE distributions and probability - Statistical Inference: Populations and samples - Statistical modeling - probability This course will take you from the basics of Python to exploring many different types of data. You will learn how to prepare distributions - fitting a model - Hypothesis Testing - Intro to R/ Python. data for analysis, perform simple statistical analyses, create meaningful data visualizations, predict future trends from data, and more.																
DATA PREPROCESSING: Data cleaning - data integration - Data Reduction Data Transformation and Data Discretization-Evaluation of classification methods - Confusion matrix, Students T-tests and ROC curves-Exploratory																
PREREQUISITE: PROGRAMMING IN PYTHON Data Analysis - Basic tools (plots, graphs and summary statistics) of EDA, Philosophy of EDA - The Data Science Process.																
COURSE OBJECTIVES																
BASIC MACHINE LEARNING ALGORITHMS: Association Rule mining – Linear Regression- Logistic Regression Understand the basics in Python programming in terms of constructs, control statements, string functions -Classifiers - k-Nearest Neighbors (k-NN), K-means -Decision tree - Naive Bayes- Ensemble Methods - Random Forest.																
Feature Generation and Feature Selection - Feature Selection algorithms - Filters- Wrappers- Decision Trees- Random Forests. To learn to use Pandas DataFrames, Numpy multi-dimensional arrays, and Scipy libraries to work with a various datasets																
CLUSTERING: Choosing distance metrics - Different clustering approaches - hierarchical agglomerative clustering, k- means (Lloyd's algorithm) - DBSCAN - Relative merits of each method - clustering tendency and quality To introduce another open-source library, scikit-learn, and we will use some of its machine learning algorithms to build smart models and make cool predictions																
COURSE OUTCOMES: Basic principles, ideas and tools for data visualization.																
On the successful completion of the course, students will be able to																
REFERENCE BOOKS																
CO1: Understand the basics in Python programming in terms of constructs, control statements, string functions Guthrie, O'Neil and Rachel Schutt, “Doing Data Science, Straight Talk From The Frontline”, O'Reilly, 2014.												Understand				
CO2: To use Pandas DataFrames, Numpy multi-dimensional arrays, and Scipy libraries to work with various datasets Jawar, Han, Micheline Kamber, and Jian Pei, “Data Mining: Concepts and Techniques”, Third Edition. ISBN 0123814790, 2011												Understand				
CO3: To use pandas, an open-source library, and we will use it to load, manipulate, analyze, and visualize cool datasets. Mohammed J. Zaki and Wagner Miera Jr, “Data Mining and Analysis: Fundamental Cambridge University Press, 2014.												Understand				
CO4: To use scikit-learn, and we will use some of its machine learning algorithms to build smart models and make cool predictions Matt Harrison, “Learning the Pandas Library: Python Tools for Data Munging, Analysis, and Visualization”, O'Reilly, 2016												Apply				
MAPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES																
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	
CO1	S	M	S	-	M	-	-	-	-	-	-	M	S	S	M	
CO2	S	M	S	-	M	-	-	-	-	-	-	M	M	S	M	
CO3	S	M	S	-	M	-	-	-	-	-	-	M	S	S	M	
CO4	S	M	S	-	M	-	-	-	-	-	-	M	S	S	M	
S- Strong, M-Medium, L-Low				Professor				CSE				rjaichadran@gmail.com				
2.	Mr.M.Annamalai			Assistant Professor				CSE				annamalai@vmkvec.edu.in				

17AICC10	BIG DATA ANALYTICS	Category	L	T	P	Credit
		CC	3	0	0	3

PREAMBLE

This course covers foundational techniques and tools required for big data analytics. This course spotlights the concepts, principles, and techniques are applicable in big data analytics environment in industry and real-world experience.

PREREQUISITE

DATABASE MANAGEMENT SYSTEM

COURSE OBJECTIVES

1	To understand how big data analytics can leverage into a key component
2	To understand the big data tools with their applications
3	To understand the big data reports for the existing tools
4	To understand the big data applications like MongoDB, Cassandra and Hive.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO1: Understand the basics of digital data and introduction to big data	Understand
CO2: Analyze the basic big data challenges, important and technologies.	Analyze
CO3: Solve big data analytics challenges with the help of Hadoop and MongoDB architecture and technologies.	Apply
CO4: Analyze big data storage like MongoDB, Cassandra and Hive.	Analyze
CO5: Analyze Pig and Hive in terms of processing and to design JasperReports.	Analyze

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
CO2	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
CO3	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
CO4	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
CO5	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M

S- Strong; M-Medium; L-Low

SYLLABUS

DIGITAL DATA AND INTRODUCTION TO BIG DATA

Types of Digital Data - Structured Data - Semi-Structured Data - Unstructured Data - Introduction to Big Data - What is Big Data - Why Big Data - Traditional Business Intelligence (BI) versus Big Data - Typical Hadoop Environment - Changes in the Realms of Big Data - Coexistence of Big Data and Data Warehouse.

BIG DATA ANALYTICS

What's in Store? - Big Data Analytics - Classification of Analytics - Greatest Challenges that Prevent Businesses from Capitalizing on Big Data - Greatest Challenges that Prevent Businesses from Capitalizing on Big Data - Big Data Analytics Important - Technologies for Meet the Challenges Posed by Big Data - Data Science - Data Scientist - Big Data Environment - Analytics Tools.

HADOOP

Introduction to Hadoop - Hadoop Components - Hadoop Conceptual Layer - High Level Architecture of Hadoop - Business Value of Hadoop -Hadoop Distributed File System - Processing Data with Hadoop - MapReduce Daemons - MapReduce working - MapReduce Example - Managing Resources and Application with Hadoop YARN - Hadoop Ecosystem.

MONGODB, CASSANDRA AND HIVE

MongoDB - RDBMS and MongoDB - Data Types in MongoDB-CRUD- Introduction to Apache Cassandra - Features of Cassandra - CQL Data Types -CQLSH- Keyspaces-CRUD-Collections- Using a Counter - Time To Live (TTL)-Alter - Import and Export - Export to CSV - Import from CSV - Import from STDIN - Export to STDOUT - System Tables - Practice Examples - Introduction to Hive - Hive Architecture - Hive Data Types - Hive File Format - Hive Query Language - RCFILE Implementation - SERDE - UDF.

PIG AND JASPER REPORTS

Anatomy of Pig - Pig on Hadoop - Pig Philosophy - Use Case for Pig: ETL Processing - Pig Latin Overview - Data Types in Pig - Running Pig - Execution Modes of Pig - HDFS Commands - Relational Operators - Eval Function - Complex Data Type - Piggy Bank - UDF (User Defined Function) - Parameter Substitution - Diagnostic Operator - Word Count Example - When to use Pig? - When NOT to use Pig? - Pig at Yahoo - Pig versus Hive - Hive Vs Pig - Introduction to Jasper Reports, Jaspersoft Studio - Connecting to MongoDB NoSQL database - Connecting to Cassandra NoSQL Databases

TEXT BOOKS

1. Big Data and Analytics - Seema Acharya and Subhashini C - Wiley India
2. Big data for dummies - Judith Hurwitz, Alan Nugent,Fern Halper, Marcia Kaufman
3. Hadoop: The Definitive Guide by Tom White
4. Hadoop in action - Chuck Lam
5. Hadoop for dummies - Dirk Deroos, Paul C. Zikopoulos, Roman B. Melnyk,Bruce Brown

REFERENCES

1. Frank J Ohlhorst, "Big Data Analytics: Turning Big Data into Big Money", Wiley and SAS Business Series, 2012.
2. Colleen Mccue, "Data Mining and Predictive Analysis: Intelligence Gathering and Crime Analysis", Elsevier, 2007
3. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007.
4. Anand Rajaraman and Jeffrey David Ullman, Mining of Massive Datasets, Cambridge University Press, 2012.
6. Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", Wiley and SAS Business Series, 2012

COURSE DESIGNERS

S. No.	Name of the Faculty	Designation	Department	Mail ID
1.	Dr.R.Jaichandran	Professor	CSE	rjaichandran@avit.ac.in
2.	Dr.M. Nithya	Professor	CSE	nithya@vmkvec.edu.in

17AICC11	BIG DATA ANALYTICS LAB	Category	L	T	P	Credit
		CC	0	0	4	2

PREAMBLE

This course covers foundational techniques and tools required for big data analytics. This course spotlights the concepts, principles, and techniques are applicable in big data analytics environment in industry and real-world experience.

PREREQUISITE

DATA WAREHOUSING AND DATA MINING

COURSE OBJECTIVES

1	To understand how big data analytics can leverage into a key component
2	To understand the big data tools with their applications
3	To understand the big data reports for the existing tools
4	To understand the big data applications like MongoDB, Cassandra and Hive.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO1: Understand the basics of digital data and introduction to big data	Understand
CO2: Analyze the basic big data challenges, important and technologies.	Analyze
CO3: Solve big data analytics challenges with the help of Hadoop and MongoDB architecture and technologies.	Apply
CO4: Analyze big data storage like MongoDB, Cassandra and Hive.	Analyze
CO5: Analyze Pig and Hive in terms of processing and to design JasperReports.	Analyze

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
CO2	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
CO3	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
CO4	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
CO5	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M

S- Strong; M-Medium; L-Low

LIST OF EXPERIMENTS

1. Install, configure and run Hadoop and HDFS
2. Implement word count / frequency programs using MapReduce
3. Implement an MR program that processes a weather datasetR
4. Implement Linear and logistic Regression
5. Implement SVM / Decision tree classification techniques
6. Implement clustering techniques
7. Visualize data using any plotting framework
8. Implement an application that stores big data in Hbase / MongoDB / Pig using Hadoop / R.

TEXT BOOKS

1. Big Data and Analytics - Seema Acharya and Subhashini C - Wiley India
2. Big data for dummies - Judith Hurwitz, Alan Nugent, Fern Halper, Marcia Kaufman
3. Hadoop: The Definitive Guide by Tom White
4. Hadoop in action - Chuck Lam
5. Hadoop for dummies - Dirk Deroos, Paul C. Zikopoulos, Roman B. Melnyk, Bruce Brown

REFERENCES

1. Frank J Ohlhorst, "Big Data Analytics: Turning Big Data into Big Money", Wiley and SAS Business Series, 2012.
2. Colleen Mccue, "Data Mining and Predictive Analysis: Intelligence Gathering and Crime Analysis", Elsevier, 2007
3. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007.
4. Anand Rajaraman and Jeffrey David Ullman, Mining of Massive Datasets, Cambridge University Press, 2012.
5. Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", Wiley and SAS Business Series, 2012

SYLLABUS

PYTHON PROGRAMMING:

Python Basics: Your first program – Types - Expressions and Variables - String Operations - Python Data Structures: Lists and Tuples – Sets – Dictionaries - Python Programming Fundamentals: Conditions and Branching – Loops – Functions - Objects and Classes - Working with Data in Python: Reading files with open Writing files with open - Loading data with Pandas - Working with and Saving data with Pandas

IMPORTING DATASETS

Learning Objectives - Understanding the Domain - Understanding the Dataset - Python package for data science - Importing and Exporting Data in Python - Basic Insights from Datasets – Cleaning and preparing the data - Identify and Handle Missing Values - Data Formatting - Data Normalization Sets – Binning - Indicator variables - Summarizing The Data Frame - Descriptive Statistics - Basic of Grouping – ANOVA – Correlation - More on Correlation -

PROBABILITY AND STATISTICS:

Introduction to probability - Sampling and sampling distributions - Hypothesis testing - Two sample testing and introduction to ANOVA - Two way ANOVA and linear regression - Linear regression and multiple regression - Concepts of MLE and Logistic regression - ROC and Regression Analysis Model Building - χ^2 Test and introduction to cluster analysis Clustering analysis - Classification and Regression Trees (CART)

MODEL DEVELOPMENT

Simple and Multiple Linear Regression - Model Evaluation Using Visualization - Polynomial Regression and Pipelines - R-squared and MSE for In-Sample Evaluation - Prediction and Decision Making

MODEL EVALUATION

Model Evaluation - Over-fitting, Under-fitting and Model Selection - Ridge Regression - Grid Search Model Refinement

REFERENCES

1. McKinney, W. (2012). Python for data analysis: Data wrangling with Pandas, NumPy, and IPython. " O'Reilly Media, Inc."
2. Swaroop, C. H. (2003). A Byte of Python. Python Tutorial.
3. Jay L. Devore (2011). Probability and Statistics for Engineering and the Sciences. "Cengage Learning".
4. David W. Hosmer, Stanley Lemeshow (2000). Applied logistic regression (Wiley Series in probability and statistics). "Wiley-Interscience Publication".
5. Leonard Kaufman, Peter J. Rousseeuw (1990). Finding Groups in Data: An Introduction to Cluster Analysis. "John Wiley & Sons, Inc".

COURSE DESIGNERS

S. No.	Name of the Faculty	Designation	Department	Mail ID
1	Mrs.V.Subapriya	Assistant Professor (G II)	CSE	Subapriya.cse@avit.ac.in
2	Mr.B.Sundaramurthy	Associate Professor	CSE	sundaramurthy@vmvkec.edu.in

17CYEC01	DIGITAL FORENSICS	Category	L	T	P	Credit
			3	0	0	3

PREAMBLE

The course covers the principles and practice of digital forensics. Students will study about societal and legal impact of computer activity: computer crime, intellectual property, privacy issues, legal codes; risks, vulnerabilities, and countermeasures; methods and standards for extraction, preservation, and deposition of legal evidence in a court of law.

PREREQUISITE : Cyber Security

COURSE OBJECTIVES

1.	To understand how to do the digital forensics investigation.
2.	To apply appropriate skills and knowledge in solving various computer forensics problems.
3.	To apply knowledge in solving forensic problems related with data.
4.	To apply knowledge in solving forensic problems related with routers, networks and E-mails.
5.	To learn email forensics and steganography

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO1: Able to understand basics in digital forensics	Understand
CO2: Able to understand and apply digital forensics in investigation	Understand and Apply
CO3: Able to understand and apply data forensics	Understand and Apply
CO4: Able to understand and apply network forensics	Understand and Apply
CO5: Able to understand and apply email forensics & Steganography	Understand and Apply

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	M	M	-	M	-	S	-	-	-	-	S	M	M
CO2	S	M	S	M	M	M	-	S	-	-	-	-	M	M	M
CO3	M	M	S	M	M	M	-	S	-	-	-	-	M	M	M
CO4	S	M	M	M		M	-	S	-	-	-	-	M	M	S
CO5	S	M	M	M	S	M	-	S	-	-	-	-	M	M	S

S- Strong; M-Medium; L-Low

SYLLABUS:

UNIT I - INTRODUCTION	8 Hours
History of Forensics – Computer Forensic Flaws and Risks – Rules of Computer Forensics – Legal issues – Digital Forensic Principles – Digital Environments – Digital Forensic Methodologies.	
UNIT II - DIGITAL FORENSIC INVESTIGATION	9 Hours
Live forensics and investigation – Digital evidence – Seizure methodology- Factors limiting the whole sale seizure of hardware- Demystifying computer /cyber crime – explosion of networking – explosion of wireless networks – Interpersonal communication.	
UNIT III - DATA FORENSIC	8 Hours
Recovering deleted files and deleted partitions – deleted file recovery tools – deleted partitioned recovery tools – data acquisition and duplication – data acquisition tools – hardware tools – backing up and duplicating data.	
UNIT IV - NETWORK FORENSIC	10 Hours
An overview of Routers – Hacking Routers – Investigating Routers – Investigating Wireless Attacks – Basics of wireless – Wireless Penetration Testing – Direct Connections to Wireless Access Point – Wireless Connect to a Wireless Access Point.	
UNIT V - EMAIL FORENSIC & STEGANOGRAPHY	10 Hours
E-Mail Terminology - Forensics Acquisition – Processing Local mail archives – Processing server level archives – classification of steganography – categories of steganography in Forensics – Application of steganography -Types of password cracking	
TEXT BOOKS	
1. John Sammons, “The Basics of Digital Forensics”, Elsevier 2015 2. Linda Volonins, Reynalds Anzaldua, “Computer Forensics for dummies”, Wiley Publishing Inc., 2008. 3. Anthony Reyes, Jack Wiles, “Cybercrime and Digital Forensics”, Syngress Publishers, Elsevier 2007.	
REFERENCES	
1. Thomas J Holt, Adam M Bossler and Kathryn C, “Cybercrime and Digital Forensics: An Introduction” 1st Edition, Routledge Publisher, 2015.	

COURSE DESIGNERS			
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Dr.R.Jaichandran	Professor	CSE	rjaichandran@avit.ac.in

17CYEC02	CYBER CRIMES AND LAWS								Category	L	T	P	Credit		
										3	0	0	3		
PREAMBLE															
This course provides basic knowledge about cyber crimes and laws. Students will study about cyber laws for various types of cyber crimes.															
PREREQUISITE : Nil															
COURSE OBJECTIVES															
1.	To provide introduction to cybercrimes and types														
2.	To provide introduction to cyber crimes and digital evidences														
3.	To study cyber laws														
4.	To study about copy rights in digital medium														
5.	To study cyber laws in e-commerce														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1: Able to understand types of cyber crimes												Understand			
CO2: Able to understand various types of cybercrimes and apply digital evidence in investigation												Understand and Apply			
CO3: Able to understand and apply cyber laws against cyber crimes												Understand and Apply			
CO4: Able to understand copy rights in digital medium												Understand			
CO5: Able to understand and apply cyber laws in e-commerce												Understand and Apply			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	M	M	M	-	S	-	S	-	-	-	-	S	M	M
CO2	M	M	S	M	M	S	-	S	-	-	-	-	M	M	M
CO3	M	M	S	M	M	S	-	S	-	-	-	-	M	M	M
CO4	S	M	M	M		S	-	S	-	-	-	-	M	M	S
CO5	S	M	M	M	S	S	-	S	-	-	-	-	M	M	S
S- Strong; M-Medium; L-Low															

SYLLABUS:

UNIT I - INTRODUCTION			8 Hours
History of computer networking and the Internet. Network edge - Protocol layers and their service models - Networks attacks – types of cybercrimes, case studies in cyber crime			
UNIT II - CYBER CRIME AND DIGITAL EVIDENCE			9 Hours
Computer system security- History-Standards, International security activity access controls-user access management –types of access control-Information security-threats-structure-policies- Tools - Information processing-Introduction to wireless network security.			
UNIT III - CYBER LAW			9 Hours
Scope of Cyber Law, Introduction to Indian Cyber Law, General Laws and Procedures in India-Cyber Law and Internet- Understanding of internet-Cyber Jurisprudence-Analytical and Ethical Jurisprudence-Conflicts of Law-Case Study: International Conventions on Cyber Law.			
UNIT IV - COPY RIGHTS IN DIGITAL MEDIUM			10 Hours
Organization security-asset classification and control-physical and environment security-personnel security-Human Rights- Cyber Stalking, Privacy Invasion by Government, E-Government and E-governance-Legal Issues in E-Governance Intellectual Property Issues and Cyberspace - The Indian Perspective.			
UNIT V - CYBER LAWS FOR E-COMMERCE			9 Hours
e-Commerce in India-Overview of e-Commerce- Growth and Potential of Ecommerce in India- Bottlenecks of e-Commerce-Regulatory and Legal Environment of E-Commerce- e-Banking-Tele-Banking Service-Challenges of Development of e-Banking- Electronic Contracts- Digital Signatures- legal and technical issues.			
TEXT BOOKS			
<ol style="list-style-type: none"> 1. Kenneth J. Knapp, “Cyber Security and Global Information Assurance: Threat Analysis and Response Solutions”, IGI Global, 2009. 2. Debby Russell and Sr. G.T Gangemi, “Computer Security Basics (Paperback)”, 2nd Edition, O’ Reilly Media, 2006. 3. Thomas R. Peltier, “Information Security policies and procedures: A Practitioner’s Reference”, 2nd Edition Prentice Hall, 2004. 4. Jonathan Rosenoer, “Cyber law: the Law of the Internet”, Springer-verlag, 1997. 5. Thomas R Peltier, Justin Peltier and John blackley, “Information Security Fundamentals”, 2nd Edition, Prentice Hall, 1996. 			
REFERENCES			
COURSE DESIGNERS			
Name of the Faculty	Designation	Department	Mail ID
Dr.R.Jaichandran	Professor	CSE	rjaichandran@avit.ac.in

1. Law Relating to COMPUTERS, Internet and E-Commerce - A Guide to CYBER LAWS & the IT Act, with Rules, Regulations, Notifications & Case Law By NandanKamath (Ed.), Foreword by N.R.MadhavaMenon.
2. Electronic Banking: The Ultimate Guide to Online Banking Hardcover by SCN Education B.V.
3. Law Relating to COMPUTERS, Internet and E-Commerce - A Guide to CYBER LAWS & the IT Act, with Rules, Regulations, Notifications & Case Law By NandanKamath (Ed.), Foreword by N.R.MadhavaMenon.
4. Information Technology Law and practices by Vakulsharma,
5. Computers, Internet and New Technology Laws (A comprehensive reference work with a special focus on developments in India)" By: Karnika Seth,
6. Cyber Law & Crimes By: BarkhaBhasin, Rama Mohan Ukkalam,

17CYEC03	INTRUSION DETECTION AND PREVENTION SYSTEM	Category	L	T	P	Credit
			3	0	0	3

PREAMBLE

This course provides knowledge on intrusion detection and prevention system. Students learn about the different types of intrusions and tools used for detection and prevention of intrusions.

PREREQUISITE: Network Security and management

COURSE OBJECTIVES

1	To understand the concepts of intrusion detection and prevention system
2	To study intrusion detection system models
3	To study about anomaly detection
4	To develop secure intrusion detection system
5	To study recent trends in intrusion detection and prevention systems

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO1: Understand intrusion detection and prevention systems	Understand
CO2: Develop and apply intrusion detection and prevention systems models	Understand and apply
CO3: Detect anomaly's	Understand and apply
CO4: Apply security concepts in intrusion detection and prevention system	Understand and apply
CO5: Apply IDPS tools	Apply

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	-	-	-	-	S	-	-	-	M	M	M	S	M
CO2	M	M	S	M	-	-	-	-	-	-	L	M	S	-	-
CO3	M	M	M	M	-	M	-	L	-	-	L	-	S	M	S
CO4	M	S	M	-	-	M	-	-	-	M	-	M	-	M	-
CO5	M	M	-	-	S	M	-	L	-	-	M	M	-	-	M

S- Strong; M-Medium; L-Low

SYLLABUS:

UNIT I - INTRODUCTION			9 Hours
Intruder types, intrusion methods, processes and detection, message integrity and authentication, honeypots, firewalls.			
UNIT II - INTRUSION DETECTION SYSTEM (IDS)			9 Hours
General IDS model, data mining based IDS, Denning model, data mining framework for constructing features and models for intrusion detection systems			
UNIT III - ANOMALY DETECTION			9 Hours
Unsupervised anomaly detection, Host-based anomaly detection, taxonomy of security flaws in software, self-modeling system calls for intrusion detection with dynamic window size.			
UNIT IV - SECURE INTRUSION DETECTION SYSTEM			10 Hours
Secure intrusion detection systems, network security, secure intrusion detection environment, secure policy manager, and secure IDS sensor, alarm management, intrusion detection system signatures, sensor configuration, signature and intrusion detection configuration, IP blocking configuration, intrusion detection system architecture.			
UNIT V - RECENT TRENDS			8 Hours
Zero day attacks, artificial Intelligence in IDPS, tools for IDPS, Case studies			
TEXT BOOKS			
3. Al-Sakib Khan Patha, The State of the Art in Intrusion Prevention and Detection, CRC press, 2016.			
4. Endorf, C., Schultz E. and Mellander J., “Intrusion Detection and Prevention,” McGraw-Hill, 2003.			
REFERENCES			
2. Rash, M., Orebaugh, A. and Clark, G., “Intrusion Prevention and Active Response: Deploying Network and Host IPS”, Syngress. 2005.			
3. Cooper, M., Northcutt, S., Fearnow, M. and Frederick, K., “Intrusion Signatures and Analysis”, Sams. 2001			
COURSE DESIGNERS			
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Dr.R.Jaichandran	Professor	CSE	rjaichandran@avit.ac.in

17CYEC04	PENETRATION TESTING	Category	L	T	P	Credit
			3	0	0	3

PREAMBLE

To course provides basic knowledge on the penetration testing. Students will learn about the tools used for penetration testing

PREREQUISITE: Ethical Hacking

COURSE OBJECTIVES

1	To understand penetration testing and its types
2	To study metasploit techniques
3	To understand and apply meterpreter techniques
4	To understand and apply credential harvesting techniques
5	To apply tools for penetration testing

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO1: Able to understand penetration techniques	Understand
CO2: To understand and develop applications for metasploit	Understand and apply
CO3: To understand and develop applications for meterpreter	Understand and apply
CO4: To understand and develop applications for credential harvesting	Understand and apply
CO5: Able to setup penetration testing environment.	Apply

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	-	-	-	-	S	-	-	-	M	M	M	S	M
CO2	M	M	S	M	-	-	-	-	-	-	L	M	S	-	-
CO3	M	M	M	M	-	M	-	L	-	-	L	-	S	M	S
CO4	M	S	M	-	-	M	-	-	-	M	-	M	-	M	-
CO5	M	M	-	-	S	M	-	L	-	-	M	M	-	-	M

S- Strong; M-Medium; L-Low

SYLLABUS:

UNIT I - INTRODUCTION			10 Hours
Basics of Penetration Testing, Types of Penetration Testing, Intelligence Gathering, Thread Modeling, Vulnerability Analysis, Vulnerability Scanners			
UNIT II – METASPLOIT			8 Hours
Metasploit Overview, Meta Sploit Interfaces, Utilities,			
UNIT III – METERPRETER			10 Hours
Scanning with NMAP, Attack MS SQL, Basic Meterpreter Commands, Dumping Username and Password, Meterpreter Scripting			
UNIT IV - CREDENTIAL HARVESTING			8 Hours
Credential Harvesting overview, Configuration, Launching the attack, , Building Your Own Module			
UNIT V - SIMULATED PENETRATION TESTING			9 Hours
Post Exploitation, Attacking Apache Tomcat, Attacking Obscure Services, Configuring your Own Target Machine			
TEXT BOOKS			
1. David Kennedy, Jim O'Gorman, Devon Kearns, and Mati Aharoni, "Metasploit the Penetration Tester's Guide", No Starch Press, 2011, ISBN is 9781593272883.			
REFERENCES			
1. Lee Allen, Tedi Heriyanto, Shakeel Ali, "Kali Linux – Assuring Security by Penetration Testing", Packt Publishing, 2014, ISBN is 978-1-84951-948-9			
COURSE DESIGNERS			
Name of the Faculty	Designation	Department	Mail ID
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UNIT I - INTRODUCTION	10 Hours
Introduction to Mobile Security - Security of GSM Networks - Security of UMTS Networks - LTE Security - Vulnerabilities in Cellular Services - WiFi and Bluetooth Security - SIM/UICC Security - Security of Mobile VoIP Communications.	
UNIT II - MOBILE COMMUNICATION AND SECURITY	10 Hours
Threats, Hacking, and Viruses in Mobile Communications. Access Control and Authentication in Mobile Communications. Common Techniques for Mobile Communications Security. Smart Card Security: The SIM/USIM Case.	
UNIT III - ATTACKS AND PROTECTION TECHNIQUES IN MOBILE COMMUNICATION	8 Hours
Security of GSM Networks. Security of 3G Networks. Wireless Local Area Network Security. Security of Ad Hoc Networks.	
SECURITY OF NETWORK-BASED SERVICES IN MOBILE COMMUNICATION	9 Hours
Inter-System Roaming and Internetworking Security. Securing Mobile Services. Security of Mobile Sensor Networks. Security of Satellite Services.	
PROTECTION TECHNIQUES FOR MOBILE APPLICATIONS	8 Hours
Security of Mobile Payments. Security of Mobile Voice Communications. Security of Multimedia Communications	
TEXT BOOKS	
<ol style="list-style-type: none"> 1. Nourreddine Boudriga, Security of Mobile Communications, Auerbach Publications, CRC Press, 2019. 2. Nouredine Boudriga, "Security of Mobile Communications", CRC Press, 2009. 	
REFERENCES	
1. Himanshu Dwivedi, Chris Clark and David Thiel, "Mobile Application Security", McGraw-Hill, 1st Edition, 2010.	

COURSE DESIGNERS			
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17CYEC06	BIG DATA SECURITY								Category	L	T	P	Credit		
									EC(PS)	3	0	0	3		
PREAMBLE In this course you will learn how to program in R and how to use R for effective data analysis. You will learn how to install and configure software necessary for a statistical programming environment, discuss generic programming language concepts as they are implemented in a high-level statistical language. The course covers practical issues in statistical computing which includes programming in R, reading data into R, accessing R packages, writing R functions, debugging, and organizing and commenting R code. Topics in statistical data analysis and optimization will provide working example.															
PREREQUISITE BIG DATA ANALYTICS															
COURSE OBJECTIVES															
1	To understand the mathematical foundations of security principles														
2	To appreciate the different aspects of encryption techniques														
3	To understand the role played by authentication in security														
4	To understand the security concerns of big-data.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1: To understand the mathematical foundations of security principles												Understand			
CO2: To appreciate the different aspects of encryption techniques												Understand			
CO3: To understand the role played by authentication in security												Understand			
CO4: To understand the security concerns of big-data												Understand			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
CO2	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
CO3	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
CO4	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
S- Strong; M-Medium; L-Low															

SYLLABUS**SYMMETRIC TECHNIQUES**

Probability and Information Theory - Algebraic foundations – Number theory - Substitution Ciphers – Transposition Ciphers – Classical Ciphers – DES – AES – Confidentiality Modes of Operation

ASYMMETRIC TECHNIQUES

Diffie-Hellman Key Exchange protocol – Discrete logarithm problem – RSA cryptosystems & cryptanalysis – ElGamal cryptosystem – Elliptic curve architecture and cryptography - Data Integrity techniques.

AUTHENTICATION

Authentication requirements – Authentication functions – Message authentication codes – Hash functions – Security of hash functions and MACS – MD5 Message Digest algorithm – Secure hash algorithm.

SECURITY ANALYTICS I

Introduction to Security Analytics – Techniques in Analytics – Analysis in everyday life – Challenges in Intrusion and Incident Identification – Analysis of Log file – Simulation and Security Process.

SECURITY ANALYTICS II

Access Analytics – Security Analysis with Text Mining – Security Intelligence – Security Breaches

REFERENCESBOOKS:

1. William Stallings, “Cryptography and Network security: Principles and Practices”, Pearson/PHI, 5th Edition, 2010.
2. Behrouz A. Forouzan, “Cryptography and Network Security”, Tata McGraw Hill Education, 2nd Edition, 2010.
3. Douglas R. Stinson, “Cryptography Theory and Practice”, Chapman & Hall/CRC, 3rd Edition, 2006.
4. Mark Talabis, Robert McPherson, I Miyamoto and Jason Martin, “Information Security Analytics: Finding Security Insights, Patterns, and Anomalies in Big Data”, Syngress Media, U.S., 2014.

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17CYEC07	CLOUD COMPUTING SECURITY						Category	L	T	P	Credit				
							EC(PS)	3	0	0	3				
PREAMBLE This course cloud computing security introduces the basic concepts of security in cloud services and crypto systems in cloud services, which are widely used in the design of cloud computing security. The security issues in virtualization system, virtualization technology, virtualization attacks and legal issues are also considered with in this course.															
PREREQUISITE CLOUD COMPUTING,,CYBER SECURITY															
COURSE OBJECTIVES															
1	To understand cloud computing security concepts														
2	To study various cloud services														
3	To apply cloud computing in collaboration with other services														
4	To understand the cloud computing services														
5	To apply cloud computing online														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1: Understand basic service concepts of cloud computing										Understand					
CO2: Understand and apply security issues in cloud computing										Analyze					
CO3: Apply virtualization techniques										Apply					
CO4: Understand and apply the attacks concepts in virtualization										Apply					
CO5: Understand and apply legal issues in cloud services										Apply					
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	L	-	M	-	-	M	-	-	-	M	S	M	M
CO2	S	M	L	-	M	-	-	M	-	-	-	M	S	M	M
CO3	S	M	L	-	M	-	-	M	-	-	-	M	S	M	M
CO4	S	M	L	-	M	-	-	M	-	-	-	M	S	M	M
CO5	S	M	L	-	M	-	-	M	-	-	-	M	S	M	M
S- Strong; M-Medium; L-Low															

SYLLABUS

INTRODUCTION

Security in Cloud Services (PaaS, IaaS and SaaS). Authentication in cloud services, open SSL, key management and crypto systems in cloud services: stream ciphers, block ciphers, modes of operation, hashing, digital signatures.

SECURITY ISSUES

Security Issues in Virtualization System: ESX and ESXi Security, ESX file system security, storage considerations, backup and recovery. Vulnerabilities in virtual machine, hypervisor vulnerabilities, hypervisor escape vulnerabilities, configuration issues, malware (botnets etc).

VIRTUALIZATION TECHNOLOGY

IBM security virtual server protection, virtualization-based sandboxing; Storage Security- HIDPS, log management, Data Loss Prevention. Location of the Perimeter.

VIRTUALIZATION ATTACKS

Guest hopping, attacks on VM (attack on control of VM, code injection into virtualized file structure), VM migration attack, hyperjacking.

LEGAL ISSUES

Responsibility, ownership of data, right to penetration test, local law where data is held, examination of modern Security Standards (eg PCIDSS), how standards deal with cloud services and virtualization, compliance for the cloud provider vs. compliance for the customer

TEXT BOOKS

1. Tim Mather, Subra Kumaraswamy, Shahed Latif, "Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance" O'Reilly Media; 1 edition [ISBN: 0596802765], 2009.
2. Ronald L. Krutz, Russell Dean Vines, "Cloud Security" [ISBN: 0470589876], 2010.

REFERENCES

1. John Rittinghouse, James Ransome, "Cloud Computing" CRC Press; 1 edition [ISBN: 1439806802], 2009.

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17CYEC08		DATA VISUALIZATION TECHNIQUES						Category	L	T	P	Credit			
								EC(PS)	3	0	2	4			
PREAMBLE															
Visualization is increasingly important in this era where the use of data is growing in many different fields. Data visualization techniques allow people to use their perception to better understand this data. The goal of this course is to introduce students to data visualization including both the principles and techniques. Students will learn the value of visualization, specific techniques in information visualization and scientific visualization, and how understand how to best leverage visualization methods.															
PREREQUISITE															
DATA WAREHOUSING AND DATA MINING															
COURSE OBJECTIVES															
1	To understand how accurately represent voluminous complex data set in web and fromother data sources														
2	To understand the methodologies used to visualize large data sets														
3	To understand the process involved in data visualization and security aspects involved in data visualization														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1: Understand how accurately represent voluminous complex data set in web and fromother data sources												Understand			
CO2: Understand the methodologies used to visualize large data sets												Understand			
CO3: Uunderstand the process involved in data visualization and security aspects involved in data visualization												Understand			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	L	-	M	-	-	M	-	-	-	M	S	M	M
CO2	S	M	L	-	M	-	-	M	-	-	-	M	S	M	M
CO3	S	M	L	-	M	-	-	M	-	-	-	M	S	M	M
S- Strong; M-Medium; L-Low															

SYLLABUS

INTRODUCTION

Context of data visualization – Definition, Methodology, Visualization design objectives. Key Factors – Purpose, visualization function and tone, visualization design options – Data representation, Data Presentation, Seven stages of data visualization, widgets, data visualization tools.

VISUALIZING DATA METHODS

Mapping - Time series - Connections and correlations - Scatterplot maps - Trees, Hierarchies and Recursion - Networks and Graphs, Info graphics

VISUALIZING DATA PROCESS

Acquiring data, - Where to Find Data, Tools for Acquiring Data from the Internet, Locating Files for Use with Processing, Loading Text Data, Dealing with Files and Folders, Listing Files in a Folder, Asynchronous Image Downloads, Advanced Web Techniques, Using a Database, Dealing with a Large Number of Files. Parsing data - Levels of Effort, Tools for Gathering Clues, Text Is Best, Text Markup Languages, Regular Expressions (regexps), Grammars and BNF Notation, Compressed Data, Vectors and Geometry, Binary Data Formats, Advanced Detective Work.

INTERACTIVE DATA VISUALIZATION

Drawing with data – Scales – Axes – Updates, Transition and Motion – Interactivity - Layouts – Geomapping – Exporting, Framework – T3, .js, tablo.

SECURITY DATA VISUALIZATION

Port scan visualization - Vulnerability assessment and exploitation - Firewall log visualization - Intrusion detection log visualization - Attacking and defending visualization systems - Creating security visualization system.

REFERENCES

1. Scott Murray, “Interactive data visualization for the web”, O’Reilly Media, Inc., 2013.
2. Ben Fry, “Visualizing Data”, O’Reilly Media, Inc., 2007.
3. Greg Conti, “Security Data Visualization: Graphical Techniques for Network Analysis”, No Starch Press Inc, 2007

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17CYEC09		DATA CENTRE VIRTUALIZATION						Category	L	T	P	Credit			
								EC	3	0	0	3			
PREAMBLE															
This course focuses on the challenges in setting up a data center. Resource monitoring using hypervisors and access control to virtual machines will be covered in depth in this course. Setting up of a virtual data center and how to manage them with software interfaces will be discussed in detail															
PREREQUISITE															
DATABASE MANAGEMENT SYSTEM															
COURSE OBJECTIVES															
1	To learn the concepts of Web design patterns and page design														
2	To understand and learn the scripting languages with design of web applications														
3	To learn the maintenance and evaluation of web design														
4	To learn about Resource monitoring and virtual machine data Protection														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1: Explain the concept of data center and Evolution of Data Centre												Understand			
CO2: Apply enterprise-level virtualization machines through software management interfaces, Environments connectivity.												Apply			
CO3: Illustrate the virtualization deployment, modification, management; monitoring and migration methodologies												Apply			
CO4: Analyze the utility in Windows Vista and later, displays information about the use of hardware and software resources in real time.												Analyze			
CO5: Develop the resource monitoring and virtual machine data Protection skills.												Analyze			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	L	-	M	-	-	-	-	-	-	M	S	M	-
CO2	S	L	L	-	M	-	-	-	-	-	-	M	S	M	M
CO3	S	M	L	-	M	-	-	-	-	-	-	M	S	-	M
CO4	S	M	L	-	L	-	-	-	-	-	-	M	S	M	M
CO5	S	L	L	-	M	-	-	-	-	-	-	M	S	M	-

SYLLABUS

DATA CENTER CHALLENGES

How server, desktop, network Virtualization and cloud computing reduce data centre footprint, environmental impact and power requirements by driving server consolidation; Evolution of Data Centres: The evolution of computing infrastructures and architectures from standalone servers to rack optimized blade servers and unified computing systems (UCS).

ENTERPRISE-LEVEL VIRTUALIZATION

Provision, monitoring and management of a virtual datacenter and multiple enterprise-level virtual servers and virtual machines through software management interfaces; Networking and Storage in Enterprise Virtualized Environments - Connectivity to storage area and IP networks from within virtualized environments using industry standard protocols

VIRTUAL MACHINES & ACCESS CONTROL

Virtual machine deployment, modification, management; monitoring and migration methodologies.

RESOURCE MONITORING

Physical and virtual machine memory, CPU management and abstraction techniques using a hypervisor

VIRTUAL MACHINE DATA PROTECTION

Backup and recovery of virtual machines using data recovery techniques; Scalability - Scalability features within Enterprise virtualized environments using advanced management applications that enable clustering, distributed network switches for clustering, network and storage expansion; High Availability : Virtualization high availability and redundancy techniques.

TEXT BOOKS

1. Mickey Iqbal, "IT Virtualization Best Practices: A Lean, Green Virtualized Data Center Approach", MC Press [ISBN: 978-1583473542]2012.
2. Mike Laverick, "VMware vSphere 4 Implementation" Tata McGraw-Hill Osborne Media; 1 edition [ISBN: 978-0071664523],2012.
3. Jason W. McCarty, Scott Lowe, Matthew K. Johnson, "VMware vSphere 4 AdministrationInstant

REFERENCES

1. BrianPerry,ChrisHuss,Jeantet Fields,"VCPVMwareCertifiedProfessionalonvSphere4 StudyGuide"Sybex; edition [ISBN: 978-0470569610],2013.
2. Jason Kappel, Anthony Velte, Toby Velte, "Microsoft Virtualization with Hyper-V: Manage Your Datacenter with Hyper-V, Virtual PC, Virtual Server, and Application Virtualization" McGraw-Hill Osborne [ISBN: 978-007161

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17CYEC10		DISTRIBUTED COMPUTING								Category	L	T	P	Credit	
										EC(PS)	3	0	0	3	
PREAMBLE The student will be able to understand the concepts of distributed computing and communicating in distributed systems. This course also includes the network internet protocol, remote method invocation, peer to peer systems & distributed file system, synchronize, transaction and distributed deadlocks															
PREREQUISITE COMPUTER NETWORKS															
COURSE OBJECTIVES															
1	To layout foundations of distributed systems														
2	To introduce the idea of network related issues														
3	To understand in detail the remote method and objects and support required for distributed system														
4	To introduce the idea of middleware and computing of distributed systems														
5	To understand the synchronization and cloud computing in distributed systems														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1: Explain the characteristics, models and design issues related to distributed systems													Understand		
CO2: Implement a distributed file system for a given Operating System													Apply		
CO3: Develop Remote Procedure Call based client-server programs													Apply		
CO4: Construct a fault tolerant distributed computing system to satisfy the given requirements.													Apply		
CO5: Analyze the message complexity of various deadlock detection and prevention algorithms													Analyze		
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	-	-	-	-	S	-	M	-	-	-	-	M	M	-
CO2	S	S	S	M	-	M	-	L	-	-	-	L	S	M	-
CO3	S	-	M	-	M	-	-	M	-	-	-	L	S	S	S
CO4	S	S	S	M	-	S	-	-	-	-	-	M	S	-	S
CO5	S	S	M	M	-	S	S	S	-	-	-	-	M	S	-
S- Strong; M-Medium; L-Low															

SYLLABUS

INTRODUCTION

Introduction – Examples of Distributed Systems–Trends in Distributed Systems – Focus on resource sharing – Challenges, DCS design goals: Transparencies, Fundamental issues, Case study: World Wide Web.

COMMUNICATION IN DISTRIBUTED SYSTEM

System Model – Inter process Communication - the API for internet protocols – External data representation and Multicast communication. Network virtualization: Overlay networks. Case study: MPI

REMOTE METHOD INVOCATION AND OBJECTS

Remote Invocation – Introduction - Request-reply protocols - Remote procedure call - Remote method invocation. Case study: Java RMI - Group communication - Publish-subscribe systems - Message queues - Shared memory approaches - Distributed objects - Case study: CORBA -from objects to components.

PEER TO PEER SERVICES AND FILE SYSTEM

Peer-to-peer Systems – Introduction - Napster and its legacy - Peer-to-peer – Middleware - Routing overlays. Overlay case studies: Pastry, Tapestry- Distributed File Systems : Data-Intensive Computing , Distributed Hash Tables , Consistency Models , Fault Tolerance , Many-Core Computing

SYNCHRONIZATION AND REPLICATION

Introduction - Clocks, events and process states - Synchronizing physical clocks - Logical time and logical clocks - Global states – Coordination and Agreement – Introduction - Distributed mutual exclusion – Elections – Transactions and Concurrency Control– Transactions -Nested transactions – Locks – Optimistic concurrency control - Timestamp ordering -Distributed deadlocks – Replication – Workflow Systems: Grid Computing, Cloud Computing , Virtualization , IaaS Clouds , File systems, Networked File systems, Parallel File systems.

TEXTBOOKS

1. George Coulouris, Jean Dollimore, Tim Kindberg, “Distributed Systems Concepts and Design” Fifth edition – 2011-AddisonWesley.

REFERENCES

1. Tanenbaum A.S., Van Steen M., “ Distributed Systems: Principles and Paradigms” , Pearson Education,2007.
2. Liu M.L., “Distributed Computing, Principles and Applications”, Pearson and education,2004.

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17CYEC11		AGILE METHODOLOGIES						Category	L	T	P	Credit			
								EC(PS)	3	0	2	4			
PREAMBLE Software Development is an umbrella term for an arrangement of strategies and practices in light of the qualities and standards communicated in the Agile Manifesto. Arrangements advance through coordinated effort between self-sorting out, cross-utilitarian groups using the suitable practices for their specific circumstance.															
PREREQUISITE SOFTWARE ENGINEERING															
COURSE OBJECTIVES															
1	To understand the background and driving forces for taking an Agile approach to software development														
2	To obtain practical knowledge of agile development frameworks and be able to distinguish between agile and traditional project management methodologies.														
3	To Examine various metrics for adopting agile software engineering														
4	Describe how an unit tests is executed from beginning to end.														
5	Identify the approaches, tools and scenarios to introduce Agile to your organization effectively														
6	To design automated build tools, version control and continuous integration														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1: Identify the fundamentals of agile and scrum framework												Understand			
CO2: Apply design principles and refactoring to achieve Agility.												Apply			
CO3: Reduce the risks in Test driven approach in agile projects												Analyze			
CO4: Implement a real software project that implements agile execution techniques												Apply			
CO5: Deploy a firm basis for adopting agile methodology, regardless of the industry/professional sector.												Analyze			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
CO2	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
CO3	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
CO4	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
CO5	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
S- Strong; M-Medium; L-Low															

SYLLABUS

FUNDAMENTALS OF AGILE

The Genesis of Agile- Introduction and background- Agile Manifesto and Principles- Overview of Scrum- Extreme Programming- Feature Driven development- Lean Software Development- Agile project management- Design and development practices in Agile projects- Test Driven Development- Continuous Integration- Refactoring- Pair Programming- Simple Design- User Stories- Agile Testing- Agile Tools.

AGILE SCRUM FRAMEWORK

Introduction to Scrum- Project phases- Agile Estimation- Planning game- Product backlog- Sprint backlog- Iteration planning- User story definition- Characteristics and content of user stories- Acceptance tests and Verifying stories- Project velocity- Burn down chart- Sprint planning and retrospective- Daily scrum- Scrum roles – Product Owner- Scrum Master- Scrum Team- Scrum case study- Tools for Agile project management.

AGILE TESTING

The Agile lifecycle and its impact on testing- Test-Driven Development (TDD)- xUnit framework and tools for TDD- Testing user stories - acceptance tests and scenarios- Planning and managing testing cycle- Exploratory testing- Risk based testing- Regression tests- Test Automation- Tools to support the Agile tester.

AGILE SOFTWARE DESIGN AND DEVELOPMENT

Agile design practices- Role of design Principles including Single Responsibility Principle- Open Closed Principle- Liskov Substitution Principle- Interface Segregation Principles- Dependency Inversion Principle in Agile Design- Need and significance of Refactoring- Refactoring Techniques- Continuous Integration- Automated build tools- Version control.

INDUSTRY TRENDS

Market scenario and adoption of Agile- Agile ALM- Roles in an Agile project- Agile applicability- Agile in Distributed teams- Business benefits- Challenges in Agile- Risks and Mitigation- Agile projects on Cloud- Balancing Agility with Discipline- Agile rapid development technologies

TEXT BOOKS

1. Ken Schawber, Mike Beedle, "Agile Software Development with Scrum", Pearson, 21 Mar2008.
2. Robert C. Martin, "Agile Software Development, Principles, Patterns and Practices", Prentice Hall, 25 Oct2002.
3. Lisa Crispin, Janet Gregory, "Agile Testing: A Practical Guide for Testers and Agile Teams", AddisonWesley, 30 Dec 2008
4. www.it-ebooks.info/tag/agile
5. <http://martinfowler.com/agile.html>

REFERENCES

1. Alistair Cockburn, "Agile Software Development: The Cooperative Game", Addison Wesley, 19 Oct2006.
2. Mike Cohn Publisher, "User Stories Applied: For Agile Software", Addison Wesley, 1 Mar2004

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17CYEC12	BIO METRICS										Category	L	T	P	Credit
											EC(PS)	3	0	0	3
PREAMBLE To explore how biological information could be stored in digital form to create biometric resources and how the same may be processed.															
PREREQUISITE INFORMATION SECURITY															
COURSE OBJECTIVES															
1	To understand the concepts of Biometrics, to enable design of biometric system														
2	To understand the basics of Biometrics and its functionalities														
3	To get the exposure the context of Biometric Applications														
4	To learn to develop applications with biometric security														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1: To learn about the concepts of biometric matching for identification												Understand			
CO2: To identify algorithms for finger biometric technology												Understand			
CO3: Apply facial biometrics for identification												Apply			
CO4: Analyze iris biometric, voice biometric, physiological biometrics etc. for identification.												Analyze			
CO5: To analyze the use of ethical issues												Analyze			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
CO2	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
CO3	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
CO4	S	L	L	-	M	-	-	-	-	-	-	M	S	M	M
CO5	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
S- Strong; M-Medium; L-Low															

SYLLABUS

INTRODUCTION

The design cycle of biometric systems – Applications of Biometric systems – Security and priPerson Recognition – Biometric systems –Biometric functionalities: verification, identification – Biometric systems issues.

FINGERPRINT, FACIAL and IRIS RECOGNITION

FINGERPRINT: Friction ridge pattern- finger print acquisition: sensing techniques, image quality –Feature Extraction –matching –indexing. FACE RECOGNITION: Image acquisition: 2D sensors, 3D sensors- Face detection- Feature extraction -matching. Design of an IRIS recognition system-IRIS segmentation- normalization – encoding and matching- IRIS quality –performance evaluation.

BEHAVIORAL BIOMETRICS AND MULTIBIOMETRICS

Ear detection and - gait feature extraction and matching - hand geometry- soft biometrics - sources of multi-biometrics- Acquisition and processing - Fusion levels.

BIOMETRIC CRYPTOGRAPHY

Protection of biometric data –biometric data shuffling scheme- experimental results –security analysis - cryptographic key Reservation - cryptographic key with biometrics-Revocability in key generation system-Adaptations of Generalized key Regeneration scheme –IRIS Biometrics –Face Biometrics –Extension of Key Regeneration scheme.

ETHICAL USAGE

Public sector Implementation – Border Control – Responsibilities –Customer service – Government sector – Agriculture – Academic Research – Online Communications – Environmental situations – External pressure – Distractions – Implementations issues – Future Works

TEXT BOOKS

1. Anil K Jain and Arun A Roass Karthik Nandedkar, "Introduction to Biometrics", Springer,2011.
2. David Check Ling Ngo,Andrew Beng Jin Teoh,Jiankun Hu "Biometric Security" Cambridge,2015.

REFERENCES

1. LI , S . Z . , AND JAIN, A. K. , Eds. Handbook of Face Recognition. Springer, Heidelberg, Germany,2011.
2. MALTONI , D. , MAIO, D. , JAIN, A. K. , AND PRABHAKAR , S . Handbook of Fingerprint Recognition. Springer,2009.
3. JAIN, L.C. , HALICI, U. , HAYASHI, I. ; LEE, S.B., TSUTSUI, S. Intelligent Biometric Techniques in Fingerprint and Face Recognition. CRC Press,1999.

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17CYEC13	OPEN SOURCE SYSTEMS										Category	L	T	P	Credit
											EC(PS)	3	0	0	3
PREAMBLE The purpose of an open standard is to increase the market for a technology by enabling potential consumers or suppliers of that technology to invest in it without having to either pay monopoly rent or fear litigation on trade secret, copyright, patent, or trademark causes of action. No standard can properly be described as "open" except to the extent it achieves these goals.															
PREREQUISITE NIL															
COURSE OBJECTIVES															
1	Students will study common open source software licenses, open source project structure														
2	To understand distributed team software development, and current events in the open source world														
3	To learn free and open source components & tools														
4	Students will also work on an open source project and will be expected to make a significant contribution														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1: Explain common open source licenses and the impact of choosing a license												Understand			
CO2: Analyze the open source project structure and how to successfully setup a project												Analyze			
CO3 Apply the linux based user profile, file security, and file link and management.												Apply			
CO4: Knowledge of free and open source tools like libre office, open office.												Apply			
CO5: Apply the libre office- presentation like create, open, adding slide, text, background.												Apply			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	L	L	-	L	-	-	-	-	-	-	S	S	S	S
CO2	S	M	M	-	M	-	-	-	-	-	-	M	S	M	-
CO3	S	M	M	M	-	-	-	-	-	-	-	M	S	S	S
CO4	S	S	L	M	M	-	-	-	-	-	-	M	S	M	-
CO5	S	M	L	M	-	-	-	-	-	-	-	M	S	S	S
S- Strong; M-Medium; L-Low															

SYLLABUS

OPEN SOURCE LICENSING

Open Source Licensing, Contract, and Copyright Law-The MIT, BSD, Apache, and Academic Free Licenses-The GPL, LGPL, and Mozilla Licenses-Qt, Artistic, and Creative Commons Licenses-Non-Open Source Licenses.

OPEN SOURCE OPERATING SYSTEM

Linux history-distributions-licensing-installing Linux-working with directories-working with files-working with file contents-the Linux file tree. shell expansion: commands and arguments-control operators-shell variables-file globbing. Pipes and commands: I/O redirection-filters -regular expressions. Introduction to vi – scripting: scripting introduction-scripting loops-scripting parameters

LINUX USER MANAGEMENT

local user management- introduction to users-user management-user passwords-user profiles -groups. file security: standard file permissions-advanced file permissions-access control lists-file links.

LIBRE OFFICE –WORD, SPREAD SHEET

Introduction of libre office- WRITER — THE WORD PROCESSOR: Opening a Document -Laying Out the Page- Setting paper size, margins, and orientation -Creating headers and footers -Numbering pages -Entering and Editing Text-Modifying text-Moving and copying text.

CALC — THE SPREADSHEET: Creating a Spreadsheet -Inputting Your Data -Entering your data -Editing your data -Filling cells automatically -Managing Columns and Rows-Copying, pasting, cutting, dragging, and dropping your cells -Adding the Art -Formula Basics.

LIBRE OFFICE- PRESENTATION

IMPRESS — THE PRESENTATION Creating a Presentation -Opening an existing presentation -Adding Slides - Adding text to a slide -Saving Your Presentation for Posterity - Making Presentations Picture Perfect -Adding Images -Clipping art -Drawing objects -Coloring Backgrounds - Creating a plain-colored background -Creating a gradient background.

TEXT BOOKS

1. Understanding Open Source and Free Software Licensing By Andrew M. St. Lauren , August 2004 , Pages: 207. (UnitI)

2. Linux study link:<https://itsfoss.com/learn-linux-for-free/> (Unit II &Unit III).

3.<https://www.libreoffice.org/assets/Uploads/Documentation/en/GS51-GettingStartedLO.pdf> (Unit IV &V)

REFERENCES

1. Andy channelle (2009), “Beginning OpenOffice 3”,Aprèss.

2. Ellen Siever, Stephen Figgins, Robert Love, Arnold Robbins, “Linux in a Nutshell”, Sixth Edition, O'Reilly Media, 2009.

3. N. B. Venkateshwarlu (Ed); Introduction to Linux: Installation and Programming, B S Publishers;2005.

4. Matt Welsh, Matthias Kalle Dalheimer, Terry Dawson, and Lar Kaufman, Running Linux, Fourth Edition, O'Reilly Publishers,2002.

5. Carla Schroder, Linux Cookbook, First Edition, O'Reilly Cookbooks Series,2004.

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17CYEC14	KNOWLEDGE BASED DECISION SUPPORT SYSTEMS									Category	L	T	P	Credit	
										EC(PS)	3	0	0	3	
PREAMBLE															
The purpose of this course is to impart knowledge on decision support systems and implementation.															
PREREQUISITE															
NIL															
COURSE OBJECTIVES															
1	To familiarize decision support systems and their characteristics														
2	To study about Intelligent DSS and applications of DSS														
3	To learn Collaborative Computing Technologies														
4	To learn the technologies related to decision support systems														
5	To learn Electronic Commerce and Management-Support Systems.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1: Understand decision making and computerized support												Understand			
CO2: Able to Understand Business Intelligence ,Data Warehousing and Data Mining												Understand			
CO3: Understand Collaboration, Communication, Enterprise Decision												Apply			
CO4: Able to Understand Artificial Intelligence and Expert Systems over the Internet.												Apply			
CO5: Able to Understand Electronic Commerce and Management-Support Systems.												Apply			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	S	M	L	-	-	-	-	-	-	M	S	M	M
CO2	M	S	S	S	M	-	-	-	-	-	-	M	M	M	M
CO3	S	M	S	M	M	-	-	-	-	-	-	M	M	-	M
CO4	S	M	S	S	M	-	-	-	-	-	-	M	S	S	S
CO5	S	M	M	M	S	-	-	-	-	-	-	-	M	M	-
S- Strong; M-Medium; L-Low,															

SYLLABUS**DECISION MAKING AND COMPUTERIZED SUPPORT**

Management Support Systems: An Overview - Decision Making, Systems, Modeling, and Support.

DECISION SUPPORT SYSTEMS

Decision Support Systems: Overview - Modeling and Analysis – Business Intelligence: Data Warehousing, Data Acquisition, Data Mining, Business Analysis, and Visualization - Decision Support System Development.

COLLABORATION, COMMUNICATION, ENTERPRISE DECISION

Collaborative Computing Technologies: Group Support Systems -Enterprise Information Systems - knowledge Management.

EVIDENCE COLLECTION AND FORENSICS TOOLS

Artificial Intelligence and Expert Systems: Knowledge-Based System – Knowledge Acquisition, Representation, and Reasoning - Advanced Intelligent Systems - Intelligent Systems over the Internet.

IMPLEMENTING IN THE E-BUSINESS ERA

Electronic Commerce - Integration, Impacts, and the Future of the Management-Support Systems.

TEXT BOOKS

1. Efraim Turban, Jay Aronson E., Ting-Peng Liang, "Decision Support Systems and Intelligent Systems", 7th Edition, Pearson Education, 2013.

REFERENCES

1. Michel R. Klein and Leif B. Methlie, "Knowledge-Based Decision Support Systems With Applications in Business", Wiley; 2nd edition

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17CYEC15	INFORMATION RETRIEVAL TECHNIQUES								Category	L	T	P	Credit		
									EC(PS)	3	0	0	3		
PREAMBLE This syllabus is intended for the Engineering students and enable them to understand the basics of Information Retrieval with pertinence to modeling, query operations and indexing.															
PREREQUISITE DATA MINING & DATA WAREHOUSING															
COURSE OBJECTIVES															
1	To learn about the basic concepts, practical issues and impact of the web on Information Retrieval														
2	To understand about the various IR models														
3	To get an understanding of machine learning techniques for text classification and clustering														
4	To understand the various applications of Information Retrieval giving emphasis to Multimedia IR														
5	To lay foundation for learning the concepts of digital libraries														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1: Describe the objectives of information retrieval systems											Understand				
CO2: Understand about the various IR models											Apply				
CO3: Understand the static and dynamic indices and query operations											Apply				
CO4: implement clustering algorithms like hierarchical clustering and classification											Apply				
CO5: Able to Understand searching ,ranking and digital libraries											Apply				
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	-	M	M	M	-	-	-	-	-	M	S	S	S
CO2	S	S	S	M	M	L	-	M	-	-	-	M	S	M	M
CO3	S	L	L	-	L	-	-	-	-	-	-	S	M	S	S
CO4	S	S	S	M	M	M	-	M	-	-	-	M	S	-	S
CO5	S	S	M	M	M	L	-	-	-	-	-	M	M	M	M
S- Strong; M-Medium; L-Low															

SYLLABUS

INTRODUCTION

Motivation – Basic Concepts – Practical Issues - Retrieval Process – Architecture - Boolean Retrieval –Retrieval Evaluation – Open Source IR Systems–History of Web Search – Web Characteristics–The impact of the web on IR — IR Versus Web Search–Components of a Searchengine.

MODELING

Taxonomy and Characterization of IR Models – Boolean Model – Vector Model - Term Weighting – Scoring and Ranking –Language Models – Set Theoretic Models - Probabilistic Models – Algebraic Models – Structured Text Retrieval Models – Models for Browsing.

INDEXING

Static and Dynamic Inverted Indices – Index Construction and Index Compression. Searching - Sequential Searching and Pattern Matching. Query Operations -Query Languages – Query Processing - Relevance Feedback and Query Expansion - Automatic Local and Global Analysis – Measuring Effectiveness and Efficiency.

CLASSIFICATION AND CLUSTERING

Text Classification and Naïve Bayes – Vector Space Classification – Support vector machines and Machine learning on documents. Flat Clustering – Hierarchical Clustering –Matrix decompositions and latent semantic indexing – Fusion and Meta learning.

SEARCHING AND RANKING

Searching the Web –Structure of the Web –IR and web search – Static and Dynamic Ranking - Web Crawling and Indexing – Link Analysis - XML Retrieval Multimedia IR: Models and Languages – Indexing and Searching Parallel and Distributed IR – Digital Libraries.

TEXT BOOKS

1. Ricardo Baeza – Yates, BerthierRibeiro – Neto, Modern Information Retrieval: The concepts and Technology behind Search (ACM Press Books), SecondEdition
- 2.Textbook Retrieval Systems In Information Management by GGChowdhury

REFERENCES

1. ChristopherD.Manning,PrabhakarRaghavan,HinrichSchutze,IntroductiontoInformationRetrieval,Cambridge University Press, First South AsianEdition
2. Stefan Buttcher, Charles L. A. Clarke, Gordon V. Cormack, Information Retrieval Implementing and Evaluating Search Engines, The MIT Press,Cambridge.

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17CYEC16	IT INFRASTRUCTURE AND MANAGEMENT										Category	L	T	P	Credit
											EC(PS)	3	0	0	3
PREAMBLE The proposed course exposes the students to understand the features of different technologies involved in IT infrastructure and management.															
PREREQUISITE NIL															
COURSE OBJECTIVES															
1	To understand the basics of IT infrastructure														
2	To understand the current computing techniques in IT fields														
3	To explore the business models														
4	To understand the different security management and storage management in IT infrastructure														
5	To understand the service delivery concept in IT field														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1: Understand the basics of IT infrastructure												Understand			
CO2: Understand the current computing techniques in IT fields												Understand			
CO3: Explore the business models												Apply			
CO4: Apply the different security management and storage management in IT infrastructure												Apply			
CO5: Understand the service delivery concept in IT field												Analyze			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	-	-	M	S	-	-	-	-	-	M	M	S	S
CO2	S	-	S	-	M	S	-	-	-	-	-	M	M	M	-
CO3	S	M	S	-	M	S	-	-	-	-	-	M	M	S	S
CO4	S	L	S	M	M	M	-	-	-	-	-	L	S	M	-
CO5	S	S	S	M	M	M	-	-	-	-	-	M	M	M	M
S- Strong; M-Medium; L-Low															

SYLLABUS

IT system Management

Common tasks in IT system management, approaches for organization Management, Models in IT system design, IT management systems context diagram, patterns for IT system Management.

IT Infrastructure Management

Factors to consider in designing IT organizations and IT infrastructure, Determining customer's Requirements, Identifying System Components to manage, Exist Processes, Data, applications, Tools and their integration, Patterns for IT systems management, Introduction to the design process for information systems, Models, Information Technology Infrastructure Library (ITIL).

Establishing business value of information system

Information system costs and benefits, Capital budgeting for information system, Real Options pricing models, Limitation of financial models.

Service Delivery and Service Support Management

Service-level management, financial management and advantages of financial management -Service support process, Configuration Management-Incident management.

Storage Management and Security Management

Types of Storage management, Benefits of storage management, backups, Archive, Recovery, Disaster recovery-Introduction Security, Identity management, Single sign-on, Access Management.

TEXT BOOKS

1. A. S. Goodman and M. Hastak, Infrastructure planning handbook: Planning, engineering, and economics, McGraw-Hill, New York,2006.
2. J. Parkin and D. Sharma, Infrastructure planning, Thomas Telford, London,1999

REFERENCES

1. P. Chandra, Projects: Planning, analysis, selection, financing, implementation, and review, Tata McGraw-Hill, New Delhi,2009.
2. J. D. Finnerty, Project financing - Asset-based financial engineering, John Wiley & Sons, New York,1996.
3. A. S. Goodman and M. Hastak, Infrastructure planning handbook: Planning, engineering, and economics, McGraw-Hill, New York,2006.

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17CYEC17		VIRTUALIZATION TECHNIQUES						Category	L	T	P	Credit			
								EC(PS)	3	0	0	3			
PREAMBLE ThissyllabisintendedfortheEngineeringstudentsandenablethemtounderstandthebasicsvirtualizationandvirtual machines.															
PREREQUISITE NIL															
COURSE OBJECTIVES															
1	To understand the concepts of virtualization and virtual machines														
2	To understand the implementation of process and system virtual machines														
3	To explore the aspects of high level language virtual machines														
4	To gain expertise in server, network and storage virtualization														
5	To understand and deploy practical virtualization solutions and enterprise solutions														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1: Install and configure virtualization technology such as VMware												Apply			
CO2: Configure and manage virtual network and storage such as vCenter server or ESxi												Apply			
CO3: Deploy, manage and migrate virtual machines.												Apply			
CO4: Describe the architecture of a Data Center environment with RAID and Intelligent Storage Systems.												Apply			
CO5: Configure and manage a Storage Area Network (SAN).												Apply			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	S	-	-	-	-	-	-	-	-	M	S	-	M
CO2	S	M	L	-	M	-	-	-	-	-	-	L	-	M	-
CO3	S	S	M	-	-	-	-	-	-	-	-	M	S	-	M
CO4	S	S	L	-	-	-	-	-	-	-	-		-	M	-
CO5	S	M	L	-	L	-	-	-	-	-	-	L	M	-	S
S- Strong; M-Medium; L-Low															

SYLLABUS

OVERVIEW OF VIRTUALIZATION

System architectures - Virtual Machine basics - Process vs System Virtual Machines - Taxonomy. Emulation: Basic Interpretation - Threaded Interpretation - Precoded and Direct Threaded Interpretation - Binary Translation. System Virtual Machines - Key concepts - Resource utilization basics.

PROCESS VIRTUAL MACHINES

Implementation – Compatibility – Levels – Framework – State Mapping – Register – Memory Address Space – Memory Architecture Emulation – Memory Protection – Instruction Emulation – Performance Tradeoff - Staged Emulation – Exception Emulation – Exception Detection – Interrupt Handling – Operating Systems Emulation – Same OS Emulation – Different OS Emulation – System Environment

HIGH LEVEL LANGUAGE VIRTUAL MACHINES AND SERVER VIRTUALIZATION

HLL virtual machines: Pascal P-Code – Object Oriented HLLVMs - Java VM architecture - Java Native Interface - Common Language Infrastructure. Server virtualization: Partitioning techniques - virtual hardware - uses of virtual servers - server virtualization platforms.

NETWORK AND STORAGE VIRTUALIZATION

Design of Scalable Enterprise Networks – Layer2 Virtualization – VLAN - VFI - Layer 3 Virtualization – VRF - Virtual Firewall Contexts - Network Device Virtualization - Data- Path Virtualization - Routing Protocols. Hardware Devices – SAN backup and recovery techniques – RAID – Classical Storage Model – SNIA Shared Storage Model – Virtual Storage: File System Level and Block Level.

APPLYING VIRTUALIZATION

Multi-threaded programming – interrupting threads – thread states – thread properties – thread synchronization – Executors – synchronizers – Socket Programming – UDP Datagram – Introduction to Java Beans.

TEXT BOOKS

1. Cay S. Horstmann and Gary Cornell, “Core Java: Volume I – Fundamentals”, Eighth Edition, Sun Microsystems Press, 2008.

REFERENCES

1. James E. Smith, Ravi Nair, “Virtual Machines: Versatile Platforms for Systems and Processes”, Elsevier/Morgan Kaufmann, 2005.
2. David Marshall, Wade A. Reynolds, “Advanced Server Virtualization: VMware and Microsoft Platform in the Virtual Data Center”, Auerbach Publications, 2006.
3. Kumar Reddy, Victor Moreno, “Network virtualization”, Cisco Press, July, 2006.
4. Chris Wolf, Erick M. Halter, “Virtualization: From the Desktop to the Enterprise”, APress, 2005.
5. Kenneth Hess, Amy Newman, “Practical Virtualization Solutions: Virtualization from the Trenches”, Prentice Hall, 2010.

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17CYEC18	USER INTERFACE DESIGN										Category	L	T	P	Credit
											EC(PS)	3	0	0	3
PREAMBLE This syllabus is intended for the Engineering students and enables them to implement the basics and in-depth knowledge about User Interface Design so that the students will gain an understanding of the critical importance of user interface design and industry standard methods.															
PREREQUISITE NIL															
COURSE OBJECTIVES															
1	To impart basic knowledge in various user interfaces so that the student will understand the importance of user interface design														
2	To inculcate the knowledge of key theories and frameworks that underlie the design of most interfaces today														
3	To lay foundation for learning industry standard methods for approaching user interface design														
4	Position their knowledge and skills against current social and ethical concerns														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1: Understand functions and importance of Human Computer Interface, Characteristics of GUI and Direct manipulation graphical system.												Understand			
CO2: Learn User interface design process and the basic business functions												Understand			
CO3: Know the characteristics and presentation styles, device based controls and Screen-based controls of Windows												Apply			
CO4: Implement the concept of network security for web pages and multimedia.												Analyze			
CO5: Design Windows layout-test: Prototypes network security and testing tools.												Analyze			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
CO2	S	M	L	L	M	-	-	-	-	-	-	M	S	-	-
CO3	S	-	L	-		-	-	-	-	-	-	M	S	M	M
CO4	S	M	L	L	M	-	-	-	-	-	-	L	S	M	M
CO5	S	M	L	-	M	-	-	-	-	-	-	M	S	M	-
S- Strong; M-Medium; L-Low															

SYLLABUS

INTRODUCTION

Introduction-Importance – Human Computer Interface – Characteristics of GUI – Direct manipulation graphical system- Web user interface – Popularity – Characteristics and Principles

USER INTERFACE DESIGN PROCESS

User interface design process – Obstacles – Usability – Human characteristics in design – Human interaction speed – Business functions – Requirements analysis – Direct – Indirect methods – Basic business functions – Design standards – System Timings – Human consideration in screen design – Structures of menus – Functions of menus – Contents of menu – Formatting – Phrasing the Menu – Selecting menu choice – Navigating menus – Graphical menus

WINDOWS

Windows: Characteristics – Components – Presentation styles – types – Managements – Organizations – Operations – Web systems- device- based controls: Characteristics – Screen-based controls: Operate control – Text boxes – Selection control – Combination control – Custom control – Presentation control.

NETWORK SECURITY

Text for web pages – Effective feedback – Guidance & assistance – Internationalization – Accessibility – Icons – Image – Multimedia – Coloring.

WINDOWS LAYOUT- TEST

Windows layout-test: Prototypes – Kinds of tests – Retest – Information search – Visualization – Hypermedia – WWW – Software tools.

TEXTBOOKS

1. Maurice J. Bach, "The Design of the Unix Operating System", Pearson Education 2002. 1. Wilbent. O. Galitz, "The Essential Guide to User Interface Design", John Wiley & Sons
2. Designing Interfaces : Patterns For Effective Interaction Design 2nd Edition By Jenifer Tidwell

REFERENCES

1. Ben Shneiderman, "Design the User Interface", Pearson Education.
2. Alan Cooper, "The Essential of User Interface Design", Wiley – Dream Tech Ltd.

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17CYEC19	OPTIMIZATION TECHNIQUES							Category	L	T	P	Credit			
								EC(PS)	3	0	0	3			
PREAMBLE Optimization techniques helps in solving problems in different environments that need decisions like, Inventory control problems, Maintenance and Replacement problems, Sequencing and Scheduling problems, Assignment of Jobs to applicants, Transportation problems, Network problems and Decision models. Entire subject is useful for all resource managers of various fields.															
PREREQUISITE - NIL															
COURSE OBJECTIVES															
1	To be thorough with linear programming problem and formulate a real world problem as a mathematical programming model.														
2	To acquire knowledge of linear programming, assignment and transportation problems.														
3	To acquire skills in handling techniques of PERT, CPM and sequencing model.														
4	To be get exposed to the concepts of Inventory control.														
5	To study decision theory and game theory techniques to analyze the real world systems.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Formulate and Solve the Linear programming problem.													Apply		
CO2. Solve specialized linear programming problems like the Transportation and Assignment problems.													Apply		
CO3. Predict the shortest path in network problems.													Analyze		
CO4. Design a continuous or periodic review inventory control system.													Apply		
CO5. Solve larger problem using technical knowledge and complete tasks on time.													Apply		
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	S	M	M	M	-	-	-	-	-	-	S	M	M	M
CO2	S	S	M	M	M	-	-	-	-	-	-	S	M	S	M
CO3	S	S	S	M	M	-	-	-	-	-	-	S	M	S	M
CO4	S	S	S	M	M	-	-	-	-	-	-	S	M	S	M
CO5	S	S	S	M	M	-	-	-	-	-	-	S	M	S	M
S- Strong; M-Medium; L-Low															
SYLLABUS															

LINEAR PROGRAMMING: Linear programming problem – Graphical method - Simplex method – Big M method – Duality principle.

TRANSPORTATION MODEL: Transportations problem – Assignment problem – Under Assignment - Travelling salesman problem.

NETWORK MODEL: Project Network – CPM and PERT Networks – Critical path scheduling – Sequencing Models.

INVENTORY MODELS: Inventory Model – Economic Order Quantity Model – Purchasing Model (with and without shortages) – Manufacturing Model (with and without shortages) - Stochastic Inventory Model (Stock in discrete and continuous units).

DECISION MODEL: Decision Model – Game theory – Two Person Zero sum game – Algebraic solutions Graphical solutions – Replacement model – Model based on Service life – Economic life single / multivariable search technique.

TEXTBOOKS:

1. H.A.Taha, “Operations Research: An Introduction”, Prentice Hall of India, 1999, sixth edition.
2. Kanti Swarup, P.K.Gupta, Man Mohan, “Operations Research” S.Chand & Sons, New Delhi,(2010).

REFERENCES:

1. Sundarasan.V, Ganapathy subramaniam .K.S,Ganesan.K. “Resource Management Techniques”, A.R. Publications, Chennai(2013).
2. Premkumar Gupta, D.S. Hira, “Operations Research” S. Chand & company New Delhi.

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17CYEC20		MACHINE LEARNING								Category	L	T	P	Credit	
										CC	3	0	0	3	
PREAMBLE															
To provide an in-depth knowledge about machine learning concepts and identify applications suitable for different types of machine learning with suitable justification.															
PREREQUISITE: INTRODUCTION TO ARTIFICIAL INTELLIGENCE															
COURSE OBJECTIVES															
1	To study the outline the key concepts of machine learning														
2	To understand the supervised learning and classification techniques														
3	To apply the concept of unsupervised learning and Clustering for applications														
4	To infer theoretical and practical aspects of reinforcement learning														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1: Outline the key concepts of machine learning												Understand			
CO2:Summarize supervised learning and classification techniques												Understand			
CO3: Apply the concept of unsupervised learning and Clustering for applications												Apply			
CO4:Infer theoretical and practical aspects of reinforcement learning												Understand			
CO5: Infer theoretical and practical aspects of reinforcement learning												Understand			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	-	-	-	-	L	-	-	-	-	-	L	L	-	-
CO2	S	S	S	L	-	L	-	L	L	-	L	L	S	M	L
CO3	S	S	M	L	-	L	-	L	L	-	L	L	S	M	L
CO4	S	L	M	L	-	L	-	-	-	-	-	L	-	-	-
CO5	S	L	S	-	-	L	-	L	-	-	-	L	-	L	-
S- Strong; M-Medium; L-Low															

SYLLABUS

INTRODUCTION

Machine Learning - Examples of machine learning applications- Types of machine learning –Model selection and generalization – Guidelines for Machine Learning Experiments

SUPERVISED LEARNING

Classification - Decision Trees – Univariate Tree –Multivariate Tree - Pruning –Perceptron – Multilayer Perceptron - Back Propagation – Cross Validation and Resampling Methods

UNSUPERVISED LEARNING

Clustering- Mixture densities -K-means - EM Algorithm – Supervised Learning After Clustering- Hierarchical Clustering

DIMENSIONALITY REDUCTION

The Curse of Dimensionality –Subset Collection - Principal Component Analysis - Factor Analysis – Linear Discriminant Analysis

REINFORCEMENT LEARNING

Single State Case – Elements of Reinforcement Learning - Model Based Learning – TemporalDifference Learning –Generalization in Reinforcement Learning - Policy Search

TEXT BOOKS

1. EthemAlpaydin, Introduction to Machine Learning MIT Press, 2014.

REFERENCES

1. Tom M Mitchell, Machine Learning, First Edition, McGraw Hill Education, 2013
2. Richard S. Sutton and Andrew G. Barto: Reinforcement Learning: An Introduction. MIT Press

COURSE DESIGNERS

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2	T.Narmadha	Assistant Professor	CSE	Narmadha@vmkvec.edu.in

17CYEC21	DATA ANALYTICS	Category	L	T	P	Credit
		EC(PS)	3	0	0	3

PREAMBLE

This course is to introduce the concepts of data modeling techniques using Machine Learning for Data Analytics to increase the job opportunities of B. Tech. students in corporate sectors as well as government agencies can be extended to the other streams like IT and ECE. This will not only enhance their job opportunity through the placement cell but also they can take up their project work, in this new field, in final year.

PREREQUISITE

NIL

COURSE OBJECTIVES

1	To understand data and usage of data in solving real time problems
2	To introduce general idea of database management systems
3	To explains the fundamental concepts of big data analytics and data visualization

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO1: Understand data and usage of data in data analytics	Understand
CO2: Apply data analytics techniques for visualization through Excel	Apply
CO3: Examine how to visualize trends and discover insights of data	Apply
CO4: Show the Entity- Relationship (E-R) model from specifications and transform it into relational model	Apply
CO5: Analyze and design multidimensional data models	Analyse
CO6: Design SQL queries to perform CRUD operations on database (Create, Retrieve, Update, and Delete)	Create

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		M			M								M		
CO2	S	M			M				M	M				M	
CO3	M	S			M				M	M					
CO4	M	S			M				M			M		M	
CO5	M	S			M				M	M		M			
CO6	M	S			M				M			M	M	M	

S- Strong; M-Medium; L-Low

SYLLABUS

INTRODUCTION TO DATA ANALYTICS

Introduction, MS Excel Basics (options: Create, Save Rename, Add, Delete), Editing data in Worksheet (options: Insert, Select, Delete, Copy & Paste, Find & Replace) Formatting Cells, Worksheets (operations: Add/Remove Columns & Rows, Hiding/Unhiding Columns & Rows, Merging Cells), Setting Colors.

MANIPULATION OF EXCEL DATA

Working with Formula: Data Filtering, Sorting, Use of Range, Functions: SUM(), AVERAGE(), MAX() & MIN(), COUNT() & COUNTA(), IF(), Data Representation using Charts & Graphs, Creation of Pivot table, Create a Chart, Change Chart Type, Switch Row/Column, labels and legends, Print Area.

BASICS OF DBMS

Introduction, Characteristics, Data models (Entity-Relationship Model, Relational Model, Network model), Relational algebra.

DATA VISUALIZATIONS:

Getting started with basic design templates, Multidimensional Models, Basic Design, Chart Generation, Dashboard Creation, Data Visualization.

BASICS OF OPEN SOURCE RDBMS:

Introduction, Installation, MySQL Commands (Administrative Commands), Various Syntax of SQL, DDL and DML Commands.

TEXT BOOKS

1. Microsoft Excel 2013 Step by Step, Curtis D. Frye, Microsoft Press 2013.
2. Database System Concepts, Abraham Silberschatz, Prof. Henry F. Korth, and S. Sudarshan, McGraw-Hill Education Publications, 3rd Edition.

REFERENCES

1. Learning Tableau, Joshua N. Milligan, ISBN 139781784391164, PACKT Books - Packt Publishing.

COURSE DESIGNERS

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17CYEC22	PROBLEM IDENTIFICATION AND DESIGN THINKING	Category	L	T	P	Credit
		EC(PS)	3	0	0	3

PREAMBLE

This course applies to everyday problems in order to create human-centered innovations. Envisioned as a collaborative lab, it fosters the integration of research, problem-forming and problem-solving, aesthetics, technology, prototyping, and publishing, with a strong focus on user's needs. It will address design needs through research on end users, creating a human-centric point of view as a guide. It will drive students to experiment with ideas, to analyze case studies and to build rapid prototypes, in order to test and communicate the proposed product.

PREREQUISITE

NIL

COURSE OBJECTIVES

1	Introduce students to a discipline, design thinking that enhances innovation activities in terms of value creation, speed, and sustainability. Be exposed to architectural styles and views
2	Strengthen students individual and collaborative capabilities to identify problems/issues/needs, develop sound hypotheses, collect and analyze appropriate data, and develop ways to collect meaningful feedback in a real-world environment
3	Teach students to translate broadly defined opportunities into actionable innovation possibilities and recommendations for key stakeholders and their organizations

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO1: Explain how design thinking can be applied in a wide range of contexts, from the personal to the global	Understand
CO2: Understand how to please and win as a designers	Understand
CO3: Initiate an attitude of playfulness to aid design thinking	Apply
CO4: Use computing tools and online environments	Apply
CO5: Apply your skills in thinking and visualizing images, words, colour, shapes etc.	Apply

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1									M			M			
CO2	S								M						
CO3														L	L
CO4		S	S		S				M			M		L	L
CO5		S	S		S				M			M		L	L

S- Strong; M-Medium; L-Low

SYLLABUS

STAGES OF THINKING:

Why Design Thinking, The Design Process, Stages of Design Thinking, Research- Identifying drivers, Information gathering, Target groups, Samples and feedback

IDEA GENERATION:

Idea generation- Basic design, Themes of thinking, Inspiration and References, Brainstorming ,Value, Inclusion, Sketching, Presenting ideas , Refinement - Thinking in images, Thinking in signs, Appropriation , Humour, Personification, Visual metaphors, Modification, Thinking in words, Words and language , Type ‘faces’, Thinking in shapes, Thinking in proportions, Thinking in color

REFINEMENT:

Thinking in images – Thinking in signs – Appropriation – Humour – Personification – Visual metaphors – Modification – Thinking in words – Words and language – Type ‘faces’ – Thinking in shapes – Thinking in proportions – Thinking in colour

PROTOTYPING:

Developing designs, ‘Types’ of prototype, Vocabulary, Implementation-Format, Materials, Finishing, Media, Scale, Series/Continuity

DESIGNING TO WIN/ PLEASE:

Formula One Designing – Radical innovation – City / Car Design – Learning from Failures – Design Process and Working Methods – Product Innovations – Learning from Failures – Design Process and Working Methods

TEXT BOOKS

1. Designing for Growth: A Design Thinking Tool Kit for Managers, Jeanne Liedtka and Tim Ogilvie , Columbia University Press, 2011
2. Design Thinking: Understanding How Designers Think and Work, Niger Cross , BERG 2011

REFERENCES

- 1.The Art of Innovation: Lessons in Creativity From IDEO, Tom Kelly , America’s Leading Design Firm (Profile Books, 2002)
2. Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation, Tim Brown,Harper Business, 2009
3. The Design of Business: Why Design Thinking Is The Next Competitive Advantage, Roger Martin, (Harvard Business Review Press, 2009)
4. Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers , Alexander Osterwalder and Yves Pigneur , John Wiley and Sons, 2010
5. Design Thinking: Understanding How Designers Think and Work, Nigel Cross , Bloomsbury Academic, 2011

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17MBHS04	TOTAL QUALITY MANAGEMENT						Category	L	T	P	Credit				
							EC(OE)	3	0	0	3				
PREAMBLE:															
Quality is the mantra for success or even for the survival of any organization in this competitive global market. Total Quality Management (TQM) is an enhancement to the traditional way of doing business. TQM integrates fundamental management techniques, existing improvement efforts, and technical tools under a disciplined approach for providing quality of products and processes. It becomes essential to survive and grow in global markets, organizations will be required to develop customer focus and involve employees to continually improve Quality and keep sustainable growth.															
PREREQUISITE: NIL															
COURSE OBJECTIVES:															
1. To understand the Total Quality Management concepts.															
2. To practice the TQM principles.															
3. To apply the statistical process control															
4. To analyze the various TQM tools															
5. To adopt the quality systems.															
COURSE OUTCOMES:															
After successful completion of the course, students will be able to															
CO1: Understand the importance of quality and TQM at managerial level.												Understand			
CO2: Practice the relevant quality improvement tools to implement TQM.												Apply			
CO3: Analyse various TQM parameters with help of statistical tools.												Analysing			
CO4: Assess various TQM Techniques.												Evaluate			
CO5: Practice the Quality Management Systems in a different organization Environment.												Apply			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	-	-	-	-	-	L	L	L	M	L	M	L	-	-
CO2	M	-	-	-	L	L	-	L	M	M	-	L	L	-	-
CO3	S	S	M	S	S	-	-	L	-	L	-	L	-	M	-
CO4	L	M	S	L	M	-	L	-	L	M	L	M	-	-	-
CO5	L	L	M	-	L	M	S	S	M	L	L	M	L	-	-
S- Strong; M-Medium; L-Low															
SYLLABUS:															

INTRODUCTION

Quality: Definition - Dimensions - Planning- costs – Analysis Techniques for Quality Costs- Basic concepts of Total Quality Management- Historical Review- Principles - Leadership – Concepts- Role of Top Management- Quality Council – Quality Statements- Strategic Planning- Deming Philosophy- TQM Implementation – Barriers.

TQM PRINCIPLES

Customer satisfaction – Perception of Quality- Complaints- Service Quality- Customer Retention- Employee Involvement – Motivation- Empowerment - Teams- Recognition and Reward- Performance Appraisal- Benefits- Continuous Process Improvement – Juran’s Trilogy- PDSA Cycle- 5S – Kaizen - Basic Concepts.

STATISTICAL PROCESS CONTROL (SPC)

The Seven tools of Quality- Statistical Fundamentals – Measures of central Tendency & Dispersion- Population and Sample- Normal Curve- Control Charts for variables and attributes- Process capability- Concept of six sigma- New seven Management tools.

TQM TOOLS

Benchmarking – Reasons - Process- Quality Function Deployment (QFD) – House of Quality- QFD Process- Benefits- Taguchi Quality Loss Function- Total Productive Maintenance (TPM) – Concept- Improvement Needs- FMEA – Stages of FMEA.

QUALITY SYSTEMS

Need for ISO 9000 and Other Quality Systems- ISO 9000:2000 Quality System – Elements- Implementation of Quality System- Documentation- Quality Auditing- QS 9000- ISO 14000 – Concept- Requirements and Benefits.

TEXT BOOKS:

1. Dale H. Besterfield et al. - Total Quality Management- PHI-1999. (Indian reprint 2002).
2. Feigenbaum, A.V. “Total Quality Management- McGraw-Hill-1991.

REFERENCES:

1. James R. Evans & William M. Lindsay - The Management and Control of Quality- (5th Edition) - South-Western (Thomson Learning) - 2002 (ISBN 0-324-06680-5).
2. Oakland, J.S. “Total Quality Management Butterworth – Heinemann Ltd - Oxford. 1989.
3. Narayana V and Sreenivasan - N.S. Quality Management – Concepts and Tasks- New Age International 1996.

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1	A. Mani	Associate Professor	Management Studies	mani@vmkvec.edu.in
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17MBHS03	ENGINEERING MANAGEMENT AND ETHICS							Category	L	T	P	Credit			
								EC(OS)	3	0	0	3			
PREAMBLE:															
Engineering management provides technological problem-solving ability of engineering and the organizational to oversee the operational performance of complex engineering enterprises to Engineers. Engineers require honesty, impartiality, fairness, and equity, and dedication to the protection of the public health, safety, and welfare. Ethics emphasises the importance of moral issues, rights and duties of the employees through basic ethics confronting individuals and organizations engaged. It also emphasise values that are morally desirable in engineering practice and research. It allows them to understand various occupational crimes and learn the moral leadership.															
PREREQUISITE: NIL															
COURSE OBJECTIVES:															
1. To Understand the principles of planning at various levels of the organisation.															
2. To analyse and practice the concepts of organizing, staffing to higher productivity.															
3. To apply the concepts related to directing and controlling.															
4. To understand and apply the case studies to practice code of ethics in organisation.															
5. To apply the ethical principles in working environment.															
COURSE OUTCOMES:															
After successful completion of the course, students will be able to															
CO1: Understand the importance of planning principles in organization											Understand				
CO2: Apply the various strategies of organising and staffing process.											Apply				
CO3: Analyse various leadership skills and control techniques for shaping the organization.											Analyse				
CO4: Understand and apply best ethical practices in organisation											Analyse				
CO5: Analyse and Apply relevant ethical practices in engineering.											Apply				
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	M	M	L	S	M	M	L	S	S	S	S	S	S	M
CO2	M	L	L	-	M	M	M	L	M	S	M	M	M	M	M
CO3	M	M	L	-	M	M	M	L	L	S	S	M	M	M	M
CO4	L	M	-	M	-	M	S	S	S	S	-	M	M	-	L
CO5	M	M	-	L	-	M	S	S	S	S	-	M	L	M	L
S- Strong; M-Medium; L-Low															

SYLLABUS:**PLANNING**

Management – Nature & Scope – Functions of Management – Levels of Management – Role of Managers - Nature and purpose of planning - Planning process - Types of plans – Objectives Managing by objective (MBO) - Decision Making - Types of decision - Decision Making Process - Decision Making under different conditions.

ORGANIZING & STAFFING

Nature and purpose of organizing - Organization structure - Formal and informal Organization - Line and Staff authority - Departmentation - Span of control - Centralization and Decentralization - Delegation of authority - Staffing - Selection and Recruitment - Orientation - Career Development - Career stages – Training Methods - Performance Appraisal.

DIRECTING & CONTROLLING

Creativity and Innovation - Motivation and Satisfaction - Motivation Theories - Leadership Styles - Communication - Barriers to effective Communication – Controlling – Controlling Techniques - Organization Culture - Elements and types of culture – Managing cultural diversity.

INTRODUCTION TO ETHICS

Moral dilemmas -Uses of Ethical Theories- Engineering As Social Experimentation- Engineer's Responsibility For Safety-Codes of Ethics-Challenger Case Study.

ETHICS IN ENGINEERING

Employed Engineers Rights and Duties- Collective Bargaining - Occupational Crime - Global Issues- Multinational Corporation- Technology transfer - Engineers as managers - Consulting Engineers - Expert Witness-Moral Leadership.

TEXT BOOKS:

1. Stephen P. Robbins and Mary Coulter, 'Management', Prentice Hall of India, 8th edition.
2. Charles W L Hill, Steven L McShane, 'Principles of Management', McGraw Hill Education, Special Indian Edition, 2007.
3. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw Hill, New York(2005).

REFERENCES:

1. Charles D Fleddermann, "Engineering Ethics", Prentice Hall, New Mexico,(1999).
2. Harold Koontz, Heinz Weihrich and Mark V Cannice, 'Management - A global & Entrepreneurial Perspective', Tata McGraw Hill, 12th edition, 2007.
3. Andrew J. Dubrin, 'Essentials of Management', Thomson South-western, 7th edition, 2007.
4. Prof. (Col) P S Bajaj and Dr. Raj Agrawal, "Business Ethics – An Indian Perspective", Biztantra, New Delhi, (2004)
5. David Ermann and Michele S Shauf, "Computers, Ethics and Society", Oxford University Press,(2003).

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17MBHS05	MARKETING TECHNIQUES FOR ENGINEERS	Category	L	T	P	Credit
		EC(OE)	3	0	0	3

PREAMBLE: Marketing is enveloping trend in modern competitive world as it contributes greatly for the productivity of firms. Marketing includes advertising, promotions, public relations, and sales and procedure of introducing and promoting the product or service into the market and enhancing sales from the buying public. Marketing techniques are significant management process that includes the distribution of marketing activities. Marketing techniques for engineers emphasises the ways to Work closely with advertising and **marketing** teams to promote understanding of the product, Gives technical presentations and demonstrationsonproductsandmakestheengineerst Participateinproductdevelopmentcyclegivinginput about clients potential needs.

PREREQUISITE: NIL

COURSE OBJECTIVES:

1. To understand the concept of marketing.
2. To analyse various indicators of marketing
3. To assess the product Promotion and relevant Strategies.
4. To evaluate market channel for Promotion .
5. To Apply and practice Promotional activities covering online Marketing.

COURSE OUTCOMES:

After successful completion of the course, students will be able to

CO1: Understand the basics of marketing opportunities	Understand
CO2: Analyse the relevant marketing engineering strategies	Analyse
CO3: Apply analytical skills in solving Product promotional challenges	Apply
CO4: Assess the marketing distribution strategies	Analyse
CO5: Analyse the digital marketing techniques for both Product and Market Promotion	Analyse

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	-	-	-	L	-	L	M	M	L	S	-	L	L	-	-
CO2	-	-	-	L	L	L	M	M	M	M	-	M	-	-	L
CO3	L	-	-	L	L	L	-	-	M	M	L	M	-	M	M
CO4	L	-	-	M	L	L	-	-	-	M	M	M	-	M	L
CO5	L	M	M	M	M	M	-	-	M	M	M	M	M	M	M

S- Strong; M-Medium; L-Low

SYLLABUS:

Basics of Marketing

Meaning – Definition and Importance of Marketing – Difference between Selling and Marketing – Approaches to the study of Marketing – Marketing concept – Market Segmentation – Basic for segmenting the consumer market – Marketing Environment - macro and micro components and their impact on marketing decisions - Buyer Behaviour.

Marketing Engineering:

Marketing engineering – importance – Marketing environment decision – Marketing Engineering approach- Marketing Engineering opportunities – Re-engineering Marketing –tools for Marketing engineering –Dynamic effects of Marketing engineering.

Product Promotion

Product – Meaning and Definition – Product Policy – Classification of Products – Product mix – product line strategies – Branding– Product life cycle – New Product Development case studies - Pricing – Importance of Price – Objectives of Pricing- Factors affecting Price determination – Pricing Policies – kinds of Pricing – Pricing of New products – Discounts and Allowance- Resale – Price maintenance.

Market Promotion

Channels of Distribution – Factors influencing the choice of a channel – Channel of Distribution for consumer and Industrial goods – Middlemen – Kinds of Wholesalers and retailers and their functions- Promotional mix- Factors determining promotional mix – Sales promotion – Objectives – Types- Advertising Budget – Personal Selling – Kinds of Advertising – Benefits — Personal selling – kinds of salesmen – Function – Qualities of a good salesmen- process of selling.

Marketing Research and Online Marketing

Marketing Research: Meaning and scope of marketing research; Marketing research process- Social, ethical and legal aspects of marketing; Marketing of services; International marketing; Green marketing; Cyber marketing; Relationship marketing and other developments of marketing. The evolution of online marketing technologies – Difference between online and traditional advertising - Difference between search engines and search advertising – Measuring the effectiveness of online advertising- improving paid search engines.

TEXT BOOK:

1. Philip Kotler, Marketing Management,Millennium Edition, Prentice HallPublication.
2. KS Chandrasekar, “Marketing management Text and Cases”, Tata McGrawHill - Vijaynicole, Firstedition,2010
3. Gary L. Lilien (Author), Arvind Rangaswamy (Author), De Bruyn, Arnaud (Author) “Principles of Marketing Engineering and Analytics”– April 21,2017

REFERENCES:

1. Ramasamy & Namakumari, Marketing Management, MacmillanPub.
2. Arunkumar, Meenakshi, Marketing Management, VikasPub.
3. Sherlaker.S.A, Marketing Management,HPH
4. Rajan Saxena, Marketing Management,TMH
5. Beri. C. G, Marketing Research, Sultan ChandPub.

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17CVEC07	DISASTER MITIGATION AND MANAGEMENT	Category	L	T	P	Credit
		EC(OE)	3	0	0	3

Preamble

This course deals with the various disasters and to expose the students about the measures, its effect against built structures, and Hazard Assessment procedure in India. This course also deals with the methods of mitigating various hazards such that their impact on communities is reduced.

Prerequisite

NIL

Course Objectives

1	To Understand basic concepts in Disaster Management
2	To Understand Definitions and Terminologies used in Disaster Management
3	To Understand the Challenges posed by Disasters
4	To understand Impacts of Disasters

Course Outcomes

On the successful completion of the course, students will be able to

Co1. Understand the various types of disaster viz Hydrological, Coastal and Marine Disasters, Atmospheric Disasters, Geological, Mass Movement and Land Disasters, Wind and Water Driven Disasters.	Understand
Co2. Identify the potential deficiencies of existing buildings for Earthquake disaster and suggest suitable remedial measures.	Understand
Co3. Derive the guide lines for the precautionary measures and rehabilitation measures for Earthquake disaster.	Apply
Co4. Derive the protection measures against floods, cyclone, land slides	Apply
Co5. Understand the effects of disasters on built structures in India	Understand

Mapping with Programme Outcomes and Programme Specific Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1.	M	-	-	L	-	-	-	-	-	-	-	-	-	-	-
CO2.	M	M	L	L	-	M	-	-	-	-	-	-	L	-	-
CO3.	S	M	S	M	-	L	-	M	-	-	-	-	-	-	-
CO4.	S	M	S	-	L	-	-	-	-	-	-	-	-	-	-
CO5.	L	L	-	L	-	-	-	-	-	-	-	-	-	-	-

S- Strong; M-Medium; L-Low

Syllabus

UNIT – I	INTRODUCTION	9 – hours
Concept of disaster; Different approaches; Concept of Risk; Levels of disasters; Disaster phenomena and events (Global, national and regional); Natural and man-made hazards		
UNIT – II	RISK ASSESSMENT AND VULNERABILITY ANALYSIS	9 – hours
Response time, frequency and forewarning levels of different hazards; Characteristics and damage potential of natural hazards; hazard assessment ;Dimensions of vulnerability factors; vulnerability assessment; Vulnerability and disaster risk; Vulnerabilities to flood and earthquake hazards		
UNIT – III	DISASTER MANAGEMENT MECHANISM	9 – hours
Concepts of risk management and crisis management ; Disaster management cycle ;Response and Recovery ; Development, Prevention, Mitigation and Preparedness; Planning for relief		
UNIT – IV	DISASTER RESPONSE	9 – hours
Mass media and disaster management; Disaster Response Plan; Communication, Participation, and Activation of Emergency Preparedness Plan; Logistics Management; Psychological Response; Trauma and Stress Management; Rumour and Panic Management ;Minimum Standards of Relief; Managing Relief; Funding.		
UNIT – V	DISASTER MANAGEMENT IN INDIA	9 – hours
Strategies for disaster management planning; Steps for formulating a disaster risk reduction plan; Disaster management Act and Policy in India; Organisational structure for disaster management in India; Preparation of state and district disaster management plans.		

TextBooks

1. Alexander, D. Natural Disasters, ULC press Ltd, London,1993.
2. Carter, W. N. Disaster Management: A Disaster Management Handbook, Asian Development Bank, Bangkok,1991.
3. Chakrabarty, U. K. Industrial Disaster Management and Emergency Response, Asian Books Pvt. Ltd., New Delhi2007.

Reference Books

1. Abarquez I. & Murshed Z. Community Based Disaster Risk Management: Field Practitioner's Handbook, ADPC, Bangkok, 2004.
2. Goudie, A. Geomorphological Techniques, Unwin Hyman, London 1990.
3. Goswami, S. C. Remote Sensing Application in North East India, Purbanchal Prakesh, Guwahati, 1997.
4. Manual on Natural Disaster Management in India, NCDM, New Delhi, 2001.
5. Disaster Management in India, Ministry of Home Affairs, Government of India, New Delhi, 2011.
6. National Policy on Disaster Management, NDMA, New Delhi, 2009.
7. Disaster Management Act. (2005), Ministry of Home Affairs, Government of India, New Delhi, 2005.

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17EEEC22	SCADA										Category	L	T	P	Credit
											EC(OE)	3	0	0	3
PREAMBLE Communication tool to analyze the power system date in real time applications.															
PREREQUISITE – NIL															
COURSE OBJECTIVES															
1	To understand the fundamentals of SCADA.														
2	To analyze the SCADA Components.														
3	To apprise the communication in SCADA.														
4	To learn the Concept of Monitoring and Control unit of SCADA.														
5	To analyze the application of SCADA in power System.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Estimate the system components of SCADA.													Evaluate		
CO2. Outline the fundamentals of SCADA.													Analyze		
CO3. Compare the various SCADA communication protocol.													Analyze		
CO4. Illustrate the SCADA communication.													Apply		
CO5. Explain the monitoring and control unit of SCADA.													Understand		
CO6. Describe the applications of SCADA in power system .													Understand		
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	L	L	L	M	M	--	--	--	--	--	--	L	L	M
CO2	M	--	--	--	M	M	--	--	--	--	--	--	L	--	L
CO3	L	M	--	--	M	M	--	L	--	S	--	L	M	L	M
CO4	L	M	--	--	M	M	--	--	--	S	--	L	M	L	M
CO5	L	--	--	--	L	M	--	--	--	--	--	L	M	M	M
CO6	S	S	--	--	L	M	--	--	--	--	--	L	L	L	M
S- Strong; M-Medium; L-Low															

SYLLABUS

INTRODUCTION TO SCADA

Evolution of SCADA, SCADA definitions, SCADA Functional requirements and Components, SCADA Hierarchical concept, SCADA architecture, General features, SCADA Applications, Benefits.

SCADA SYSTEM COMPONENTS

Remote Terminal Unit (RTU), Interface units, Human- Machine Interface Units (HMI), Display Monitors/Data Logger Systems, Intelligent Electronic Devices (IED), Communication Network, SCADA Server, SCADA Control systems and Control panels.

SCADA COMMUNICATION

SCADA Communication requirements, Communication protocols: Past, Present and Future, Structure of a SCADA Communications Protocol, Comparison of various communication protocols, IEC61850 based communication architecture, Communication media like Fiber optic, PLCC etc. Interface provisions and communication extensions, synchronization with NCC, DCC.

SCADA MONITORING AND CONTROL

Online monitoring the event and alarm system, trends and reports, Blocking list, Event disturbance recording. Control function: Station control, bay control, breaker control and disconnect control.

SCADA APPLICATIONS IN POWER SYSTEM

Applications in Generation, Transmission and Distribution sector, Substation SCADA system Functional description, System specification, System selection such as Substation configuration, IEC61850 ring configuration, SAS cubicle concepts, gateway interoperability list, signal naming concept. System Installation, Testing and Commissioning

TEXT BOOKS:

1. Stuart A. Boyer: SCADA-Supervisory Control and Data Acquisition, Instrument Society of America Publications, USA, 2004
2. Gordon Clarke, Deon Reynders: Practical Modern SCADA Protocols: DNP3, 60870.5 and Related Systems, Newnes Publications, Oxford, UK, 2004.
- 3.

REFERENCES:

1. William T. Shaw, Cybersecurity for SCADA systems, PennWell Books, 2006
2. David Bailey, Edwin Wright, Practical SCADA for industry, Newnes, 2003
3. Michael Wiebe, A guide to utility automation: AMR, SCADA, and IT systems for electric Power, PennWell 1999.
4. Dieter K. Hammer, Lonnie R. Welch, Dieter K. Hammer, "Engineering of Distributed Control Systems", Nova Science Publishers, USA, 1st Edition, 2001

COURSE DESIGNERS

S.No.	Name of the Faculty	Designation	Department	Mail ID
1	V.MANJULA	Assistant Professor	EEE/VMKVEC	manjula@vmkvec.edu.in
2	L.CHITRA	Associate Professor	EEE/AVIT	chitra@avit.ac.in

17EEEC03	COMPUTER AIDED DESIGN OF ELECTRICAL APPARATUS										Category	L	T	P	Credit	
											EC(OE)	3	0	0	3	
PREAMBLE To understand and familiarize the principle, Concepts of Computer Aided Design technology for the design of Electrical Machines.																
PREREQUISITE: NIL																
COURSE OBJECTIVES																
1	Learn the importance of computer aided design method.															
2	Understand the basic electromagnetic field equations and the problem formulation for CAD applications.															
3	Become familiar with Finite Element Method as applicable for Electrical Engineering.															
4	Know the organization of a typical CAD package.															
5	Apply Finite Element Method for the design of different Electrical apparatus.															
COURSE OUTCOMES																
On the successful completion of the course, students will be able to																
CO1: Understand the concept of electromagnetic energy conversion and designing parameters.													Understand			
CO2: Familiarize the mathematical expressions for different field problems.													Understand			
CO3: Implement the concepts of FEM to design the apparatus													Apply			
CO4: Analyze the performance of electrical apparatus through the concepts of CAD													Analyze			
CO5: Design the electrical apparatus.													Create			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES																
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	
CO1	S	M	-	M	-	-	-	-	-	-	-	-	S	M	M	
CO2	S	M	-	-	-	-	-	-	-	-	-	-	M	M	M	
CO3	S	S	M	M	M	-	-	-	-	-	-	-	M	S	M	
CO4	S	S	M	M	M	-	-	-	-	-	-	-	M	S	M	
CO5	S	S	S	M	S	-	-	-	-	-	-	--	M	S	S	
S- Strong; M-Medium; L-Low																

Syllabus

INTRODUCTION

Conventional design procedures – Limitations – Need for field analysis based design –Review of Basic principles of energy conversion – Development of Torque/Force.

MATHEMATICAL FORMULATION OF FIELD PROBLEMS

Electromagnetic Field Equations – Magnetic Vector/Scalar potential – Electrical vector / Scalar potential – Stored energy in Electric and Magnetic fields – Capacitance – Inductance- Laplace and Poisson's Equations – Energy functional.

PHILOSOPHY OF FEM

Mathematical models – Differential/Integral equations – Finite Difference method – Finite element method – Energy minimization – Variational method- 2D field problems – Discretisation – Shape functions – Stiffness matrix – Solution techniques.

CAD PACKAGES

Elements of a CAD System –Pre-processing – Modelling – Meshing – Material properties- Boundary Conditions – Setting up solution – Post processing.

DESIGN APPLICATIONS

Voltage Stress in Insulators – Capacitance calculation – Design of Solenoid Actuator – Inductance and force calculation – Torque calculation in Switched Reluctance Motor.

TEXT BOOKS

1. S.J Salon, 'Finite Element Analysis of Electrical Machines', Kluwer Academic Publishers, London,1995.
2. Nicola Bianchi, 'Electrical Machine Analysis using Finite Elements', CRC Taylor& Francis,2005.

REFERENCES

1. Joao Pedro, A. Bastos and Nelson Sadowski, 'Electromagnetic Modeling by Finite Element Methods', Marcell Dekker Inc.,2003.
2. P.P.Silvester and Ferrari, 'Finite Elements for Electrical Engineers', Cambridge University Press,1983.
3. D.A.Lowther and P.P Silvester, 'Computer Aided Design in Magnetics', Springer Verlag, New York,1986.
4. S.R.H.Hoole, 'Computer Aided Analysis and Design of Electromagnetic Devices', Elsevier, New York,1989.
5. User Manuals of MAGNET, MAXWELL & ANSYSSoftwares.

COURSE DESIGNERS				
S.No.	Name of the Faculty	Designation	Department	Mail ID
1	Mr.G.Ramakrishnaprabu	Associate Professor	EEE / VMKVEC	ramakrishnaprabu@vmkvec.edu.in
2	Mr.S.Prakash	Assistant	EEE/AVIT	sprakash@avit.ac.in

17EEEC21	NON CONVENTIONAL ENERGY SOURCES	Category	L	T	P	Credit
		EC(OE)	3	0	0	3
PREAMBLE Non Conventional sources of energy are generally renewable sources of energy. This type of energy sources include anything, which provides power that can be replenished with increasing demand for energy and with fast depleting conventional sources of energy such as coal, petroleum, “natural gas etc. The non- conventional sources of energy such as energy from sun, wind, biomass, tidal energy, geo thermal energy and even energy from waste material are gaining importance. This energy is abundant, renewable, pollution free and eco-friendly. It can also be more conveniently supplied to urban, rural and even remote areas. Thus, it is also capable of solving the twin problems of energy supply in a decentralized manner and helping in sustaining cleaner environment. It concerned with development of the national grid system will focus on those resources that have established themselves commercially and are cost effective for on grid applications						
PREREQUISITE NIL						
COURSE OBJECTIVES						
1	To impart the knowledge of basics of different non conventional types of power generation & power plants					
	To understand the need and role of Non-Conventional Energy sources.					
2	To learn economical and environmental merits of solar energy for variety applications.					
3	To learn modern wind turbine control & monitoring.					
4	To learn various power converters in the field of renewable energy technologies.					
5	To study and analyse different types of Power converters for Renewable energy conversion					
COURSE OUTCOMES						
On the successful completion of the course, students will be able to						
CO1	Identify the different non conventional sources and the power generation techniques to generate electrical energy.					Understand
CO2	Explore the Solar Radiation, different Methods of Solar Energy Storage and its Applications.					Analyse
CO3	FamiliarizetheWinds energyas alternate form of energy and to know how it can betapped					Understand

CO4	Explore the Geothermal Energy Resources and its methods.	Understand
CO5	Identify the Bio mass and Bio gas resources and its tapping technique	Analyze
CO6	Investigate the Tidal, Wave and OTEC Energy, Concepts of Thermo-Electric Generators and MHD Generators	Analyse

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	L	-	M	M	-	L	L	-	L	-	-	M	L	-	-
CO2		L		L	M		S	-	M	L	M	S	S	S	M
CO3	-	M	M	S	L	M	L	-	-	L	S	-	S	S	-
CO4	M	L	-	-	-	S	-	S	S	L	M	S	M	L	S
CO5	-	M	L	M	L	L	M	L	S	M	S	L	-	-	S
CO6	L	-	-	-	-	-	M	-	S	S	-	M	L	M	S

S- Strong; M-Medium; L-Low

SYLLABUS

INTRODUCTION

Statistics on conventional energy sources, Classification of Energy Resources, Definition Concepts of NCES, Limitations of RES, Criteria for assessing the potential of NCES. - Solar, Wind, Geothermal, Bio-mass, Ocean Energy Sources, comparison of these energy sources

SOLAR ENERGY CONCEPT

Introduction to Solar Energy - Radiation and its measurement, Solar Energy conversion and its types - Introduction to Solar Energy Collectors and Storage, Applications of Solar Energy: Solar Thermal Electric Conversion Systems, Solar Electric power Generation, Solar Photo-Voltaic, Solar Cell Principle, Semiconductor Junctions, Conversion efficiency and power output, Basic Photo Voltaic System for Power Generation, Stand-alone, Grid connected solar powersatellite

WIND ENERGY CONCEPT

Introduction - Basic Principles of Wind energy conversion-The nature of wind- The power in the wind (No derivations) - Forces on the Blades (No derivations)-Site Selection considerations-Basic components of a wind energy conversion system (WECS)-Advantages & Limitations of WECS-Wind turbines (Wind mill)- Horizontal Axis wind mill-Vertical Axis wind mill-performance of wind mills-Environmental aspects - Determination of torque coefficient, Induction typegenerators

GEOTHERMAL AND BIOMASS ENERGY

Geothermal Sources - Hydro thermal Sources - a. Vapor dominated systems b. Liquid dominated systems
-Prime movers for geothermal energy conversion - Biomass Introduction - Biomass conversion techniques-Biogas
Generation-Factors affecting biogas Generation-Types of biogas plants- Advantages and disadvantages of biogas
plants-urban waste to energy conversion - MSW incineration plant.

TIDAL AND OTEC ENERGY

Tidal Energy-Basic Principles of Tidal Power-Components of Tidal Power Plants- Schematic Layout of Tidal
Power house-Advantages & Limitations of Tidal, Wave, OTEC energy - Difference between tidal and wave power
generation, OTEC power plants, Design of 5 Mw OTEC pro-commercial plant, Economics of OTEC,
Environmental impacts of OTEC.

TEXT BOOK

1. Ashok V Desai, Non-Conventional Energy, Wiley Eastern Ltd, New Delhi, 2003
2. K M, Non-Conventional Energy Systems, Wheeler Publishing Co. Ltd, New Delhi, 2003.
3. Non Conventional Energy Resources, Shobh Nath. Singh, Pearson Education India, 2016, e – ISBN :
978933255906 -6

REFERENCES

1. Ramesh R & Kumar K U, Renewable Energy Technologies, Narosa Publishing House, New Delhi, 2004
2. Wakil MM, Power Plant Technology, Mc Graw Hill Book Co, New Delhi, 2004.
3. Non – Conventional Energy Sources. Rai.

COURSE DESIGNERS

S.No.	Name of the Faculty	Designation	Department	e-Mail ID
1	P. LOGANATHAN	Assistant Professor	EEE / VMKVEC	loganathan@vmkvec.edu.in

17MEPI04	NON-DESTRUCTIVE TESTING	Category	L	T	P	Credit									
		EC(OE)	3	0	0	3									
Preamble To study and understand the various Non Destructive Evaluation and Testing methods, theory and their industrial applications.															
Prerequisite NIL															
Course Objective															
1	To expose to the concept of overview of NDT														
2	To familiarize with the applications of differential equations, surface NDE Methods														
3	To understand the concept of thermography and Eddy current testing														
4	To understand the concept of ultrasonic testing and acoustic emission														
5	To understand the concept of Radiography (RT)														
Course Outcomes: On the successful completion of the course, students will be able to															
CO1.	Explain the concept of overview of NDT					Understand									
CO2.	To familiarize with the applications of differential equations, surface NDE Methods					Understand									
CO3.	Experiment with the concept of thermography and Eddy current testing					Apply									
CO4.	Experiment with the concept of ultrasonic testing and acoustic emission					Apply									
CO5.	Experiment with the concept of Radiography (RT)					Apply									
Mapping with Programme Outcomes and Programme Specific Outcomes															
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S		L	M									L		
CO2	S	M	M	M	L								L		
CO3	S	L	M	M	M								L		
CO4	S		S	S	M								L		
CO5	S	M	L	M									L		
S- Strong; M-Medium; L-Low															
SYLLABUS															
OVERVIEW OF NDT															

NDT Versus Mechanical testing, Overview of the Non Destructive Testing Methods for the detection of manufacturing defects as well as material characterization. Relative merits and limitations, Various physical characteristics of materials and their applications in NDT., Visual inspection – Unaided and aided

SURFACE NDE METHODS

Liquid Penetrant Testing – Principles, types and properties of liquid penetrants, developers, advantages and limitations of various methods, Testing Procedure, Interpretation of results. Magnetic Particle Testing- Theory of magnetism, inspection materials Magnetisation methods, Interpretation and evaluation of test indications, Principles and methods of demagnetization, Residual magnetism.

THERMOGRAPHY AND EDDY CURRENT TESTING

Thermography- Principles, Contact and non contact inspection methods, Techniques for applying liquid crystals, Advantages and limitation – infrared radiation and infrared detectors, Instrumentations and methods, applications. Eddy Current Testing-Generation of eddy currents, Properties of eddy currents, Eddy current sensing elements, Probes, Instrumentation, Types of arrangement, Applications, advantages, Limitations, Interpretation/Evaluation.

ULTRASONIC TESTING (UT) AND ACOUSTIC EMISSION (AE)

Ultrasonic Testing-Principle, Transducers, transmission and pulse-echo method, straight beam and angle beam, instrumentation, data representation, A/Scan, B-scan, C-scan. Phased Array Ultrasound, Time of Flight Diffraction. Acoustic Emission Technique –Principle, AE parameters, Applications

RADIOGRAPHY (RT)

Principle, interaction of X-Ray with matter, imaging, film and film less techniques, types and use of filters and screens, geometric factors, Inverse square, law, characteristics of films – graininess, density, speed, contrast, characteristic curves, Penetrameters, Exposure charts, Radiographic equivalence. Fluoroscopy- Xero-Radiography, Computed Radiography, Computed Tomography

Text Books

1. Baldev Raj, T.Jayakumar, M.Thavasimuthu “Practical Non-Destructive Testing”, Narosa Publishing House.
2. Ravi Prakash, “Non-Destructive Testing Techniques”, 1st revised edition, New Age International Publishers.

Reference Books

1. ASM Metals Handbook, “Non-Destructive Evaluation and Quality Control”, American Society of Metals, Metals Park, Ohio, USA, 200, Volume-17.
2. Paul E Mix, “Introduction to Non-destructive testing: a training guide”, Wiley, 2nd Edition New Jersey
3. Charles, J. Hellier, “Handbook of Nondestructive evaluation”, McGraw Hill, New York.

Course Designers

S.No	Faculty Name	Designation	Department/ Name of the College	Email id
1	S.ASHOKKUMAR	Asst.Professor G-II	Mech / Avit	ashokkumar@avit.ac.in

17MESE17	MODERN MANUFACTURING METHODS	Category	L	T	P	Credit									
		EC(OE)	3	0	0	3									
Preamble This course aims to teach the various advanced manufacturing processes used in industries for making products. The students will get complete knowledge of the unconventional processes in terms of aspects stated above.															
Prerequisite – NIL															
Course Objective															
1	To discuss the basic concepts of various unconventional machining processes														
2	To Demonstrate the Mechanical energy based unconventional machining processes.														
3	To Demonstrate the Electrical energy based unconventional machining processes.														
4	To Demonstrate the Chemical & Electro-Chemical energy based unconventional machining processes.														
5	To Demonstrate the Thermal energy based unconventional machining processes.														
Course Outcomes: On the successful completion of the course, students will be able to															
CO1.	Discuss the basic concepts of various unconventional machining processes					Understand									
CO2.	Explain the Mechanical energy based unconventional machining processes					Apply									
CO3.	Illustrate the Electrical energy based unconventional machining processes					Apply									
CO4.	Explain the Chemical & Electro-Chemical energy based unconventional machining processes					Apply									
CO5.	Illustrate the Thermal energy based unconventional machining processes					Apply									
Mapping with Programme Outcomes and Programme Specific Outcomes															
CO	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	S	-	-	-	L	-	-	-	-	-	M	-	L		
CO2	S	-	-	M	M	-	-	-	-	-	M	-	L		
CO3	S	-	-	M	M	-	-	-	-	-	M	-	L		
CO4	S	-	-	M	M	-	-	-	-	-	M	-	L		
CO5	S	-	-	M	M	-	-	-	-	-	M	-	L		
S- Strong; M-Medium; L-Low															

SYLLABUS				
INTRODUCTION				
Unconventional machining Process – Need – classification – Brief overview–merits –demerits– Applications				
MECHANICAL ENERGY BASED PROCESSES				
Abrasive Jet Machining – Water Jet Machining – Abrasive Water Jet Machining - Ultrasonic Machining. Working Principles & Applications – equipment used – process parameters – MRR - Variation in techniques used.				
ELECTRICAL ENERGY BASED PROCESSES				
Electric Discharge Machining - working principle and applications – equipments - process parameters - surface finish and MRR- Power and control circuits–Wire cut EDM – working principle andApplications.				
CHEMICAL AND ELECTRO-CHEMICAL ENERGY BASED PROCESSES				
Chemical machining and Electro-Chemical Machining- Electro Chemical Grinding and Electro chemical Honing-working principle and applications-Process Parameters -Surface finish and MRR -Etchants–Maskants				
THERMAL ENERGY BASED PROCESSES				
Laser Beam Machining and drilling, Plasma Arc Machining and Electron Beam Machining Working principles & Applications – Equipment –Types - Beam control techniques. Micromachining and Nanofabrication Techniques				
Text Books				
1	Vijay.K. Jain “Advanced Machining Processes” Allied Publishers Pvt. Ltd.			
2	P.K.Mishra , " Non Conventional Machining " - - The Institution of Engineers (India) Text Books: Series.			
Reference Books				
1	Benedict. G.F. “Nontraditional Manufacturing Processes” Marcel Dekker Inc., NewYork			
2	Pandey P.C. and Shan H.S. “Modern Machining Processes” Tata McGraw-Hill, New Delhi.			
3	Paul De Garmo, J.T.Black, and Ronald.A.Kohser, “Material and Processes in Manufacturing”			
Course Designers				
S.No	Faculty Name	Designation	Department/Name of the College	Email id
1	S.PRAKASH	Assistant Professor (Gr-II)	Mech / AVIT	prakash@avit.ac.in
2	M SARAVANAN	Asst Prof	Mech / VMKVEC	saravananm@vmkvec.edu.in

17ECCC07	MICROCONTROLLERS & ITS APPLICATIONS	Category	L	T	P	Credit
		EC(OE)	3	0	0	3

PREAMBLE

Microcontroller is used as the main controller in most of the embedded systems nowadays. Due to the development in VLSI technology, microcontrollers evolve which function similar to microprocessors but they have most of the peripherals built on-chip. This course makes the students to be familiar with the architecture and programming of Microcontrollers. This course also introduces the architecture and hardware features of PIC 16F877 and ARM7 (LPC2148) microcontrollers.

PREREQUISITE – NIL

COURSE OBJECTIVES

1	To learn the concepts of microprocessors and knowledge of interfacing devices.
2	To study the Architecture of 8051 microcontroller
3	To develop skill in simple program writing of microcontroller
4	To study the interfacing and applications of microcontroller
5	To study the advanced microcontrollers.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO1. Explain the concept of microprocessor and interfacing devices.	Understand
CO2. Explain the architecture and function of 8051 microcontroller	Apply
CO3. Design and implement programs on 8051 Microcontroller	Analyze
CO4. Design and implement applications using 8051 Microcontroller	Analyze
CO5. Illustrate various applications using advanced Microcontrollers.	Analyze

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	S	M	-	M	-	-	-	-	-	-	M	S	M	-
CO2	S	S	S	-	M	-	-	-	-	-	-	M	-	-	-
CO3	S	M	M	-	M	M	-	-	-	-	-	M	-	-	-
CO4	S	S	M	-	M	M	-	-	-	-	-	M	M	-	-
CO5	S	M	S	-	M	M	-	-	-	-	-	M	M	M	M

S- Strong; M-Medium; L-Low

SYLLABUS

INTEL 8086 MICROPROCESSOR & I/O INTERFACING

Introduction to 8086 - Architecture of 8086 - Register organization – Signal Description of 8086 - Addressing modes – Data Transfer Instruction – Arithmetic Instruction - Branching Instruction - Program Transfer Instruction – simple programs- Programmable Peripheral Interface 8255 – Programmable Communication Interface 8251 USART – Programmable Interrupt Controller 8259A – Direct Memory Access Controller 8257- Programmable Interval Timer 8253 – Keyboard/Display Controller 8279.

INTEL 8051 MICROCONTROLLER

Introduction to 8 bit microcontroller – architecture of 8051- Signal descriptions of 8051- Role of PC and DPTR- Flags and PSW- CPU registers- Internal RAM & ROM- Special Function Register-Counter & Timers- Serial Communication.

ASSEMBLY LANGUAGE PROGRAM OF INTEL 8051

Interrupt- Addressing Mode- Data Transfer Instruction- Arithmetic Instruction- Logical Instruction- Jump Loop & Call Instruction- I/O Port Programming.

INTERFACING AND APPLICATION OF INTEL 8051

LCD Interfacing - A/D and D/A Interfacing- Sensor Interfacing- Relays and Optoisolators- Stepper Motor Interfacing- DC Motor Interfacing.

ADVANCED MICROCONTROLLERS

PIC 16F877 microcontroller – Architecture On chip ADC, I²C – SPI – Watchdog timer – ARM7 (LPC2148) microcontroller – Architecture and applications.

TEXTBOOKS:

1. Muhammad Ali Mazidi and Janica Gilli Mazidi, The 8051 microcontroller and embedded systems, Pearson Education, 5th Indian reprint, 2003.
2. Frank D. Petruzella. “Programmable Logic Controllers”, McGraw–Hill Book, Company, 1989

REFERENCE BOOKS:

1. B.P. Singh, Microprocessors and Microcontrollers, Galcotia Publications (P) Ltd, First edition, New Delhi, 1997.
2. Embedded Controller Hand book, Intel Corporation, USA.
3. Microcontroller Hand Book, INTEL, 1984.
4. Ajay V. Deshmukh, “Microcontrollers- Theory and applications”, Tata McGraw-Hill, publisher, 2005.

COURSE DESIGNERS

S.No.	Name of the Faculty	Designation	Department	Mail ID
1	Mr.S.Selvam	Assistant Professor	ECE	selvam@avit.ac.in
2	Mr.R.Ramani	Assistant Professor	ECE	ramani@vmkvec.edu.in
3	Mr.G.Sureshkumar	Assistant Professor	ECE	sureshkumar@vmkvec.edu.in

17MBHS02	FINANCE AND ACCOUNTING FOR ENGINEERS							Category	L	T	P	Credit			
								EC(OE)	3	0	0	3			
PREAMBLE: Engineers are in a position to do Decision Making during every activity in the industry. The activities ranging from Operation to Non-Operation during the routine functions of the organization. Especially, Finance and Accounting also becomes the part of responsibility of every engineer to do data analysis activities. His interpretation through data analysis and reporting in every transaction helps the organization to do decision making to run the organization effectively and efficiently. Finance and Accounting Practices enable the engineers to handle the resources to do cost and Financial decisions with optimum resources for the betterment of the organization.															
PREREQUISITE: NIL															
COURSE OBJECTIVES:															
1. To understand the concepts and conventions to prepare Income Statement, and Balance Sheet.															
2. To apply the various methods to claim depreciation and															
3. To practice fundamental investment decision through capital budgeting techniques.															
4. To analyse cost-volume profit analysis for decision making and analyse standard costing techniques.															
5. To estimate the working capital requirements for day-to-day activities and handling inventories with economic ordering quantities.															
COURSE OUTCOMES:															
After successful completion of the course, students will be able to															
CO1: Understand the importance of recording, book keeping and reporting of the business transaction.												Understand			
CO2: Identify and Apply suitable method for charging depreciation on fixed assets.												Apply			
CO3: Analyse the various methods of capital budgeting techniques for investment decision.												Apply			
CO4: Justify the scope of cost-volume-profit analysis, standard costing, and marginal costing techniques for decision making.												Analyse			
CO5: Estimation of working capital requirements of the organization.												Evaluate			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	M	L	S	M	-	S	-	M	M	L	M	L	M
CO2	L	-	-	L	M	-	L	L	-	-	L	M	L	L	-
CO3	-	M	-	M	L	-	-	L	S	M	-	L	-	L	M
CO4	L	L	-	S	-	-	L	-	-	L	M	L	M	L	M
CO5	L	-	L	S	L	-	-	M	M	L	-	L	M	M	-
S- Strong; M-Medium; L-Low															

SYLLABUS:

Introduction: Business Environment – Forms of business – Book Keeping and Accounting – Accounting Concepts and Conventions – Journal – Subsidiary books - Ledger – Trial Balance – Final Accounts

Deprecation: Meaning – Causes - Methods of Calculating Depreciation: Straight Line Method, Diminishing Balance Method and Annuity Method.

Capital Budgeting Decisions: Meaning – Nature & Importance of Investment Decisions – Types - Evaluation Techniques – Non-Discounting Cash Flow Techniques: Pay Back Period – Accounting Rate of Return – Discounting Cash Flow Techniques: NPV – IRR - Profitability Index.

Costing Accounting: Concepts - Elements of Cost - Preparation of Cost Sheet - Types of Costs – Marginal Cost - Breakeven Analysis - Cost Volume Profit Relationship - Applications of Standard and marginal Costing Techniques.

Working Capital Management: – Types of Working Capital – Operating Cycle – Determinants of Working Capital - Receivables Management – ACP, Aging schedule – Inventory Management – Need for holding inventories – Objectives – Inventory Management Techniques: EOQ & Reorder point – ABC Analysis - Cash Management – Motives for holding cash.

Text Book

1. Kesavan, C. Elenchezian, and T. Sunder Selwyan, “Engineering Economics and Financial Accounting”, Firewall Media, 2005.
2. Kasi Reddy .M and Saraswathi .S, “Managerial Economics and Financial Accounting”, PHI Learning Pvt., Ltd. 2007.

Reference Book

1. Periyasamy .P, “A Textbook of Financial, Cost and Management Accounting”, Himalaya Publishing House, 2010.
2. Palanivelu V.R., “Accounting for Managers”, Lakshmi Publications, 2005.
1. Mark S Bettner, Susan Haka, Jan Williams, Joseph V Carcello, “Financial and Management Accounting”, Mc-Graw-Hill Education, 2017

COURSE DESIGNERS:

S.No	Name of the Faculty	Designation	Department	Mail ID
1	M.Manickam	Associate Professor	Management Studies	manickam@vmkec.edu.in
2	Dr. Rajeshkumar	Assistat Professor	Management Studies	Rajesh.mba@avit.ac.in

17MBHS09	INTELLECTUAL PROPERTY RIGHTS AND ALTERNATE DISPUTE RESOLUTION	Category	L	T	P	Credit
		EC(OE)	3	0	0	3

PREAMBLE: IPR & ADR

Intellectual Property Rights are valuable assets and the most essential for any kind of business development. IPR helps to set the business to show individuality from market competitors. It prevents duplication and provide authentication as a unique selling point to compete in the market and built confidence over the product among the customers. ADR is a new legal mechanism to sort out disputes among industries and helps to get easily solved through mediation and counselling. It provides instant solutions to both the parties with meagre loss in a faster way and less expensive through arbitrator.

PREREQUISITE: NIL

COURSE OBJECTIVES:

1. To understand and practice the basic concept of IPR and Patent filing procedure.
2. To describe the various procedure for getting grants of patent, trademark and trade secrets.
3. To apply various legal aspects in patent ownership and transfer.
4. To implement the best practices and laws relating to the Intellectual property rights.
5. To examine the practices of ADR mechanism in the technological advancement contexts.

COURSE OUTCOMES:

After successful completion of the course, students will be able to

CO1: Understand the concept and development of intellectual property rights.	Understand
CO2: Explain the procedure and requirement of to apply New IPR development and related system in India and across the Globe.	Understand
CO3: Solve the various issues of transfer of patent ownership with reference to International Patent Law.	Apply
CO4: Analyse the present system of Patent Act in India and changes aligned with international standards.	Analyse
CO5: Criticise the present dispute mechanism and how ADR supports and solution to business issues.	Evaluate

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	L	M	M	-	-	S	L	M	L	M	-	L	-	-	-
CO2	-	-	M	L	M	M	S	L	M	L	L	L	-	-	M
CO3	-	-	M	M	-	L	M	-	M	L	L	M	L	M	-
CO4	M	-	-	L	M	-	L	-	-	L	L	M	-	-	L
CO5	-	L	-	L	M	L	-	M	L	-	M	L	L	L	-

S- Strong; M-Medium; L-Low

SYLLABUS:

UNIT – I: Introduction To IPRs

Basic concepts of Intellectual Property- Patents Copyrights, Geographic Indicators, History of IPRs- the way from WTO to WIPO- TRIPS, Nature of Intellectual Property, Industrial Property, Technological Research, Inventions and Innovations - Defining Intellectual Property and Patents, Patent Searches and Application.

UNIT – II: New Developments in IPR

Procedure for grant of Patents, TM, GIs, Trade Secrets, Patenting under PCT, Administration of Patent system in India, Patenting in foreign countries - International Treaties and conventions on IPRs, The TRIPS Agreement.

UNIT – III: Patent Ownership and Transfer

Defining Intellectual Property and Patents, Patent Searches and Application, Patent Ownership and Transfer, Patent Infringement, New Developments and International Patent Law

UNIT – IV: Legislation of IPRs

The Patent Act of India, Patent Amendment Act (2005), Design Act, Trademark Act, Geographical

Indication Act, Bayh- Dole Act and, IPR strength in India - Patent Ownership and Transfer, Patent Infringement, New Developments and International Patent Law

UNIT – V: Alternate Dispute Resolution

Alternate Dispute Resolution and Arbitration – ADR Initiatives - Reason for Choosing ADR – Advantages and Disadvantages of ADR – Assessment of ADR's – Litigation – Arbitration - Effective Mechanism for Business Issues.

TEXTBOOK:

1. Deborah E. Bouchoux, Intellectual Property Rights, Delmar, Cengage Learning, 2005.

REFERENCES:

1. V. Sople Vinod, Managing Intellectual Property by (Prentice hall of India Pvt.Ltd),2006.
2. A. Primer, R. Anita Rao and Bhanoji Rao, Intellectual Property Rights, Lastain Book company. Edited by Derek Bosworth and Elizabeth Webster, The Management of Intellectual Property, Edward Elgar Publishing Ltd., 2006.
3. Tejaswini Apte, A single guide to Intellectual property rights, Biodiversity and Traditionalknowledge.
4. WIPO Intellectual Property Handbook.
5. Intellectual Property rights and copyrights, Ess EssPublications.

COURSE DESIGNERS:

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1	Dr. G. Palaniappan	Associate Professor	Management Studies	palaniappan@vmkvec.edu.in
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17ATEC14	COMPUTER CONTROLLED VEHICLE SYSTEMS	Category	L	T	P	C
		EC(OE)	3	0	0	3

Preamble

This course introduces the role of sensors and actuators for controlling the engine, drive line. It also provide

Prerequisite

NIL

Course Objectives

1	To know the control Autonomy of vehicles
2	To study computer controlled fuel, Ignition , Speed and knock system of IC engine
3	To learn the computer controlled drive line system of Automobile
4	To study about the computer control transportation system
5	To learn about the smart safety devices of Automobile

Course Outcomes:

After Successful completion of this course, the students will be able to:

CO1.	Summarize sensors and actuators used in vehicle control system	Understand
CO2.	Identify Control of fuel, Ignition , speed and knock in IC engine	Apply
CO3.	Make use of Drive line system, Steering and suspension systems	Apply
CO4.	Examine intelligent transportation system	Analyze
CO5.	Analyze the smart safety Devices used in Automobiles	Analyze

Mapping with Programme Outcomes and Programme Specific Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	M	M	--	--	--	M	--	--	--	M	M	--	--
CO2	S	M	M	M	--	--	M	M	M	--	--	M	M	--	--
CO3	S	S	S	M	--	--	M	M	M	--	--	M	M	--	--
CO4	S	S	S	M	--	--	M	M	M	--	--	M	M	--	--
CO5	S	S	S	M	--	--	M	M	M	--	--	M	M	--	--

S- Strong; M-Medium; L-Low

Syllabus**INTRODUCTION**

Understanding autonomy – Review of the role of control in autonomy (speed control, suspension control & integrated vehicle dynamics) - Role of sensors and actuators. Examples of autonomy cruise control

ENGINE CONTROL SYSTEM

Fuel control-Ignition control in SI engines- Lambda control- idle speed control- Knock control- cylinder balancing

DRIVE LINE CONTROL SYSTEM

Speed control – gear shifting control – traction /braking- steering- suspension – vehicle handling and ride characteristics of road vehicles- adaptive cruise control

INTELLIGENT TRANSPORTATION SYSTEM

Overview – control architecture – collision avoidance, pitch, yaw, bounce control – traffic routing system-automated high way systems- lane warning system- driver information system- data

SAFETY IMPACTING DEVICES

Vision enhancement- driver conditioning warning- anti-lock braking systems – route guidance and navigation systems – in-vehicle computing – commercial vehicle diagnostic/ prognostics – hybrid/ electric and future cars- case study.

TEXT BOOK:

1. Automotive control systems, U.Kiencke and L. Nielson, SAE and Springer-Verlag, 2000

REFERENCES:

1. Crouse, W.H. & Anglin, D.L., Automotive Mechanics, Intl. Student edition, TMH, New Delhi.
2. Artamonov, M.D., Harionov, V.A. & Morin, M.M. Motor Vehicle, Mir Publishers, Moscow 1978.
3. Heitner, J., Automotive Mechanics, CBS Publishers, New Delhi 1987.
4. Stockel Martin W and Stocker Martin T., Auto Mechanics Fundamentals, Goodheart Wilcox,

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17CVSE55	REMOTE SENSING AND GIS FORENVIRONMENTAL APPLICATION									Category	L	T	P	Cre dit	
										EC(OE)	3	0	0	3	
PREAMBLE This Course helps in gaining knowledge about remote sensing and GIS for environment application.															
PREREQUISITE NIL															
COURSE OBJECTIVES															
1	Be acquainted with the concepts of Remote sensing, EMR interaction with Environmental issues.														
2	Be familiar with remote sensing platform systems, its satellites and sensors.														
3	Gain knowledge on data processing using image processing software.														
4	Gain knowledge on GIS and GIS software.														
5	Be familiar with monitoring environment using remote sensing and GIS.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Develop knowledge on concept of remote sensing.												Understand			
CO2. Be aware of remote sensing platforms and sensors.												Understand			
CO3. Identify the steps in Image processing software.												Apply			
CO4. Relate the problems in GIS software.												Apply			
CO5. Describe the environmental application using remote sensing and GIS.												Analyze			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PS O2	PSO 3
CO1	S	L	L	L	-	-	-	-	-	-	-	-	L	L	L
CO2	S	L	M	L	M	-	-	-	-	-	-	-	L	-	L
CO3	S	M	M	L	M	M	-	-	-	-	-	-	L	-	M

CO4	S	S	M	L	-	-	-	-	-	-	-	-	M	M	S
C05	S	-	M	-	M	S							M	M	S

S- Strong; M-Medium; L-Low

SYLLABUS

PRINCIPLES OF ELECTRO MAGNETIC RADIATION: Concepts of Remote Sensing - Energy sources and radiation principles, Energy interactions in the atmosphere - Spectral reflectance of earth surface features. **REMOTE SENSING PLATFORMS:** Aerial Photographs, Photographic Systems - Visible, Infra Red and Microwave sensing - Active and passive sensors - Satellites and their sensors, Indian Space Program - Satellite dataproducts

DATA PROCESSING: Photogrammetry - Satellite data analysis - Visual Interpretation, Interpretation equipments - Digital Image Processing - Image rectification, enhancement, classification, data merging and biophysical modeling - Image Processing software.

GEOGRAPHIC INFORMATION SYSTEM : Introduction to GIS concepts - Data base structure - Data analysis - GIS software

REMOTE SENSING AND GIS APPLICATIONS: Management and monitoring of environment, conservation of resources, coastal zone management - Limitations.

TEXT BOOKS:

1. Lillesand, T.M. and Kiefer, R.W., Remote Sensing and Image Interpretation, John Wiley and Sons, New York, 2004.

REFERENCES:

1. Burrough, P.A. and McDonnell, R.A., Principles of Geographic Information Systems, Oxford University Press, New York, 2001.
2. Lintz, J. and Simonet, Remote Sensing of Environment, Addison Wesley Publishing Company, New Jersey, 1998.

COURSE DESIGNERS

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1	C. Nivetha	Assistant Professor	AVIT	nivethachandru92@gmail.com
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17CVEC03	GEOGRAPHICAL INFORMATION SYSTEM	Category	L	T	P	Credit
		EC(OE)	3	0	0	3

Preamble

Geographical Information System is the application of the geologic science to engineering practice for the purpose of assuring that the geologic factors affecting the engineering works are recognized and adequately provided for. Engineering geologic studies may be performed during the planning and design. A civil engineer should be able to understand an engineering geologic report, and incorporate adequate measures into the design of engineering works.

Prerequisite

NIL

Course Objectives

1. To provide exposure to applications of GIS in various application domains through case studies
2. Students will learn about the use of zone mapping for water bodies .
3. Students will learn about the use of mapping techniques for Agriculture and Earth sciences
4. Students will also learn about the recent techniques used for GPS system
5. The student shall also be able to appreciate the importance of geological formation in causing earthquakes and landslides and literate the rural people

Course Outcomes

On the successful completion of the course, students will be able to

(CO1) Acquire the knowledge of the topographical formation, interior earth, gradational activities and GIS Technique and data INPUT	Understand
(CO2)) Understand the importance of advanced techniques involved in data Analysis and modelling	Understand
(CO3) Study the importance of Data Output And Error Analysis.	Analyse
(CO4) Understand the importance of Natural Resources And Wasteland Management using GIS	Understand
(CO5) Analysis of RS and GIS data and interpreting the data for modeling applications	Analyse

Mapping with Programme Outcomes and Programme Specific Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1.	S	M	L	S	S	M	S	M	M	S	S	S	M	-	M
CO2.	S	M	M	L	L	M	M	L	L	L	L	M	L	L	M
CO3.	S	S	S	S	L	L	M	L	L	L	L	L	L	M	M
CO4.	S	S	S	M	M	S	S	L	L	L	M	M	L	M	L
CO5.	S	S	S	S	S	S	S	S	S	S	S	S	L	M	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT - I	GIS TECHNIQUE AND DATA INPUT	9 - hours
MAP – Types of Maps – Development of GIS – Components of GIS – Hardware, software, organisation – Types of data – Spatial and non-spatial data – Print, Line and Polygon – Vector and Raster data – Database structures – Files – Vector and Raster data structures.		
UNIT - II	DATA ANALYSIS AND MODELLING	9 - hours
Data Retrieval – Query – Simple Analysis – Spatial Analysis – Overlay – Vector Data Analysis – Raster Data Analysis – Modelling using GIS– Digital Elevation Model – Cost and path analysis– Expert Systems – Artificial Intelligence – Integration with GIS		
UNIT - III	DATA OUTPUT AND ERROR ANALYSIS	9 - hours
Data Output – Types – Devices used – Raster and Vector Display Devices – Printers – Plotters – Photo write Devices – Sources of Errors – Types of Errors – Elimination – Accuracies		
UNIT - IV	GIS APPLICATIONS IN RESOURCE MANAGEMENT	9 - hours
Fields of Applications – Natural Resources – Agriculture – Soil – Water Resources – Wasteland Management - Social Resources - Cadastral Records – LIS		
UNIT - V	ADVANCED GIS APPLICATION	9 - hours
AM/FM – Utility Network Management – Integration with Remote Sensing – Knowledge based techniques – Multicriteria Techniques – Introduction to Object Oriented Data baseModel		

TextBooks

1. Burrough P A, Principles of GIS for Land Resources Assessment, Oxford Publication,2000
2. Michael N Demers, Fundamentals of Geographical Information Systems, Second Edition, John Wiley Publications,2002

Reference Books

1. Paul A Longley, Michael F Goodchild et al, Geographical Information Systems Volume I and II, Second Edition, John Wiley Publications, 1999

Course Designers:

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17CVSE02	ENTERPRISE WIDE INFORMATION SYSTEMS								Category	L	T	P	Credit		
									EC(OE)	3	0	0	3		
PREAMBLE															
This course is designed to provide the student with a thorough understanding of both the role that Enterprise Resource Planning Systems (ERPs) play in an organization and the challenging task of managing the Information Systems (IS) function.															
PREREQUISITE															
NIL															
COURSE OBJECTIVES															
1	To introduce Enterprise resource planning														
2	To make students understand the financial accounting														
3	Explain how ‘best business practices’ are incorporated in an ERP														
4	Execute an entire business process chain in the areas of sales, Procurement, Production and Accounting														
5	To study about the Materials requirement planning, billing & work centers.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
Understand													Understand		
CO2. How ‘best business practices’ are incorporated in an ERP													Understand		
CO3. The role of an ERP in carrying out business processes in a company													Understand		
CO4. Expedite production planning and control using tools provided in an ERP system													Apply		
CO5. Apply appropriate methods to collect the Materials requirement planning, billing & work centers.													Apply		
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	M	M	L	--	--	--	--	--	-	--	--	--	--	--	--
CO2	M	M	L	L	--	M	L	--	M	--	--	--	--	--	--
CO3	M	M	M	--	--	M	L	--	M	--	M	--	--	--	--
CO4	M	M	M	M	--	M	M	--	M	--	--	--	--	L	L
CO5	L	--	M	L	--	--	--	--	--	--	--	--	--	M	M
S- Strong; M-Medium; L-Low															
SYLLABUS															
INTRODUCTION: Overview - database applications -Business function vs business process- Introduction to Enterprise Resource Planning (ERP)															
FINANCIAL ACCOUNTING: Financial Accounting basics – Balance sheet, Profit and Loss Statement- General Ledger, Chart of Accounts –Posting financial transaction-Controlling –Cost															

centers and cost elements-Allocating Costs – Assessments and distributions.

BUSINESS PROCESSES: Sales and fulfillment cycle -Master Data and its role in ERP systems - Creating customer master data, material master data and pricing conditions -Implementing a Sales Cycle

PROCUREMENT PROCESSES: Forecasting raw material requirements using sales information, production requirements, sales forecast-Raw Material procurement-Vendors and pricing conditions-Payment.

PLANNING AND CONTROL: MRP – Materials requirement planning-Independent and dependent materials requirements-Creating Production orders and schedules-Bill of Materials-Executing a Production process-Inventory and Goods movement-Routing and work centers.

TEXT BOOKS:

1. Enterprise Resource Planning, 3rd Edition, by *Bret Wagner and Ellen Monk*, ISBN: 9781423901792,2009
2. SAP R/3, Business Blueprint, 2nd Edition, by *Thomas A. Curran & Andrew Ladd*,Prentice Hall PTR, 2000, ISBN: 0-13-085340-2

REFERENCES:

1. Essentials of Business Processes and Information Systems, by *Simha R. Magal and Jeffrey Word*, ©2010, ISBN:978-0-470-23059-6
2. Integrated Business Processes with ERP Systems, Preliminary Edition, by *Simha R. Magal and Jeffrey Word*, ISBN:978-0-470-88424-9

COURSE DESIGNERS

S.No	Name of the Faculty	Designation	Name of the College	Mail ID
1	Mr. Sudip Das	Asst. Prof	AVIT	sudipdas@avit.ac.in

17CVSE47	ICT BASED CITY AND INFRASTRUCTURE PLANNING	Category	L	T	P	Credit
		EC(OE)	3	0	0	3
PREAMBLE This course offers the various methods of changing scenario in the spatial order of cities and regions as well as the emergence of virtual societies in the world social networks among communities across the city, country and globe demand for paradigm shift in the spatial planning outlook and governance edge						
PREREQUISITE NIL						
COURSE OBJECTIVES						
1	To make students aware and exposed to changing scenario of virtual societies in the world					
2	The spatial order of cities like drinking water provision, transportation, sanitation facility etc.,					
3	The students will be in a position to understand the use and power of emerging new technologies					
4	Social networks among communities across the city, country and globe					
5	Paradigm shift in the spatial planning outlook and governance edge.					
COURSE OUTCOMES						
On the successful completion of the course, students will be able to						
CO1. Students are able to cope up with the application technology						Apply
CO2. Students understand its impact on the infrastructure Planning and development at the house, neighborhood and city levels.						Analyze
CO3. Appraise the spatial order of cities like drinking water provision, transportation, sanitation facility etc.,						Analyze
CO4. Building smart cities and smart communities with the help of Social networks among communities across the city, country and globe						Apply
CO5. Ability to Understand the Paradigm shift in the spatial planning outlook and governance edge.						Analyze

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	L	-	-	-	M	M	S	M	M	-	S	L	-
CO2	-	L	-	-	M	M	M	-	-	L	-	-	S	M	M
CO3	-	-	L	L	L	-	L	M	M	M	M	M	-	M	M
CO4	M	M	-	L	-	L	-	L	L	L	-	M	-	L	L
CO5	-	L	-	M	M	-	-	L	-	L	-	-	M	M	M
S- Strong; M-Medium; L-Low															
SYLLABUS PLANNING VS TECHNOLOGY: Tradition to modernity – Spatial planning and technology interface - Socio-economic planning and technology interface – Planning cities and local technologies - Technological innovations and responsive city planning - Planning responsive technology Vs technology responsive planning. CITIES-TECHNOLOGY-INFRASTRUCTURE: Transportation and technology, water, sanitation and technology, energy efficient technology for home, street, neighborhoods and city - Telecommunication, health and education – Security and safety for buildings and people in cities. TECHNO CITIES: Digital cities, virtual cities, technology parks - Smart planning and infill development – Planning, design and communication system - Socio-economic and environmental Impact of techno cities.. GOVERNANCE: Role of law and technology, administration and organization, industry and corporate, communities and people in building smart cities and smart communities. CASE STUDIES: Best practices in India and around the world. TEXT BOOKS: 1. Brkovic, M. B., ‘Planning in the Information Age: Opportunities and Challenges of e-Planning, CORP,2004 2. City Government of Naga, ‘The Naga City Citizen Chartes- A Guide Book of City Government Services.2004 REFERENCES: Elizabeth, S. Frans, V. ‘IDENSITY: Planning Paradigms for the Information Communication Age’, Isocarp Congress,2001. Intelligent Community forum, ‘Innovation and Employment in the Intelligent Community”, Intelligent Community forum, 2012 Komakech, D., ‘Achieving More Intelligent Cities”, Municipal Engineer,2005. COURSE DESIGNERS															
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17EESE03	ARTIFICIAL INTELLIGENCE APPLICATION TO POWER SYSTEMS	Category	L	T	P	Credit
		EC(OE)	3	0	0	3

PREAMBL

To Study about the Artificial Intelligence application to Power Systems.

PREREQUISITE-NIL

COURSE OBJECTIVES

1	To Understand about the Introduction of Neural networks.
2	To Understand about the Application of Neural networks to Power System
3	To study the introduction to fuzzy logic.
4	To under stand applications to power systems.
5	To study genetic algorithm and its applications to power systems.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO1:Describe the Basics of ANN-Perceptron-Delta learning rule and Algorithm	Understand
CO2: Relate the application of neural networks to power system problems.	Apply
CO3:Analysis the various types of fuzzy logic and their working proramme for various application.	Analyze
CO4: Select to develop fuzzy set theory for various model of power system control	Evaluate
CO5: Design the basic idea genetic algorithm .	Create

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	S	L	-	M	-	M	S	-	-	M	M	L	-
CO2	S	M	M		-	M	-	M	S	-	-	-	M	L	-
CO3	M	M	S	M	-	M	-	M	S	-	-	M	M	L	-
CO4	M	M	S	L	-	M	-	M	S	-	-	-	L	M	-
CO5	M	S	-	L	-	-	-	-	S	-	-	-	L	M	-

S- Strong; M-Medium; L-Low

INTRODUCTION TO NEURAL NETWORKS

Basics of ANN-Perceptron-Delta learning rule –Back Propagation Algorithm-Multilayer Feed forward network-Memory models-Bi-directional associative memory-Hopfield network

APPLICATIONS TO POWER SYSTEM PROBLEMS

Application of Neural Networks to load forecasting, Contingency Analysis-VAR control, Economic Load Dispatch.

INTRODUCTION TO FUZZY LOGIC

Crispness-Vagueness-Fuzziness-Uncertainty-Fuzzy set theory Fuzzy sets-Fuzzy set operations-fuzzy measures-fuzzy relations-fuzzy function. Structure of fuzzy logic controller- fuzzification models-data base-rule base-inference engine defuzzification module.

APPLICATIONS TO POWER SYSTEMS

Decision making in Power system Control through fuzzy set theory-Use of fuzzy set models of LP in Power systems scheduling problems-Fuzzy logic based power system stabilizer.

GENETIC ALGORITHM AND ITS APPLICATIONS TO POWER SYSTEMS

Introduction – Simple Genetic Algorithm – Reproduction,. Crossover, Mutation, Advanced Operators in Genetic Search – Applications to voltage Control and Stability Studies.

TEXT BOOKS:

1. Laurence Fausett, “Fundamentals of Neural Networks”, Prentice Hall, Englewood Cliffs, N.J.,1992
2. Timothy J.Ross, “Fuzzy Logic with Engineering Applications”, McGraw Hill Inc., 2000.

REFERENCES

1. James.A.Freeman and B.M.Skapura “Neural Networks, Algorithms Applications and Programming techniques”- AddisonWesley,1990.
2. George Klir and Tina Folger,.A., “Fuzzy sets, Uncertainty and Information”, Prentice Hall of India Pvt.Ltd.,1993.
3. Zimmerman,H.J. “Fuzzy Set Theory and its Applications”, Kluwer AcademicPublishers,1994.
4. IEEE tutorial on “Application of Neural Network to Power Systems”,1996
5. Loi Lei Lai , “Intelligent System Applications in Power Engineering”, John Wiley and Sons Ltd., 1998
6. EthemAlpaydin, “Introduction to Machine learning (Adaptive Computation and Machine Learning series)’, MIT Press, Second Edition,2010.

COURSE DESIGNERS

S.No.	Name of the Faculty	Designation	Department	Mail ID
1	Mr.A.BALAMURUGAN	Associate Professor	EEE/VMKVEC	balamurugan@vmkvec.edu.in
2	Mr.S.PRAKASH	Assistant Professor (Gr-II)	EEE/AVIT	sprakash@avit.ac.in

17BMCC03	BIOSENSORS AND TRANSDUCERS										Category	L	T	P	Credit
											EC(OE)	3	0	0	3
PREAMBLE The course is designed to make the student acquire conceptual knowledge of the transducers and biological components used for the detection of an analyte. The relation between sensor concepts and biological concepts is highlighted. The principles of biosensors that are currently deployed in the clinical side are introduced.															
PREREQUISITE – NIL															
COURSE OBJECTIVES															
1	To use the basic concepts of transducers, electrodes and its classification.														
2	To discuss the various types of electrodes.														
3	To determine the recording of biological components.														
4	To employ the knowledge in electrochemical and optical biosensors.														
5	To outline the various biological components using biosensors.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Describe the working principles of transducers.														Understand	
CO2. Explain the various types of electrodes.														Understand	
CO3. Utilize various FET sensors for recording of biological components.														Apply	
CO4. Distinguish various biosensors like electrochemical and optical biosensors.														Analyze	
CO5. Analyze the biological components using biosensors in various applications.														Analyze	
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	L	--	M	--	M	--	--	L	--	--	M	--	--	--
CO2	M	L	--	M	--	M	--	--	L	--	--	M	--	--	--
CO3	S	M	L	S	--	S	M	M	M	--	--	M	--	--	--
CO4	S	S	L	S	--	S	M	M	S	--	--	M	M	S	M
CO5	S	S	L	S	--	S	M	M	S	--	--	S	M	S	M
S- Strong; M-Medium; L-Low															
SYLLABUS															
INTRODUCTION: General measurement system, Transducers and its classification, Resistance transducers, capacitive transducer, Inductive transducer.															
TRANSDUCERS: Temperature transducers, piezoelectric transducers, Piezo resistive transducers, photoelectric transducers.															

BIO POTENTIAL ELECTRODES:

Half cell potential, Types of Electrodes –Micro electrodes, Depth and needle electrodes, Surface electrodes, Chemical electrodes, Catheter type electrodes, stimulation electrodes, electrode paste, electrode material.

BIOSENSORS:

Biological elements, Immobilization of biological components, Chemical Biosensor-ISFET, IMFET, electrochemical sensor, chemical fibre sensors.

APPLICATIONS OF BIOSENSORS:

Banana electrode, blood glucose sensors, non invasive blood gas monitoring, UREASE biosensor, Fermentation process control, Environmental monitoring, Medical applications.

TEXT BOOKS:

1. H.S. Kalsi, “**Electronic Instrumentation & Measurement**”, Tata McGraw HILL, 1995.
2. Brain R Eggins, “**Biosensors: An Introduction**”, John Wiley Publication, 1997.
3. Shakthi chatterjee, “**Biomedical Instrumentation**”, Cengage Learning, 2013.
4. John G Webster, “**Medical Instrumentation: Application and design**”, John Wiley Publications, 2001.

REFERENCES:

1. K.Sawhney, “**A course in Electronic Measurements and Instruments**”, Dhapat Rai & sons, 1991.
2. John P Bentley, “**Principles of Measurement Systems**”, 3rd Edition, Pearson Education Asia, (2000 Indian reprint).
3. Geddes and Baker, “**Principles of Applied Biomedical Instrumentation**”, 3rd Edition, John Wiley Publications, 2008.

COURSE DESIGNERS

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1	Mrs.S.Vaishnodevi	Assistant Professor	BME	vaishnodevi@vmkvec.edu.in
2	Mr.V.Prabhakaran	Assistant Professor (Gr-II)	BME	prabhakaran@avit.ac.in
3	Dr.N.Babu	Professor	BME	babu@vmkvec.edu.in

17BMEC06	APPLIED NEURAL NETWORKS AND FUZZY LOGIC SYSTEMS IN MEDICINE										Category	L	T	P	Credit
											EC(OE)	3	0	0	3
PREAMBLE To understand about the basic concepts of Neural Networks and Fuzzy Logic and learn to design and use them for biomedical applications.															
PREREQUISITE – NIL															
COURSE OBJECTIVES															
1	To understand the basic concepts of artificial neural networks.														
2	To study the various ANN Models.														
3	To familiarize about the Self organizing maps and competitive networks.														
4	To study the basic concepts of fuzzy Logic systems.														
5	To apply the concepts of ANN and Fuzzy Logic in Biomedical applications.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Explain the basic concepts of artificial neural networks.													Understand		
CO2. Discuss about basics of the fuzzy logic.													Understand		
CO5. Apply the concepts of ANN and Fuzzy Logic in Biomedical applications.													Apply		
CO4. Illustrate the artificial neural network models.													Analyze		
CO3. Summarize Self organizing maps and competitive networks.													Evaluate		
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	--	--	--	--	L	--	--	--	--	--	M	M	M	M
CO2	M	--	--	--	-	L	--	--	--	--	--	M	M	M	M
CO3	S	--	S	M	--	M	--	M	M	--	--	S	M	S	S
CO4	S	M	S	S	M	M	--	M	M	--	--	S	S	S	S
CO5	S	S	S	S	M	M	--	S	S	--	--	S	S	S	S
S- Strong; M-Medium; L-Low															

SYLLABUS

ARTIFICIAL NEURAL NETWORKS - AN OVERVIEW

Neural Networks Basics-Biological Neural nets, Processing elements-Mc Culloh Pitts Model, Types of Learning, Network Parameters-Weights, Activation, Threshold Functions, Hebb Rule, Delta Rule, Perception learning Algorithm.

ARTIFICIAL NEURAL NETWORKS MODELS

Mapping, training of Feed forward networks-Perception, Mapping, training of Recurrent Networks-Hopfield Network, Radial Basis Function Network, Training of Feed Forward Back Propagation Network, Applications of BPN.

SELF ORGANIZING MAPS (SOM)

Self organizing maps-Pattern clustering, SOM-Topological Mapping, Kohonen's SOM, K-means clustering algorithm, competitive models – Min, Max Net, Adaptive Resonance Theory (ART) – Introduction, Network and Processing in ART, Associative memory model.

INTRODUCTION TO FUZZY LOGIC

Fuzzy logic-Basic concepts -Fuzzy Vs Crisp set, Linguistic variables, Membership functions, Fuzzy IF-THEN rules, Variable inference techniques, De-fuzzification techniques, Basic fuzzy inference algorithm.

NEURAL NETWORK AND FUZZY LOGIC APPLICATIONS IN MEDICINE

Neural Networks in Biomedical Applications, Cancer, Cardiovascular Applications, Medical Image Analysis using neural networks, Fuzzy Logic Applications, Fuzzy Logic Controller, Neuro fuzzy systems – Applications in medicine.

TEXT BOOKS:

1. Mohamad H. Hassoun, “**Fundamentals of Artificial Neural Network**”, Cambridge, The MIT Press, 1st Edition, 1995.
2. Laurene Fausett, “**Fundamentals of Neural Networks: Architectures, Algorithms, and Applications**”, Pearson Education India, 3rd Edition, 2008.

REFERENCES:

1. C.M.Bishop, “**Pattern Recognition and Machine Learning**”, Springer-Verlag, 2006.
2. Timothy J. Ross, “**Fuzzy Logic with Engineering Applications**”, John Wiley and Sons, 2nd Edition, 1995.
3. B.Yegnanarayana, “**Artificial Neural Networks**”, Prentice Hall of India, 3rd Edition 2006.

COURSE DESIGNERS

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1	Dr.D.Vinodkumar	Professor	BME	vinodkumar@vmkvec.edu.in
2	Mr. R. Ezhilan	Assistant Professor	BME	ezhilan@vmkvec.edu.in
3	Ms.R.Sandhiya	Assistant Professor (Gr-I)	BME	sandhiya@avit.ac.in

17BMSE17	BRAIN COMPUTER INTERFACE										Category	L	T	P	Credit
											EC(OE)	3	0	0	3
PREAMBLE Brain-computer interface (BCI) is a collaboration between a brain and a device that enables signals from the brain to direct some external activity, such as control of a cursor or a prosthetic limb. The interface enables a direct communications pathway between the brain and the object to be controlled.															
PREREQUISITE – NIL															
COURSE OBJECTIVES															
1	To learn the basics of brain computer interfacing and to study about data acquisition, hardware and software requirements.														
2	To study about the BCI approaches.														
3	To get an idea about EEG Feature Extraction methods.														
4	To acquire knowledge about EEG Translation methods.														
5	To acquire knowledge about MATLAB tools for BCI.														
COURSE OUTCOMES Describe about the BCI approaches.															
On the successful completion of the course, students will be able to															
CO1. Describe about the brain computer interface approaches.													Understand		
CO2. Examine the development of brain computer interfacing.													Apply		
CO3.Outline the knowledge about EEG Translation methods.													Analyze		
CO4.Evaluate the data acquisition, hardware and software requirements.													Evaluate		
CO5.Develop MATLAB based tools for brain computer interface.													Create		
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	--	--	--	L	--	--	--	--	--	--	M	S	M	M
CO2	S	M	M	--	M	L	--	--	L	--	--	S	S	S	S
CO3	S	S	S	--	M	M	--	--	M	--	L	S	S	S	S
CO4	S	S	S	S	S	S	M	S	S	M	M	S	S	S	S
CO5	S	S	S	S	S	S	M	S	S	S	S	S	S	S	S
S- Strong; M-Medium; L-Low															
SYLLABUS															
INTRODUCTION Introduction to Brain computer interfaces, The Evolution of BCIs, Brain signals for BCIs: Neuronal Activity in motor cortex and related areas, Electrical and Magnetic fields produced by the brain, Signals reflecting brain metabolic activity, Concept of BCI, Invasive and Non-invasive Types, EEG Standards, Signal Features, Spectral Components, EEG Data															

Acquisition, Pre-processing, Hardware and Software, Artifacts, Methods to Remove, Near Infrared BCI.

BCI APPROACH METHODS

Mu Rhythm – Movement Related EEG Potentials – Mental States – Visual Evoked Potential Based – P300 component.

EEG FEATURE EXTRACTION METHODS

Time/Space Methods – Fourier Transform – Wavelets – AR models – Band pass filtering PCA – Laplacian Filters – Linear and Non-linear Features.

EEG FEATURE TRANSLATION METHODS

LDA – Regression – Memory Based – Vector Quantization – Gaussian Mixture Modeling – Hidden Markov Modeling.

MATLAB-BASED TOOLS FOR BCI

Introduction, Data Streaming: Field Trip, Data-Suite: Data-River and Mat-River, EEGLAB Online Data Processing: A minimalistic BCI script using native MATLAB code, Other MATLAB BCI Classification tools, BCILAB.

TEXT BOOKS:

1. Jonathan R. Wolpaw, Elizabeth Winter Wolpaw, “**Brain computer interfaces principles and practice**”, Oxford University Press -2012.
2. Desney S, Tan & Anton Nijholt, “**Brain Computer interfaces: Applying our minds to human computer interaction**”, Springer Science and Business Media, 2010.

REFERENCES:

1. Bernhard Graimann, Brendan Allison, Gert Pfurtscheller, “**Brain computer interfaces Revolutionizing Human – Computer interaction**”, Springer-2010.
2. Special Issue on “**Brain Control Interfaces**”, IEEE Transactions on Neural Systems and Rehabilitation Engineering, Vol 14, June 2006.
3. Andrew Webb, “**Statistical Pattern Recognition**”, Wiley International, Second Edition, 2002.
4. R. Spehlmann, “**EEG Primer**”, Elsevier Biomedical Press, 1981.

COURSE DESIGNERS

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1	Dr.A.Nagappan	Professor & Principal	BME	Principal.vmkec@vmu.ac.in
2	Dr. M.Ravindiran	Professor & Head	BME	ravindiran@avit.ac.in
3	Mr.R.Ezhilan	Assistant Professor	BME	ezhilan@vmkvec.edu.in

17BMSE18	ROBOTICS & AUTOMATION IN MEDICINE										Category	L	T	P	Credit
											EC(OE)	3	0	0	3
PREAMBLE The purpose of learning this course on automation and robotics in medicine to acquire knowledge and understand the basic function and to create new application of robotic and automation system in medical field especially in surgery.															
PREREQUISITE – NIL															
COURSE OBJECTIVES															
1	To understand the basics of Robotics, Kinematics.														
2	To understand the basics of Inverse Kinematics.														
3	To explore various kinematic motion planning solutions for various Robotic configurations.														
4	To study the basic inverse Kinematic motion planning solutions.														
5	To explore various applications of Robots in Medicine.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Understand the basics of robotic systems.													Understand		
CO2. Illustrate the application of automation and robotics in medicine.													Apply		
CO3. Categorize the level of planning for various Robotic configurations.													Analyze		
CO4. Compare Robotics system and formulate Kinematics.													Evaluate		
CO5. Design Robotic systems for Medical application.													Create		
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	--	L	L	--	--	--	--	L	--	--	M	M	M	S
CO2	S	--	M	M	--	--	--	M	M	--	--	S	M	S	S
CO3	S	S	S	M	M	--	L	M	M	--	L	S	M	S	S
CO4	S	S	S	S	S	S	M	S	S	M	M	S	S	S	S
CO5	S	S	S	S	S	S	M	S	S	M	S	S	S	S	S
S- Strong; M-Medium; L-Low															
SYLLABUS															
INTRODUCTION Introduction Automation and Robots, Classification, Application, Specification, Notations, Direct Kinematics Dot and cross products, Coordinate frames, Rotations, Homogeneous coordinates Link coordination arm equation – Five-axis robot, Four-axis robot, Six-axis robot.															

KINEMATICS

Inverse Kinematics – General properties of solutions tool configuration, Five axis robots, Three Four axis, Six axis Robot, Workspace analysis and trajectory planning work envelope and examples, workspace fixtures, Pick and place operations, Continuous path motion, Interpolated motion, Straight-linemotion.

ROBOT VISION

Robot Vision Image representation, Template matching, Polyhedral objects, Shape analysis, Segmentation – Thresholding, region labeling, Shrink operators, Swell operators, Euler numbers, Perspective transformation, Structured illumination, Camera calibration.

PLANNING

Task Planning Task level programming, Uncertainty, Configuration, Space, Gross motion, Planning, Grasp Planning, Fine-motion planning, Simulation of planar motion, Source and Goal scenes, Task Planner simulation.

APPLICATIONS

Applications in Biomedical Engineering – Bio Engineering, Biologically Inspired Robots, Neural Engineering, Application in Rehabilitation – Interactive Therapy, Bionic Arm, Clinical and Surgical – Gynaecology, Orthopaedics, Neurosurgery.

TEXT BOOKS:

1. Robert Schilling, “**Fundamentals of Robotics-Analysis and control**”, Prentice Hall,2003.
2. J.J.Craig, “**Introduction to Robotics**”, Pearson Education,2005.

REFERENCES:

1. Staugaard, Andrew C, “**Robotics and Artificial Intelligence: An Introduction to Applied Machine Learning**”, Prentice Hall Of India,1987
2. Grover, Wiess, Nagel, Oderey, “**Industrial Robotics: Technology, Programming and Applications**”, McGraw Hill,1986.
3. Wolfram Stadler, “**Analytical Robotics and Mechatronics**”, McGraw Hill,1995.
4. Saeed B. Niku, “**Introduction to Robotics: Analysis, Systems, Applications**”, Prentice Hall,2001.
5. K. S. Fu, R. C. Gonzales and C. S. G. Lee, “**Robotics**”, McGraw Hill,2008.

COURSE DESIGNERS

S.No.	Name of the Faculty	Designation	Department	Mail ID
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3	Mr. S.Kannan	Assistant Professor	BME	kannan@vmkvec.edu.in

17ECCC04	SIGNALS AND SYSTEMS	Category	L	T	P	Credit
		EC(OE)	3	0	0	3
PREAMBLE Signals and Systems arise in a wide variety of fields. These concepts and techniques associated with in areas of science and technology. Signals are functions of one or more independent variables contain information about the behavior or nature of some phenomenon. Signals vary continuous / discrete in time. Systems respond to particular signals by producing other signals (output) having some desired behavior. It introduces the students to analyze signals and systems and to design systems to enhance or restore signals that have been degraded in some way.						
PREREQUISITE: NIL						
COURSE OBJECTIVES						
1	To understand the various classifications of Continuous time and Discrete time Signals and Systems.					
2	To learn about the spectral analysis of Periodic and Aperiodic Signals using Fourier series.					
3	To impart the knowledge in analysis and characterization of the CT system through Laplace transforms.					
4	To learn about the analysis and characterization of the DT system through Discrete Fourier Transforms and Z Transform.					
COURSE OUTCOMES						
On the successful completion of the course, students will be able to						
CO1. Classify the type of signals and systems.					Understand	
CO2. Determine the time and frequency domain characteristics of continuous time periodic and aperiodic signals with the properties of Fourier Series and Fourier transform respectively.					Apply	
CO3. Find the response of a continuous time LTI System using convolution.					Apply	
CO4. Determine the time and frequency domain characteristics of discrete time periodic and aperiodic signals using the properties of DTFT, DFT & Z-Transforms respectively.					Apply	
CO5. Compute DFT and IDFT coefficients of a given discrete time sequence using Fast Fourier Transform algorithms.					Apply	
CO6. Apply and characterize the causality and stability of Discrete LTI system using Z-Transforms.					Apply	

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	M	L	-	-	-	-	-	-	-	-	-	M	-	-
CO2	S	M	M	-	M	-	-	-	M	-	-	M	-	-	M
CO3	S	M	M	-	M	-	-	-	M	-	-	M	-	-	-
CO4	S	M	M	-	M	-	-	-	M	-	-	M	-	-	-
CO5	S	M	M	-	M	-	-	-	M	-	-	M	M	M	-
CO6	S	S	M	-	M	-	-	-	M	-	-	M	M	-	-
S- Strong; M-Medium; L-Low															
SYLLABUS															
CLASSIFICATION OF SIGNALS AND SYSTEMS Continuous time signals, Discrete time signals, Unit step, Unit ramp, Unit impulse – Representation of signals in terms of unit impulse, Classification of continuous time signals & Discrete time signals-Continuous time systems- Discrete time systems- Classification of continuous time systems and Discrete time systems.															
ANALYSIS OF CONTINUOUS TIME SIGNALS Fourier series analysis-Representation of Continuous time Periodic signals – Trigonometric and exponential-Spectral Properties of Periodic power signals - Properties of Continuous time Fourier series – Parseval’s relation for power signals, Fourier transform analysis-Representation of Continuous time signals- Properties of Continuous time Fourier transform –Fourier transform of a Periodic function, Rayleigh’s Energytheorem.															
LTI CONTINUOUS TIME SYSTEM Convolution Integral, Impulse response, Solution of Differential equation with initial conditions- Zero state response and Zero input response, Block diagram representation, Fourier methods for analysis, Laplace transform analysis.															
ANALYSIS OF DISCRETE TIME SIGNALS AND SYSTEMS Representation of sequences – Discrete Time Fourier Transform (DTFT) - Discrete Fourier Transform (DFT) and its properties –Fast Fourier Transform- FFT Algorithm, DIF & DIT-Z Transform-Inverse Z Transform, Unilateral Z-Transform.															

LTI DT SYSTEM

Convolution sum - Impulse response and properties of LTI systems - Difference equations - Z Transform analysis - System stability and causality - Frequency response - Block Diagram representation.

TEXT BOOKS:

1. Alan V. Oppenheim, Ronald W. Schaffer, "Discrete time signal processing", Pearson education, 2nd edition, 2007.
2. John G. Proakis and Manolakis, "Digital Signal Processing, Principles, Algorithms and Applications", Pearson Education, 4th Edition, 2007.

REFERENCE BOOKS:

1. B.P. Lathi, "Linear Systems & Signals", Oxford Press, Second Edition, 2009.
2. Rodger E Ziemer, William H. Tranter, D. Ronald Fannin, "Signals and Systems – continuous and Discrete", Pearson Education, 4th Edition, 2009.
3. Douglas K Linder, "Introduction to Signals and Systems", Mc-Graw Hill, 1st Edition, 1999.

COURSE DESIGNERS

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3	Mr.P.Subramanian	Associate Professor	ECE	subramanian@avit.ac.in

17ECCC01	SEMICONDUCTOR DEVICES					Category	L	T	P	Credit						
						EC(OE)	3	0	0	3						
PREAMBLE The course is designed to teach the physical principles and operational characteristics of semiconductor devices with emphasis on metal-oxide systems, bipolar, high-electron mobility, and field-effect transistors. Topics also include SCR, TFET, HEMT, Silicon Nano Wire tubes. The course provides advanced background in solid state electronic devices and is intended to help students to develop their basic analytical skills and continue advanced research in the varied branches of semiconductor devices.																
PREREQUISITE: NIL																
COURSE OBJECTIVES																
1	To emphasize the physics of semiconductors and the working of semiconductor devices like PN and Zener diodes with their applications.															
2	To impart knowledge on working principle, configuration, operational characteristics and limitation of BJTs.															
3	To understand the construction and Characteristics of JFETs and MOSFETs.															
4	To study the working principle and applications of discrete and integrated voltage regulators															
5	To familiarize with several special semiconductor devices like SCR, MISFET, TFET, HEMT and Silicon Nano Wire tubes.															
COURSE OUTCOMES																
On the successful completion of the course, students will be able to																
CO1. Explain the electron transport properties and operation of semiconductor devices like Diode and their relevant applications like HWR, FWR, Clipper and Clamper, etc.,												Understand				
CO2. Quantify the specification and characteristics of BJT in different configuration.												Apply				
CO3. Demonstrate RMS and ripple factor values of RC filters in simple power supply and voltage regulator circuits												Apply				
CO4. Relate the construction and characteristics of JFET and its families.												Apply				
CO5. Examine the characteristics and applications of special devices like Shockley Diode, Unijunction Transistor, Phototransistors, MISFETs, MESFETs, etc.,												Apply				
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES																
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	
CO1	M	M	-	-	-	-	-	-	M	-	-	M	M	M	-	
CO2	M	M	M	-	-	-	-	-	M	-	-	M	-	-	-	
CO3	M	M	M	-	-	-	M	-	M	-	-	M	M	-	-	
CO4	S	M	M	M	-	-	M	-	M	-	-	M	-	-	-	
CO5	S	M	-	M	-	-	-	-	M	-	-	M	M	M	M	
S- Strong; M-Medium; L-Low																
SYLLABUS																
SEMICONDUCTOR DIODES AND APPLICATIONS																
Introduction, Semiconductor Materials - Ge, Si, and GaAs, Covalent Bonding and Intrinsic Materials, Energy Levels, n-Type and p-Type Materials, Semiconductor Diode, Resistance Levels, Diode Equivalent Circuits, Transition and Diffusion Capacitance, Reverse Recovery Time, Diode Specification Sheets, Semiconductor Diode Notation, Diode Testing, Zener Diodes, Light-Emitting Diodes, Sinusoidal Inputs; Half-Wave Rectifier, Full-Wave Rectifier, Clipper, Clamper, Zener Diode, Voltage-Multiplier Circuits, Practical Applications																
BIPOLAR JUNCTION TRANSISTORS																
Introduction, Transistor Construction, Transistor Operation, Common-Base Configuration, Common-Emitter Configuration, Common-Collector Configuration, Limits of Operation, Transistor Specification Sheet, Transistor Testing, Transistor Casing and Terminal Identification.																

FIELD EFFECT TRANSISTORS

Introduction, Construction and Characteristics of JFETs, Transfer Characteristics, Important Relationships, Depletion-Type MOSFET, Enhancement-Type MOSFET, MOSFET Handling.

VOLTAGE REGULATORS

Introduction, General Filter Considerations, Capacitor Filter, RC Filter, Discrete Transistor Voltage Regulation, IC Voltage Regulators.

SPECIAL PURPOSE DEVICES

Introduction, Silicon-Controlled Rectifier, Basic Silicon-Controlled Rectifier Operation, SCR Characteristics and Applications, Shockley Diode, Diac, Triac, Unijunction Transistor, Phototransistors, MISFETs, MESFETs, TFETs, HEMTs, Silicon Nano Wire Transistor.

TEXT BOOK:

1. Robert L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuit Theory", Pearson Education, 11th Edition, 2013.

REFERENCE BOOKS:

1. Jacob Millman, Christos C Halkias, Satyabrata Jit, "Electron Devices and Circuits", Tata McGraw Hill, 2010.
2. David A Bell, "Fundamentals of Electronic Devices and Circuits", Oxford Press, 2009.
3. B L Theraja, R S Sedha, "Principles of Electronic Devices and Circuits", S.Chand, 2004.

COURSE DESIGNERS

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4.	Mr. R. Karthikeyan	Assistant Professor	ECE	rrmdkarthikeyan@avit.ac.in

17ECCC15	ANALOG & DIGITAL COMMUNICATION						Category	L	T	P	Credit					
							EC(OE)	3	0	0	3					
PREAMBLE This course provides a thorough introduction to the basic principles of Analog and Digital Communications. It also deals with Analog and Digital Modulation techniques, Communication Transmitter & Receiver design, Baseband and Bandpass Communication Techniques, Noise Analysis and Multiplexing techniques.																
PREREQUISITE - NIL																
COURSE OBJECTIVES																
1	To Understand the basic elements of analog communication system															
2	To learn the basic concepts behind the transmission and reception of Angle Modulation															
3	To impart the knowledge about Analog to Digital Transition Systems & Information Theory															
4	To Analyze & design the performance of various digital carrier transmission.															
5	To Apply the knowledge of Digital Communication circuits in various fields.															
COURSE OUTCOMES																
On the successful completion of the course, students will be able to																
CO1. Interpret the various Analog communication systems.												Understand				
CO2. Illustrate the principle and operation behind various Modulators , Demodulators in Analog communications												Apply				
CO3. Apply different coding theory to estimate Entropy, Mutual information, Information rate etc.												Apply				
CO4. Demonstrate the concept of various digital carrier modulation and determine their error probability.												Apply				
CO5. Analyze the major classifications of spread spectrum techniques												Analyze				
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES																
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	
CO1	S	L	-	-	-	-	-	-	-	-	-	L	S	-	-	
CO2	S	M	M	-	M	-	-	-	-	-	-	M	M	-	-	
CO3	S	M	M	M	-	-	-	-	-	-	-	M	-	-	-	
CO4	S	S	M	M	-	-	-	-	-	-	-	M	-	M	M	
CO5	S	M	M	M	L	-	-	-	-	-	-	L	-	M	-	
S- Strong; M-Medium; L-Low																
SYLLABUS																
Analog Communication Systems Principles of Amplitude Modulation – AM Modulators- Double Side Band Suppressed Carrier Modulation, Single Side Band Modulation, Vestigial Side Band Modulation, AM Demodulators, AM transmitters-Low level & High level Transmitters, AM Receivers – TRF, Super Heterodyne Receiver, Double conversion AM receivers.																

Angle Modulation: Transmission And Reception

Angle Modulation - FM and PM, Modulation Index, Frequency Modulators and Demodulators, Phase Modulators, FM transmitters- Direct & Indirect transmitters, Angle Modulation Vs Amplitude Modulation, FM Receivers, Frequency Vs Phasemodulation.

Analog to Digital Transition Systems & Information Theory

Pulse Amplitude Modulation, Pulse Position Modulation, Pulse Code Modulation, Sampling Rate, DPCM, Delta Modulation, Time Division Multiplexing, Information Theory- Uncertainty, Information and entropy, source coding theorem, Discrete Memoryless channels, Mutual Information, Channel capacity, Channel coding theorem.

Digital Transmission

Pulse Transmission – Inter Symbol Interference, Eye pattern, Digital carrier Modulation-Binary Amplitude Shift Keying, Binary Frequency Shift Keying, Binary Phase Shift Keying, QPSK, bit and baud rate, BER Analysis

Spread Spectrum Modulation

Pseudo noise sequences, Direct sequence Spread Spectrum with coherent BPSK, Frequency hop spread spectrum modulation, Multiple Access Techniques – Wireless Communication, TDMA and FDMA

TEXT BOOK:

1. Simon Haykin and Michael Moher, “Communication systems” John Wiley & Sons, Fifth Edition, 2016

REFERENCE BOOKS:

1. Simon Haykin and Michael Moher, “An Introduction to Analog and Digital Communications”, John Wiley & Sons, second Edition, 2006.
2. Martin S.Roden, “Analog and Digital Communication System”, 3rd Edition, PHI, 2002
3. Wayne Tomasi, “Electronic Communication Systems: Fundamentals Through Advanced”, Pearson Education, 2001.
4. B. Carlson, “Introduction to Communication systems”, 3rd Edition, McGraw Hill, 1989

COURSE DESIGNERS

S.No.	Name of the Faculty	Designation	Department	Mail ID
1	Mr.B.Rajasekaran	Associate Professor	ECE	rajasekaran@vmkvec.edu.in
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3	Mr.P.Subramanian	Associate Professor	ECE	subramanian@avit.ac.in

17EEEC20	MATHEMATICAL MODELLING AND SIMULATION	Category	L	T	P	Credit
		EC(OE)	3	0	0	3
PREAMBLE Introduce the students to study the fundamentals of computing and modeling software environments for electrical engineering. This Course contains Programming in numerical computing and modeling software environments for electrical engineering. No prior programming experience or knowledge of SCILAB is assumed, and the course is structured to allow thorough assimilation of ideas through hands-on examples and exercises.						
PREREQUISITE NIL						
COURSE OBJECTIVES						
1	To study basic concepts of scientific programming using SCILAB.					
2	To learn about the Basics of Program of SCILAB and related Mathematical Applications.					
3	Analyze the concepts of Program of SCILAB.					
4	To understand the different tools in SCILAB and ODE, DAE					
5	To apply a software program to Electrical circuits and solve the simulation based solutions.					
COURSE OUTCOMES						
On the successful completion of the course, students will be able to						
CO1	Understand the main features of the SCILAB program development environment to enable their usage in the higher learning.					Understand
CO2	Understand the need for simulation/implementation for the verification of mathematical functions.					Understand and Analyze
CO3	Implement simple mathematical functions/equations in numerical computing environment such as SCILAB.					Analyze
CO4	Interpret and visualize simple mathematical functions and operations thereon using plots/display.					Create and Apply
CO5	Analyze the program for correctness and determine/ estimate/ predict the output and verify it under simulation environment using SCILAB tools					Create

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M					L		L				L	L	M	
CO2	M		L					L		L		L	L	M	
CO3	S	M	L		L		L	L	M	M	L		M	L	L
CO4	S	M	M	L	M	M	M		S	M	M	M	M	L	M
CO5	S	S	L	M	M	L	S	L	M	S	S	S	S	S	S

S- Strong; M-Medium; L-Low

SYLLABUS

INTRODUCTION

Introduction to SCILAB – Constants – Data types – SCILAB Syntax – Data type related functions – Over loading.

GRAPHICAL ANALYSIS USING SCILAB

The media – global plot parameters – 2D and 3D plotting – examples – printing graphics and exporting to Latex.

SCILAB PROGRAMMING

Linear algebra – Polynomial and rational function manipulation – Sparse matrices – random numbers – cumulative distribution functions and their inverse – building interface programs – inter SCI – dynamic linking – static linking.

SCILAB TOOLS

Systems and control toolbox – improper systems – system operation – control tools classical control – state space control – model reduction – identification – linear matrix inequalities – integrating ODEs – integrating DAEs.

APPLICATIONS

Resistive circuits – inductive and capacitive circuits – transients – steady state analysis – logics circuits – electronic devices - DC machines

TEXT BOOK

1. Claude Gomez Engineering and Scientific Computing with SCILAB, Birkhauserpublications

REFERENCES

1. [Simulation of ODE/PDE Models with MATLAB®, OCTAVE and SCILAB: Scientific and Engineering Applications](#) A. Vande Wouwer, P. Saucez, C. V.Fernández
2014 ISBN: 978-3319067896
2. SCILAB(a Free Software to Matlab), Er. HemaRamachandran and Dr. Achutsankar Nair, S.Chand

Publishers, ISBN-10: 8121939704,2011

3.<http://in.mathworks.com/>

4.<https://www.scilab.org/resources/documentation/tutorials>

5. <http://www.scilab.org/>

6.SCILAB: A Beginner's Approach, Anil Kumar Verma, Cengage Learning India Pvt. Ltd.; First edition (2018), ISBN-10: 9386858932, ISBN-13:978-9386858931

COURSE DESIGNERS

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17BMSE16	WEARABLE TECHNOLOGY										Category	L	T	P	Credit
											BM(OE)	3	0	0	3
PREAMBLE This course makes the students to understand the fundamentals and applications of the wearable technology.															
PREREQUISITE – NIL															
COURSE OBJECTIVES															
1	To understand the fundamentals of sensors and wearable technology.														
2	To ascertain the design and integration of the smart textiles.														
3	To understand the electronic textiles.														
4	T endeavor various sensor in sports wearable application.														
5	To understand the cloud storage of wearable devices.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Discuss the fundamentals of sensor and wearable technology.												Understand			
CO2. Illustrate the electronic textiles and its applications.												Apply			
CO3. Analyze the sensor for different wearable applications.												Analyze			
CO4. Compare the various data storage of wearable systems.												Evaluate			
CO5. Design of smart clothing.												Create			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	L	--	--	--	--	--	--	L	--	--	S	S	M	M
CO2	S	M	L	L	--	--	--	--	M	--	--	S	S	M	M
CO3	S	M	M	M	S	M	L	--	M	--	--	S	S	M	M
CO4	S	S	S	S	S	S	M	M	S	S	M	S	S	S	S
CO5	S	S	S	S	S	S	M	M	S	S	S	S	S	S	S
S- Strong; M-Medium; L-Low															
SYLLABUS															
BASICS OF SENSORS AND WEARABLE TECHNOLOGY Introduction to sensors – Sensor Physical Properties – Electric (Resistive, Capacitive and Inductive) – Piezoelectric – Optic – Photo elastic - Thermoelectric – Electrochemical. Wearable computers – Wearable Electronics – Intelligent Clothing – Industry on wearable technology – Current Trends – Market Forecast.															

SMART CLOTHING

Introduction – Design of Smart Cloths – 2D Design for smart wearables – Textile Development – 3D Design for smart wearables – Construction of smart wearables – Integration – Prototype Development.

ELECTRONIC TEXTILES

Conductive Fibers for textiles – Conductive for Polymers textiles – Carbon Nanotubes yarns – Textile and Electronics Integration - Embroidered Antenna – Electronic textiles for Military Applications.

SENSOR FOR WEARABLE APPLICATIONS

Load and Pressure Measurement sensor – Sports Applications – Inertial Sensor – Sports Application – Optical Sensor – Sports Application – Angle & Displacement Sensor – Sports Application.

DATA STORAGE FOR WEARABLE TECHNOLOGY

Introduction – Storage in Consumer wearable - Cloud storage – Remote Cloud – Sensor Cloud – Cloudlet - Cloud storage Architecture – Confidential disk and Cloud storage with encryption – Two-layer confidential storage.

TEXT BOOKS:

1. Patrick F. Dunn, “**Fundamentals of Sensors for Engineering and Science**”, CRC Press, Taylor & Francis.
2. Jane McCann, David Bryson, “**Smart Clothes and Wearable Technology**”, CRC Press, Woodhead Publishing Ltd.

REFERENCES:

1. Daniel A. James, Nicola Petrone, “**Sensors and Wearable Technologies in Sport: Technologies, Trends and Approaches for Implementation**”.
2. Marrington, Andrew, Kerr, Don, “**Management Association, Information Resources Managing Security Issues and the Hidden Dangers of Wearable Technologies**”.
3. Tilak Dias, “**Electronic Textiles: Smart Fabrics and Wearable Technology**”, Elsevier, Woodhead Publishing.

COURSE DESIGNERS

S.No.	Name of the Faculty	Designation	Department	Mail ID
1	Dr. M.Ravindiran	Professor & Head	BME	ravindiran@avit.ac.in
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3	Mrs.S.Vaishnodevi	Assistant Professor	BME	vaishnodevi@vmkvec.edu.in

17ECSE21	WIRELESS SENSOR NETWORKS AND IOT							Category	L	T	P	Credit			
								EC(OE)	3	0	0	3			
PREAMBLE															
To understand the fundamental concepts of wireless sensor networks and Internet of Things, have an enhanced knowledge of the various protocols with Internet of Things in the real world scenario.															
PREREQUISITE - NIL															
COURSE OBJECTIVES															
1	To understand the various sensor network concepts														
2	To Know the physical layer issues and analyze Medium Access Control Protocols														
3	To identify with the IoT Reference Architecture and Real World Design Constraints														
4	To recognize the various IoT Protocols (Datalink, Network, Transport, Session, Service)														
5	To Understand IoT value chain structure (device, data cloud), application areas and technologies involved														
COURSE OUTCOMES															
CO1. Describe and explain radio standards and communication protocols for wireless sensor networks													Understand		
CO2. Explain the function of the node architecture and use of sensors for various applications.													Understand		
CO3. Expose the architectures, functions and performance of wireless sensor networks Systems and platforms.													Understand		
CO4. Describe the basic concepts in IoT.													Understand		
CO5. Develop web services to access/control IoT devices													Apply		
CO6. Deploy an IoT application using Raspberry Pi.													Apply		
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	M	-	L	-	-	-	-	-	-	L	S	M	-
CO2	S	S	S	-	M	-	-	-	-	-	-	M	M	-	-
CO3	S	M	M	-	L	-	-	-	-	-	-	L	-	-	-
CO4	S	S	S	-	M	M	-	-	-	-	-	M	-	M	-
CO5	S	M	M	-	M	M	-	-	-	-	-	M	M	-	M
S- Strong; M-Medium; L-Low															

SYLLABUS

INTRODUCTION TO WIRELESS SENSOR NETWORKS

Course Information, Introduction to Wireless Sensor Networks: Motivations, Applications, Performance metrics, History and Design factors Network Architecture: Traditional layered stack, Cross-layer designs, Sensor Network Architecture Hardware Platforms: Motes, Hardware parameters

INTRODUCTION TO NS-3

Introduction to Network Simulator 3 (ns-3), Description of the ns-3 core module and simulation example.

MEDIUM ACCESS CONTROL PROTOCOL DESIGN

Fixed Access, Random Access, WSN protocols: synchronized, duty-cycled Introduction to Markov Chain: Discrete time Markov Chain definition, properties, classification and analysis MAC Protocol Analysis: Asynchronous duty-cycled. X-MAC Analysis (Markov Chain)

FUNDAMENTALS OF IOT

Introduction-Characteristics-Physical design - Protocols – Logical design – Enabling technologies –IoT Levels – Domain Specific IoT – IoT vs. M2M.

IOT DESIGN METHODOLOGY & BUILDING IOT WITH RASPBERRY PI

IoT systems management – IoT Design Methodology – Specifications Integration and Application Development. Physical device – Raspberry Pi Interfaces – Programming – APIs / Packages – Web services

TEXT BOOKS:

1. W.Dargie and C.Poellabauer (2010). Fundamentals of Wireless Sensor Networks – Theory and Practice. Wiley.
2. Arshdeep Bahga, Vijay Madisetti (2015). Internet of Things – A hands-on approach. Universities Press.

REFERENCE BOOKS:

1. Kazem Sohraby, Daniel Minoli and Taieb Znati (2007). Wireless sensor networks - Technology, Protocols, and Applications. Wiley Inter science.
2. Manoel Carlos Ramon (2014). Intel® Galileo and Intel® Galileo Gen 2: API Features and Arduino Projects for Linux Programmers.
3. Takahiro Hara, Vladimir I. Zadorozhny, and Erik Buchmann (2010). Wireless Sensor Network Technologies for the Information Explosion Era. Springer.
4. Marco Schwartz (2014). Internet of Things with the Arduino Yun. Packet Publishing

COURSE DESIGNERS

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1	Mr.R.Ramani	Assistant Professor	ECE	ramani@vmkvec.edu.in
2	Mr.R.Karthikeyan	Assistant Professor (Gr-II)	ECE	rrmdkarthikeyan@avit.ac.in

17ECSE22	WIRELESS TECHNOLOGIES FOR IOT						Category	L	T	P	Credit				
							EC(OE)	3	0	0	3				
PREAMBLE															
The course follows the evolution of mobile and wireless security, and the underlying principles. The course is designed to educate the purpose of defending systems from unauthorized wireless attacks. This course also discovers the latest security standards and practices in mobile and wireless network.															
PREREQUISITE – NIL															
COURSE OBJECTIVES															
1	Understand the wireless technologies, wireless network standards.														
2	Gain the knowledge on wireless networks, denial of service attacks and client-side threats.														
3	Build an understanding of mobile data network standards.														
4	To Understand the various IoT Protocols (Datalink, Network, Transport, Session, Service)														
5	To classify Real World IoT Design Constraints, Industrial Automation in IoT.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Knowledge on various wireless technologies, wireless network standards and their threats.											Understand				
CO2. Show how hackers and auditors alike test wireless networks for vulnerabilities such as rogue access points, denial of service (DoS) attacks and client-side threats											Apply				
CO3.Demonstrate the mobile data network standards and its challenges.											Apply				
CO4Summarize the vulnerabilities and mis-configurations at wireless transport layer.											Evaluate				
CO5. Invent how an attacker might attempt to subvert and bypass Wireless security measures in Bluetooth and WiFi.											Create				
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	L	M	M	M	-	-	-	-	-	-	-	-	-	-
CO2	M	L	M	M	M	-	-	-	-	-	-	-	-	-	-
CO3	S	L	M	M	M	-	-	-	M	-	-	-	S	M	-
CO4	S	L	S	S	M	-	-	-	M	M	-	M	S	-	-
CO5	S	M	S	S	S	-	-	L	M	M	M	M	M	M	M
S- Strong; M-Medium; L-Low															

SYLLABUS

MOBILE & WIRELESS TECHNOLOGIES:

Introduction to wireless technologies-Mobile cellular networks -Personal Area Networks -Transmission Media – WLAN standards, controllers -Securing WLAN -Countermeasures -Wired Equivalence Protocol(WEP).Wireless threats:Kinds of security breaches-Eavesdropping -Communication Jamming -RF interference -Covert wireless channels -DOS attack –Spoofing -Theft of services -Traffic Analysis-Cryptographic threats -Wireless security Standards.

MOBILE NETWORKS SECURITY:

Wireless Device security issues -CDPD security (Cellular Digital Packet Data)-GPRS security (General Packet Radio Service) -GSM (Global System for Mobile Communication) security –IP security -3G / 4G security.

WIRELESS TRANSPORT LAYER SECURITY:

Secure Socket Layer -Wireless Transport Layer Security -WAP Security Architecture -WAP Gateway -Wireless Intrusion Detection and Prevention Systems (WIDS/WIPS)

BLUETOOTH & WIFI SECURITY:

Basic specifications -Pico nets –Scatter nets -Bluetooth security architecture –Security at the baseband layer and link layer –Frequency hopping –Security manager –Authentication –Encryption -WiFi Hot spot architecture -Wireless honey pots -Security in IEEE 802.11.

WIRELESS SENSOR NETWORK SECURITY

Attacks on wireless sensor network and Preventive mechanisms: authentication and traffic analysis, Case study: centralized and passive intruder detection Case studies:Public safety wireless networks, Case study 2 –Satellite communications systems , Case study 3 –Wide Area Wireless Data Services (CDPD, GPRS, etc.), Case study 4– Wireless LANs (802.11, etc.), Case study 5 –Wireless Metropolitan Area Networks (e.g., 802.16)

Text Books

- 1.Wireless Security-Models, Threats and Solutions,Nichols and Lekka, Tata McGraw –Hill, New Delhi, 2006.
- 2.Wireless Security, Merritt Maxim and David Pollino, Osborne/McGraw Hill, New Delhi, 2005.

Reference Books

- 1.Wireless and Mobile Network Security-Security basics, Security in On-the-shelf andemerging technologies,Hakima Chaouchi, Maryline Maknavicius, ISBN:9781848211179,2010.
- 2.Mobile and Wireless Network Security and Privacy, Springer, ISBN: 0387710574, edition2007.
- 3.Wireless Network Security: Theories and Applications, Springer,ISBN:978-3642365102,2013

COURSE DESIGNERS

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17ECSE07	SOFTWARE TECHNOLOGY FOR EMBEDDED SYSTEM						Category	L	T	P	Credit				
							EC(OE)	3	0	0	3				
PREAMBLE The subject introduces the students to the modern technologies used in developing embedded software for better software quality. The introduction is both theoretical and practical. The subject shows why modern embedded software systems are complex, it lists the consequences of complexity, and details how we handle complexity in this context, and how we define and increase software quality. The subject then iterate through the modern solutions available to keep control over the softwaredevelopment process, and how we can increase software quality.															
PREREQUISITE – NIL															
COURSE OBJECTIVES															
1	To learn the concepts of software architecture, analysis, design & maintenance.														
2	To study the Data representation.														
3	To familiarize about the mixing C and assembly														
4	To know about input and output programming														
5	To study the memory management														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Explain the concept of software architecture, analysis, design & maintenance.											Understand				
CO2. Explain the different Data representation.											Understand				
CO3. Illustrate the concept of input and output programming											Apply				
CO4. Examine the memory management											Apply				
CO5. Analyze and implement the mixing C and assembly language programming											Analyze				
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	M	L	-	M	-	-	-	L	-	-	M	M	-	M
CO2	M	M	L	-	M	-	-	-	L	-	-	M	-	M	-
CO3	S	M	L	-	L	M	-	-	M	-	-	M	M	-	-
CO4	S	M	L	-	L	S	M	-	L	-	-	M	-	M	-
CO5	S	S	S	-	M	L	M	-	M	-	-	M	M	-	M
S- Strong; M-Medium; L-Low															
SYLLABUS															
SOFTWARE TECHNOLOGY: Software Architectures, Software development Tools, Software Development Process Life Cycle and its Model, Software Analysis, Design and Maintenance.															
INTRODUCTION TO DATA REPRESENTATION: Data representation ,Two’s complement, Fixed point and Floating Point Number Formats ,Manipulating Bits in -Memory, I/O Ports, Low level programming in C ,Primitive data types , Arrays, Functions ,Recursive Functions, Pointers, Structures & Unions ,Dynamic Memory Allocation ,File handling ,Linked lists, Queues, Stacks.															
MIXING C AND ASSEMBLY: C and assembly, Programming in assembly ,RegisterUsage															

Conventions ,Typical use of Addressing Options, Instruction Sequencing , Procedure Call and Return , Parameter passing ,Retrieving Parameters , Everything in pass by value ,Temporary variables

INPUT/ OUTPUT PROGRAMMING: I/O Instructions, Synchronization, Transfer Rate & Latency, Polled Waiting Loops, Interrupt – Driven I/O, Writing ISR in Assembly and C, Non Maskable and Software Interrupts

MEMORY MANAGEMENT: Direct Memory Access, Local and Global Scope, Automatic and Static Allocation, Distinguishing Static from Automatic Object Creation, Initialization and Destruction, Dynamic Allocation

TEXT BOOKS:

1. Daniel W.Lewis, "Fundamentals of embedded software where C and assembly meet", Pearson Education.
2. Hassan Gomma, "Designing concurrent, distributed, and real time applications with UML", Pearson Education, 2000

REFERENCE BOOKS:

1. C.M. Krishna, Kang G. Shin, "Real Time Systems", McGraw - Hill International Editions,1997
2. By Albert M. K. Cheng , “Real-time systems: scheduling, analysis, and verification” wiley.

COURSE DESIGNERS				
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2	Mr.G.Ramachandran	Assistant Professor	ECE	ramachandran@vmkvec.edu.in

17MECC12	COMPUTER INTEGRATED MANUFACTURING	Category	L	T	P	Credit									
		EC(OE)	3	0	0	3									
Preamble The students completing this course are expected to understand the nature and role of computers in manufacturing. The course includes computer aided design, fundamentals of CNC machines, programming of CNC machines, group technology, computer aided process planning techniques, shop floor control and flexible manufacturing systems. It exposes the students to various current trends followed in the industries.															
Prerequisite: NIL															
Course Objective															
1	To understand the importance of CAD and CAM														
2	To enable student to learn about Solid modelling techniques and various graphics standards in CAD														
3	To understand about the fundamentals and programming of CNC machines														
4	To gain knowledge about GT and CAPP														
5	To enable students to learn about FMS and SFC														
Course Outcomes: On the successful completion of the course, students will be able to															
CO1.	Discuss the basic concepts of Computer Aided Design and Manufacturing					Apply									
CO2.	Apply the concept of Modeling techniques for designing the products					Apply									
CO3.	Discuss the basics, working principles of various components of CNC machines.					Apply									
CO4.	Write the CNC programs for various mechanical components with different operations.					Apply									
CO5.	Apply the concepts of Group technology and discuss the concepts of Computer aided process planning techniques.					Apply									
CO6	Analyze the functions of various components of Shop Floor Control and Flexible Manufacturing Systems.					Analyze									
Mapping with Programme Outcomes and Programme Specific Outcomes															
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	L	-	-	-	-	-	-	-	-	-	-	M		
CO2	S	M	L	-	-	-	-	-	-	-	-	-	M		
CO3	S	M	L	-	-	-	-	-	-	-	-	-	M		

CO4	S	S	M	L	-	-	-	-	-	M	-	-	M		
CO5	S	S	S	M	-	-	-	-	-	M	-	-	M		
CO6	S	S	S	M	S	-	-	-	-	S	-	-	M		
S- Strong; M-Medium; L-Low															
Syllabus															
INTRODUCTION TO CAD/CAM															
The design process - Morphology of design, Product cycle - Computer Aided Design, Benefits of CAD. Role of computers - principles of computer graphics - Current trends in manufacturing engineering - Design for Manufacturing and Assembly - Sequential and concurrent engineering -Rapid prototyping.															
SOLID MODELING															
Graphic software: coordinate representation- graphic functions, software standards. Graphical Kernel system (GKS) - Initial graphics exchange system (IGES) - Graphic packages. Geometric Modeling - Wire frame, Surface and Solid models - Constructive Solid Geometry (CSG) and Boundary Representation (B-REP) Techniques - Features of Solid Modeling Packages.															
FUNDAMENTALS OF CNC MACHINES															
CNC Technology - Functions of CNC Control in Machine Tools - Classification of CNC systems - Contouring System - Interpolators, open loop and closed loop CNC systems - CNC Controllers, Direct Numerical Control (DNC Systems). - Work holding devices and tool holding devices- Automatic Tool changers. Feedback devices - Principles of Operation-Machining Centers - Tooling for CNC machines Numerical control codes - Standards - Manual Programming - Canned cycles and subroutines - Computer Assisted Programming, CAD / CAM approach to NC part programming - APT language, machining from 3D models.															
GROUP TECHNOLOGY AND COMPUTER AIDED PROCESS PLANNING															
Introduction to CIM and its related activities-History of group technology- role of G.T. in CAD/CAM integration - part families - classification and coding - DCLASS and MICLASS and OPITZ coding systems-facility design using G.T. - benefits of G.T. - cellular manufacturing. Process planning - role of process planning in CAD/CAM integration - approaches to computer aided process planning - variant approach and generative approaches - CAPP and CMPP process planning systems.															
SHOP FLOOR CONTROL AND INTRODUCTION OF FMS															
Shop floor control-phases-factory data collection system -automatic identification methods- Bar code technology-automated data collection system. FMS-components of FMS - types -FMS workstation -material handling and storage systems- FMS layout -computer control systems-application and benefits.															
Text Books															
1	Mikell.P.Groover “Automation, Production Systems and Computer Integrated														

	manufacturing”, Pearson Education 2001.			
2	Radhakrishnan P, Subramanyan.S. and Raju V., “CAD/CAM/CIM”, 2nd Edition New Age International (P) Ltd., New Delhi, 2000.			
Reference Books				
1	Yoremkoren, “Computer Integrated Manufacturing System”, McGraw-Hill, 1983.			
2	Ranky, Paul G., “Computer Integrated Manufacturing”, Prentice Hall International, 1986.			
3	David D.Bedworth, Mark R.Hendersan, Phillip M.Wolfe “Computer Integrated Design and Manufacturing”, McGraw-Hill Inc.			
4	Roger Hanman “Computer Integrated Manufacturing”, Addison – Wesley, 1997.			
Course Designers				
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17BTSE05	INDUSTRIAL WASTE MANAGEMENT							Category	L	T	P	Credit			
								EC(OE)	3	0	0	3			
PREAMBLE This course will provide an overview of management techniques for industrial wastes, as well as State and Central Pollution Board regulations for waste management. The course will also highlight the business profitability, legal framework, and the economic feasibility of the environmentally sustainable technologies for waste management.															
PREREQUISITE NIL															
COURSE OBJECTIVES															
1	To discuss the present scenario of industrial waste management in India														
2	To explain the knowledge on sources and characteristics of various industrial wastes and strategies for its prevention and control														
3	To execute about the onsite pollution from major industries														
4	To outline the various effects and disposal options for the industrial waste.														
5	To outline the maintenance of hazardous waste														
COURSE OUTCOMES															
After the successful completion of the course, learner will be able to															
CO1: Summarise the insight into the pollution from major industries including the sources and characteristics of pollutants													Understand		
CO2: Identify the plan minimization of industrial wastes													Understand		
CO3: Illustrate the facilities for the processing and reclamation of industrial waste water													Apply		
CO4: Correlate the various treatments for disposals of industrial waste.													Analyse		
CO5: Examine the physio chemical treatment for hazardous waste.													Analyse		
COS	PO1	PO2	PO	PO4	PO	PO6	PO	PO8	PO9	PO1	PO1	PO1	PSO1	PSO2	PSO3
CO1	M	-	-	M	L	M	S	-	-	M	-	M	-	-	M
CO2	M	-	-	M	L	M	M	-	-	S	L	M	-	-	-
CO3	S	S	-	-	L	-	-	-	-	-	L	M	-	-	-
CO4	M	M	M	M	M	M	M	-	M	M	M	M	-	-	-
CO5	M	M	M	-	M	M	-	S	-	L	M	M	-	-	-
S- Strong; M-Medium; L-Low															

SYLLABUS

INTRODUCTION TO INDUSTRIAL POLLUTION

Types of Industries And Industrial Pollution, Characteristics Of Industrial Wastes, Population Equivalent, Bioassay Studies, Effects Of Industrial Effluents On Streams, Sewer, Land, Sewage Treatment Plants And Human Health Environmental Legislations Related to Prevention And Control Of Industrial Effluents And Hazardous Wastes

CLEANER PRODUCTION

Waste Management Approach, Waste Audit, Volume And Strength Reduction, Material And Process Modifications, Recycle, Reuse And Byproduct Recovery – Applications.

POLLUTION FROM MAJOR INDUSTRIES

Sources, Characteristics, Waste Treatment Flow Sheets For Selected Industries Such As Textiles, Tanneries, Pharmaceuticals, Electroplating Industries, Dairy, Sugar, Paper, Distilleries, Steel Plants, Refineries, Fertilizer, Thermal Power Plants, Wastewater Reclamation Concepts

TREATMENT TECHNOLOGIES

Equalisation, Neutralisation, Removal of Suspended and Dissolved Organic Solids, Chemical Oxidation, Adsorption, Removal of Dissolved Inorganics, Combined Treatment Of Industrial And Municipal Wastes, Residue Management, Dewatering, Disposal.

HAZARDOUS WASTE MANAGEMENT

Hazardous Wastes, Physico Chemical Treatment, Solidification, Incineration, Secure Land Fills.

TEXT BOOKS:

1. Rao M. N. & Dutta A. K. "Wastewater Treatment", Oxford – IBH Publication, 1995.
2. Eckenfelder W.W. Jr., "Industrial Water Pollution Control", McGraw Hill Book Company, New Delhi, 2000.
3. Patwardhan. A.D., "Industrial Wastewater Treatment", Prentice Hall of India, New Delhi 2010.

REFERENCES:

1. Shen T.T., "Industrial Pollution Prevention", Springer, 1999.
2. Stephenson R.L. and Blackburn J.B., Jr., "Industrial Wastewater Systems Handbook", Lewis Publisher, New York, 1998
3. Freeman H.M., "Industrial Pollution Prevention Hand Book", McGraw Hill Inc., New Delhi, 1995.
4. Pandey, "Environmental Management" Vikas Publications, 2010.
5. Industrial Wastewater Management, Treatment and Disposal", (WEF – MOP – FD3) McGraw Hill, 2008

COURSE DESIGNERS

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17BMEC04	MEMS AND ITS BIOMEDICAL APPLICATIONS										Category	L	T	P	Credit
											EC(OE)	3	0	0	3
PREAMBLE To enable the students to acquire knowledge about the principles and applications of MEMS & Nanotechnology in Biomedical Industry.															
PREREQUISITE – NIL															
COURSE OBJECTIVES															
1	To understand the working principle of MEMS & Microsystems.														
2	To understand the working of MOEMS Technology.														
3	To give an insight to the microfluidic systems.														
4	To give an insight to the Bio-MEMS & its application in healthcare.														
5	To study about the biomedical Nanotechnology & its application in research domain.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Discuss the concepts of microfluidic systems.														Understand	
CO2. Explain about the basics of working of MOEMS Technology.														Understand	
CO3. Illustrate the working principle of MEMS & Microsystems.														Apply	
CO4. Analyze the nanomaterial in various biomedical applications.														Analyze	
CO5. Evaluate about the biomedical Nanotechnology & its application in research domain.														Evaluate	
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M	--	--	--	--	--	--	--	L	--	--	M	--	--	--
CO2	M	--	L	--	--	--	--	--	L	--	--	M	M	--	--
CO3	S	M	M	--	--	--	--	--	M	--	--	S	M	M	M
CO4	S	S	M	L	M	M	M	M	M	--	--	S	M	M	S
CO5	S	S	S	M	M	S	M	S	M	--	--	S	M	S	S
S- Strong; M-Medium; L-Low															
SYLLABUS															
MEMS & MICROSYSTEM															
MEMS and Microsystems-Introduction-Typical MEMS and Microsystem Products-Application of Micro- system in Healthcare Industry – Working Principles of Microsystems Micro-sensors – Micro-actuation – MEMS with Microactuation – Micro-accelerators.															

MICRO-OPTO ELECTROMECHANICAL SYSTEMS (MOEMS)

Fundamental principle of MOEMS Technology, Advantages - Light Modulators, Beam splitter – Micro-lens, Micro-mirrors - Digital Micro-mirror Device, Grating Light Valve, Optical Switch, Waveguide and Tuning

MICROFLUIDIC SYSTEMS

Microfluidics - Introduction and Fluid Properties, Applications of MFS-Fluid Actuation Methods - Electrophoresis, Dielectrophoresis, Electrowetting, Optoelectrowetting, Electro osmosis Flow, Electrothermal Flow, Thermocapillary Effect – Microfluidic Channel – Microdispenser – Microneedle - Microfilter

BIOMEMS

Introduction to BioMEMS, BioMEMS for Clinical Monitoring, Lab on a chip, DNA Sensors, E-Nose, E-Tongue, Microsystem approaches to PCR, MEMS based Implantable Drug Delivery System, Emerging, BioMEMS Technology.

BIOMEDICAL NANOTECHNOLOGY

Introduction to nanoscale phenomena, Nanoparticles - Nanomaterial characterization – XRD,SAXS,TEM,SEM, Scanning Tunneling microscopy, AFM, SPM technique, Biomolecular sensing for cancer diagnostics using carbon nanotubes, Carbon nanotube biosensors, Magnetic nanoparticles for MRImaging, Nano-devicesin biomedical applications.

TEXT BOOKS:

1. Tai-Ran Hsu, “**MEMS & Microsystems- Design, Manufacture and Nanoscale Engineering**”, John Wiley & Sons, 2nd Edition,2008.
2. Nitaigour Premch and Mahalik, “**MEMS**”, Tata McGraw Hill, 2nd Reprint2008.
3. Wanjun Wang & Steven A. Soper, “**BioMEMS – Technologies and applications**”, CRC Press, First Edition2007.

REFERENCES:

1. Steven S. Saliterman, “**Fundamentals of BioMEMS & Medical Microdevices**”, International Society for Optical Engineering, 1st Edition2006.
2. Gerald A Urban, “**BioMEMS**”, Springer, 1st Edition2006.
3. Abraham P. Lee and James L. Lee, “**BioMEMS and Biomedical Nanotechnology**”, Volume-I, Springer, 1st Edition,2006.

COURSE DESIGNERS

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17CVEC14	AIR POLLUTION MANAGEMENT	Category	L	T	P	Credit
		EC(OE)	3	0	0	3

Preamble

The course work offers the basic knowledge on various sources of air pollutants and their possible effects on local, regional and global environment. It provides various techniques for sampling and analyzing the pollutants. Also, it deals with the principles and design of control of particulate/gaseous air pollutants and its emerging trends to fulfil the legal aspects of air pollution to have a sustainable environment for future generation.

Prerequisite

NIL

Course Objectives

1. About noise pollution and the methods of controlling the same.
2. The student is expected to know about source inventory and control mechanism.
3. To impart knowledge on the sources, effects
4. The control techniques of air pollutants and noise pollution
5. The sources, characteristics and effects of air

Course Outcomes

On the successful completion of the course, students will be able to

CO1. Identify the sources of air pollution, impacts of air pollutants and their measurements	apply
CO2. identify the significance of meteorological factors in pollutants dispersion and to predict the pollutant concentration	apply
CO3. Suggest preventive and control measures for air pollution.	apply
CO4. Suggest locations for industries and appropriate city planning tips for the effective air pollution management of a city	apply
CO5. Suggest remedies for the possible effects of air pollution on local, regional and global environment.	Apply

Mapping with Programme Outcomes and Programme Specific Outcomes

CO S	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	S	M	L	L	---	L	---	L	---	---	---	---	-	-	-
CO2	S	M	L	L	L	M	---	L	---	L	L	---	-	-	-
CO3	S	M	L	L	L	M	---	L	---	L	---	---	-	-	-
CO4	S	M	M	S	L	---	---	L	---	L	---	L	L	-	-
CO5	S	M	M	S	---	---	---	M	---	M	L	---	-	-	-

S- Strong; M-Medium; L-Low

Syllabus

UNIT – I	SOURCES AND EFFECTS OF AIR POLLUTANTS	9 – hours
Classification of air pollutants – Particulates and gaseous pollutants – Sources of air pollution – Source inventory – Effects of air pollution on human beings, materials, vegetation, animals – global warming-ozone layer depletion, Sampling and Analysis – Basic Principles of Sampling – Source and ambient sampling – Analysis of pollutants – Principles.		
UNIT – II	DISPERSION OF POLLUTANTS	9 – hours
Elements of atmosphere – Meteorological factors – Wind roses – Lapse rate – Atmospheric stability and turbulence – Plume rise – Dispersion of pollutants – Dispersion models – Applications.		
UNIT – III	AIR POLLUTION CONTROL	9 – hours
Concepts of control – Principles and design of control measures – Particulates control by gravitational, centrifugal, filtration, scrubbing, electrostatic precipitation – Selection criteria for equipment – gaseous pollutant control by adsorption, absorption, condensation, combustion – Pollution control for specific major industries.		
UNIT – IV	AIR QUALITY MANAGEMENT	9 – hours
Air quality standards – Air quality monitoring – Preventive measures – Air pollution control efforts – Zoning – Town planning regulation of new industries – Legislation and enforcement – Environmental Impact Assessment and Air quality		
UNIT – V	NOISE POLLUTION	9 – hours
Sources of noise pollution – Effects – Assessment – Standards – Control methods – Prevention		

Text Books

1. Anjaneyulu, D., "Air Pollution and Control Technologies", Allied Publishers, Mumbai, 2002.
2. Rao, C.S. Environmental Pollution Control Engineering, Wiley Eastern Ltd., New Delhi, 1996

Reference Books

1. W.L. Heumann, Industrial Air Pollution Control Systems, McGraw-Hill, New York, 1997
2. Mahajan S.P., Pollution Control in Process Industries, Tata McGraw-Hill Publishing Company, New Delhi, 1991.

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17BTPI05	INDUSTRIAL BIOSAFETY	Category	L	T	P	Credit
		EC(OE)	3	0	0	3

PREAMBLE

Industrial biosafety deals with the microbial hazards caused to an individual and to the society. In the subject the learners could grasp the knowledge on biosafety levels and the roles of various regulatory committees in avoiding the risk. Biosafety often use pioneering techniques along with other applied fields of research like biotechnology, genetic engineering, biochemistry to study microbes and their complex mechanisms. Knowledge of these principles will enable practice well in handling pathogenic microorganisms carefully in the laboratory.

PREREQUISITE - NIL

COURSE OBJECTIVES

1	To recognize the basic knowledge on biosafety levels.
2	To discuss various hazards caused by the GMOs.
3	To classify the role of regulatory committees in controlling the risk
4	To outline the risk involved in using GMOs and LMOs.
5	To design the biosafety procedure in lab and research institutions on handling pathogenic microorganisms.

COURSE OUTCOMES

After the successful completion of the course, learner will be able to

CO1: Recall the various biosafety levels.	Remember
CO2: Explain the various biosafety guidelines	Understand
CO3: Identify the role of regulatory committees in controlling the risk	Understand
CO4: Analyze the risk involved in using GMOs and LMOs products	Analyse
CO5: Differentiate the various safety procedures followed in various industries.	Analyse

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	L	L	L	L	-	-	-	-	-	L	-	L	-	-	-
CO2	M	M	-	M	-	-	-	-	-	-	L	L	-	-	-
CO3	S	-	M	L	M	-	-	L	-	-	-	-	-	-	-
CO4	L	L	L	L	L	-	S	M	-	-	-	M	-	-	-
CO5	L	L	L	-	L	-	-	-	-	-	-	-	M	-	-

S- Strong; M-Medium; L-Low

SYLLABUS

PRINCIPLES OF BIOSAFETY

Introduction, Historical Background, Introduction to Biological Safety Cabinets, Primary Containment for Biohazards, Biosafety Levels, Biosafety Levels of Specific Microorganisms, Biosafety guidelines - Overview of National Regulations and relevant International Agreements including Cartagena Protocol.

BIOSAFETY IN BIOTECHNOLOGY INDUSTRIES

Hazard assessment, Use of genetically modified organisms & their release in environment; special procedures for rDNA based product production (Vaccine and Insulin); Biosafety in laboratory, Laboratory

PRINCIPLES OF BIOSAFETY

Introduction, Historical Background, Introduction to Biological Safety Cabinets, Primary Containment for Biohazards, Biosafety Levels, Biosafety Levels of Specific Microorganisms, Biosafety guidelines - Overview of National Regulations and relevant International Agreements including Cartagena Protocol.

BIOSAFETY IN BIOTECHNOLOGY INDUSTRIES

Hazard assessment, Use of genetically modified organisms & their release in environment; special procedures for rDNA based product production (Vaccine and Insulin); Biosafety in laboratory, Laboratory

associated infections and other hazards; Prudent biosafety practices in laboratory

BIOSAFETY – REGULATORY FRAMEWORKS

Biotechnology and bio-safety concerns at the level of individuals, institutions, society, region, country and world. Regulatory framework in India governing GMOs-Recombinant DNA Advisory Committee (RDAC), Institutional Biosafety Committee (IBC), Review Committee on Genetic Manipulation, Genetic Engineering Approval Committee (GEAC), State Biosafety Coordination Committee (SBCC), District Level Committee (DLC). Rules for the manufacture, use/import/export and storage of hazardous microorganisms/genetically engineered organisms or cells.

RISK ASSESMENT

Definition of GMOs & LMOs, GMO applications in food and agriculture, Risk Analysis, Risk Assessment, Risk management and communication Risk assessment in various industries- pharmaceuticals, food and beverages etc., steps towards minimizing the risk operations in industries.

SAFETY AND BIOSAFETY - CASE STUDIES

Recommended Biosafety Levels for Infectious Agents and Infected Animals, Rules and regulation for handling of microbes in laboratory purposes, lab construction procedure, decontamination and discarding procedure of laboratory used microorganisms. Case studies -swine flu spreading, Bhopal tragedy etc.,

TEXT BOOKS:

1. R.C. Dubey., 2014. A Text Book of Biotechnology Fifth Revised *Edition*, S.ChandPublications
2. Anupam Singh, Ashwani Singh, 2012. Intellectual property rights and Bio-Technology (Biosafetyand Bioethics), Published by Bio-Green Books, NewDelhi.
3. Mueller, M.J., “Patent Law”, 3rd Edition, Wolters Kluwer Law &Business,2009.

REFERENCES:

1. V Sreekrishna, 2017. Bioethics and Biosafety in Biotechnology by New ageInternationalpublishers.
- Sateesh, M.K., 2008. Bioethics and Biosafety, IK InternationalPublishers.

COURSE DESIGNERS

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3	Mr.N.Jawahar	Assistant professor	Biotechnology	jawahar@vmkvec.edu.in

17BTEC29	GREEN BUILDING AND SUSTAINABLE ENVIRONMENT							Category	L	T	P	Credit			
								EC(OE)	3	0	0	3			
PREAMBLE															
Before starting with this course, one must get a clear knowledge on the basics of green building, learning the plan details of HVAC for a building, energy efficientmodelling.															
PREREQUISITE – NIL															
COURSE OBJECTIVES															
1	To define, develop and & Plan the details of Implementation.														
2	To summarize the fundamentals of electric power systems and building electric wiring.														
3	To demonstrate about the Bioclimatic design and concepts.														
4	To construct the water conservation & water management systems.														
5	To assess the key components of remodelling project.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Interpret the basics of green building												Understand			
CO2. Explain the advantages and benefits of green building practices												Understand			
CO3. Construct low energy architecture features in residential and commercial buildings												Apply			
CO4. Develop proper water conservation systems to make up a healthy building												Apply			
CO5. Analyse the green sustainable materials and practices												Analyze			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	M	M	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	M	M	-		L	-	-	-	-	-	-	S	-	-	-
CO4	M	M	-	-	S	-	L	-	-	-	-	-	-	-	-
CO5	M	M	L	L	S	S	-	L	-	-	-	-	M	M	M
S- Strong; M-Medium; L-Low															

SYLLABUS

GREEN BUILDING BASICS AND PRACTICES:

Site Design / Development & Plan Implementation, Resource Efficiency, Energy Efficiency, Water Efficiency, Indoor Environmental Quality and Homeowner Education, Operation, Maintenance & Practices. Assessment of building design and construction, emission of CO₂, SO₂, and NO₂ of building materials, elements, and construction process.

ENERGY MANAGEMENT SYSTEM OF BUILDINGS

The objective of the course is to provide students the necessary tools to control, monitor and optimize the building's facilities, mechanical and electrical equipment for comfort, safety, and efficiency. It starts with the fundamentals of electric power systems and building electric wiring and then works through building automation systems (BAS) principles. The course allows students to acquaint applying BAS to commercial HVAC equipment, lighting systems, fire systems and security/observationsystems.

LOW ENERGY ARCHITECTURE, PASSIVE BUILDING DESIGN

Solar geometry, climate/regional limitations, natural lighting, passive design and sustainability initiatives, insulating and energy storing material. Bioclimatic design and concepts. Case studies will be used extensively as a vehicle to discuss the success/failure of ideas and their physical applications.

WATER MANAGEMENT, BUILDING METHODS & MATERIALS

Water conservation, water management systems, water efficient landscaping, green roofing, rainwater harvesting, sanitary fixtures and plumbing systems, wastewater treatment and reuse, and process water strategies. AAC (Aerated Autoclave Concrete), ICF (Insulated Concrete Forms), new Advanced Framing & Insulation Techniques, SIPs (Structural Insulated Panels), Straw Bale and Pumice-crete Rammed Earth, Timber Frame, Straw Clay, and Earth ship buildings.

ENERGY EFFICIENT REMODELLING

Key components of remodelling projects-windows, walls, roofs, heating and ventilation, insulation, tighten up the building envelope, Advances in building technology and materials, incorporate active and passive solar into the home or commercial building, Mistakes to avoid, various improvements cost

TEXT BOOKS:

1. Kibert, C.J. "Sustainable Construction: Green Building Design and Delivery," Second Edition, New York: John Wiley & Sons, Inc., 2008.
2. Thermal analysis and design of passive solar buildings by A. K. Athienitis and Mat Santamouris.
3. Passive building design by N.K. Bansal, G. Hauser, and G. Minke.

REFERENCES:

1. McDonough, W. and Braungart, M. "Cradle to Cradle: Remaking the Way We Make Things," New York: Farrar, Straus and Giroux, 2002

COURSE DESIGNERS

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17CSP101	PROJECT WORK									Category	L	T	P	Credit	
										PI	0	0	18	9	
PREAMBLE															
This course enables the students to exercise some of the knowledge and/or skills developed during the programme to new situation or problem for which there are number of engineering solutions. This course include planning of the tasks which are to be completed within the time allocated, and in turn, helps to develop ability to plan, , use, monitor and control resources optimally and economically. By studying this course abilities like creativity, imitativeness and performance qualities are also developed in students. Leadership development and supervision skills are also integrated objectives of learning thiscourse.															
PREREQUISITE – NIL															
COURSE OBJECTIVES															
1	To develop quality software solution.														
2	To involve in all the stages of the software development life cycle like requirements engineering, systems analysis, systems design, software development, testing strategies and documentation.														
3	To understand and gain the knowledge of the principles of software engineering practices.														
4	To Get good exposure and command in one or more application areas and on the software.														
5	To participate and manage a large software engineering projects in future.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
1. Describe the Systems Development Life Cycle (SDLC).													Apply		
2. Design of Modules.													Apply		
3. Perform coding.													Apply		
4. Analyze and Apply various types of testing techniques and prepare documentation.													Apply		
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	L	L	S	M	-	-	S	-	S	-	M	M	M
CO2	S	S	M	M	S	M	-	-	S	-	M	-	S	S	S
CO3	L	M	L	L	M	M	-	-	M	-	L	-	M	M	M
CO4	S	S	M	L	S	M	-	-	S	-	S	-	M	M	M
S- Strong; M-Medium; L-Low															
<ul style="list-style-type: none">Not more than one student is permitted to work on aproject.Each Student should be involved in each and every phase of Project Development. If it is found that student is not involved in any phase; for example coding phase, it may lead to the rejection/disqualifying of the project at any stage.Title of the project should be kept the same throughout theproject.															

Guidelines for preparing the Project Dissertation

This document lists the contents required for the academic project report done as part of the MCA Curriculum. Section names have been listed with description. The descriptions have been provided in italics. Important: This page and the text in italics present throughout this document are to give you guidance. Please do not include them in your project report.

Work allocation matrix:

Prepare work allocation matrix along with provision of follow-up remarks and notes.

Project execution:

Execute project preparation activities as per work allocation matrix.

Documentation and presentation:

Documentation of final project report which includes following in sequence.

- a. Title page-(Suggested as perAnnexure-II.)
- b. Certificate –As perAnnexure-III.
- c. Index.
- d. Preface/Acknowledgement.
- e. Courseoutcomes.
- f. Projecttitle.
- g. Assembly and detail productiondrawings.
- h. List of activities (suggested as per Annexure – IV) and work allocationmatrix.
- i. Plant layout withdimensions.
- j. List and specifications of machineries, equipments andtools.
- k. Bill of material with make or buy decision.
- l. Specifications of bought outparts.
- m. Process sheets-As per format given in course Industrialengineering.
- n. Flow processcharts.
- o. Specification and consumption ofconsumables.
- p. Details of inspection / testing carriedout.
- q. Details of rework / rectifications carried out.
- r. Costestimation.
- s. Monitoring and controlreport/sheet.
- t. Notes ontroubleshooting.
- u. Notes on individual achievement of skills / experience /problems / solutions.
- v. References.
- w. Day to day logbook as perAnnexure-V.
- x. Presentation including moments at work-video/photographs inaction

Notes:

Prepare project report with MS Office with following guidelines.

PAGE:	A4 (ON ONESIDE).
MARGINN:	TOP :15mm. BOTTOM :15mm. RIGHT :15mm. LEFT :30mm.
FONT:	ARIAL.
SIZE:	12-BOLD, CONTENT12, SPACING 18 POINTS,
HEADER:	TITLE OF THE PROJECT, PAGE NUMBER ON TOP RIGHT.
FOOTER:	ACADEMIC YEAR, SHORT NAME OF THEINSTITUTE

SUGGESTED LEARNING RESOURCES.

- i. Use ofLibrary.
- ii. Referencebooks.
- iii. Handbooks.
- iv. Encyclopedia.
- v. Magazines.
- vi. Periodicals.
- vii. Journals.
- viii. Visits of industry, organizations related as per therequirement.
- ix. Internet.

COURSE DESIGNERS

S.No.	Name of the Faculty	Designation	Department	Mail ID
1	Dr.M.Nithya	Professor	CSE	hodcse@vmkvec.edu.in
2	Dr.S.Rajaprakash	Associate professor	CSE	rajaprakash@avit.ac.in .

17CSPI02	INTERNSHIP										Category	L	T	P	Credit
											PI	0	0	0	3
PREAMBLE The Engineering Internship course is a Canvas-based course that offers students the opportunity to explore and develop their careers through professional practice. The structured plan of education impacts student work readiness through a number of professional development skill-building activities, including goal setting; analysis and reflection; feedback from employer; informational interviewing and debriefing their experience.															
PREREQUISITE – NIL															
COURSE OBJECTIVES															
1	An understanding of how liberal arts coursework ties to professional careers of interest.														
2	Gain insight into a possible career path of interest while learning about the industry in which the organization resides, organizational structure, and roles and responsibilities within that structure.														
3	Develop professional connections and identify a strategy for maintaining those connections														
4	Identify and articulate next steps in their career trajectory.														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Add details about your experience including new skills developed and results obtained .												Understand			
CO2. Analyze your internship experience, reflecting on lessons learned and how your liberal arts education prepared you for the internship.												Apply			
CO3. Identification of additional skills that will need to be developed to ensure career readiness.												Apply			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	S	L	S	-	L	L	S	L	S	-	M	M	M
CO2	S	S	M	M	S	M	L	L	M	M	M	-	S	S	S
CO3	L	M	M	L	M	M	L	L	M	L	L	-	M	M	M
S- Strong; M-Medium; L-Low															

General Procedure

Final Reflection Report:

I. General InformationSection

Explain your role and how your work contributed to the company

II. TechnicalSkills

Document the technical experiences you had during your work experience and discuss technical problems that you assisted in solving

III. Development of ProfessionalSkills

Describe team and leadership building opportunities on the job

IV. Assessments

- Discuss whether or not you met goals set out by your supervisor or that you set for yourself
- Evaluate your performance of assigned projects, noting both areas of strength and improvement

V. Conclusion

- Summarize by addressing the impact of the work experience on your education and career goals
- Provide two “lessons learned” to share with any student that is considering an internship

Course Designers:

S.No.	Name of the Faculty	Designation	Department	Mail ID
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17CSPI03	BUSINESS INTELLIGENCE AND ITS APPLICATIONS								Category	L	T	P	Credit		
									PI	3	0	0	3		
PREAMBLE															
Business Intelligence (BI) refers to the tools, technologies, applications and practices used to collect, integrate, analyze, and present an organization's raw data in order to create insightful and actionable business information in Data mining.															
PREREQUISITE – NIL															
COURSE OBJECTIVES															
1	To Introduce students to various business intelligence concepts														
2	To learn the concepts of data integration used to develop intelligent systems for decision support														
3	To introduce visualization tool for prepare the enterprise reporting														
4	To learn analytical components and technologies used to create dashboards and scorecards, data/text/Web mining methods														
4	To gain new insights into organizational operations in implementation of systems for Business Intelligence (BI)														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Learn about the concepts of OLTP and OLAP for BI infrastructure development												Understand			
CO2. Gained an understanding of how business professionals can use analytics techniques to formulate and solve relevant problems and how they use analytics to support decision making												Analyze			
CO3. Apply Clustering, Association and Classification techniques for Data Integration												Apply			
CO4. Assess BI tools to solve problems, issues, and trends using predictive analysis												Apply			
CO5. Develop systems to measure, monitor and predict the enterprise variables and performance indicators for business decision-making process												Apply			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
CO2	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
CO3	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
CO4	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
CO5	S	M	L	-	M	-	-	-	-	-	-	M	S	M	M
S- Strong; M-Medium; L-Low															

SYLLABUS

INTRODUCTION TO BUSINESS INTELLIGENCE

Introduction to OLTP AND OLAP – BI Definition and BI Concepts – Business Applications of BI - BI Framework- Role of Data Warehousing in BI –BI Infrastructure Components- BI Process – Developing Data Warehouse – Management Framework – Business driven approach –BI Technology — BI Roles & Responsibilities.

BASICS OF DATA INTEGRATION

Concepts of Data Integration need and advantages of using Data Integration – Introduction to common data integration approaches – Introduction to ETL using SSIS – Introduction to Data Quality – Data Profiling Concepts and Applications.

INTRODUCTION TO MULTIDIMENSIONAL DATA MODELING

Introduction to Data and Dimensional Modeling – Multi Dimensional Data Model – ER modeling Vs Multi Dimensional Model – Concepts of Dimensions - facts - cubes- attributes- hierarchies- star and snowflake schema – Introduction to Business Metrics and KPIs – Creating Cubes using SSAS.

BASICS OF ENTERPRISE REPORTING

Introduction to Enterprise Reporting - Concepts of dashboards - balanced scorecards – Introduction to SSRS Architecture– Enterprise Reporting using SSRS reporting service

BI ROAD AHEAD

BI and Mobility – BI and cloud computing – BI for ERP systems - Benefits of BI in ERP-NorthWind_Traders Data-Data Analyses through Excel-Kettle Tool – Conversion of data using Kettle Tool.

TEXT BOOKS

1.RN Prasad, Seema Acharya, "Fundamentals Of Business Analytics" Wiley India,2011

REFERENCES

1. Soumendra Mohanty, "Data Warehousing Design, Development and Best Practices", Tata McGraw-Hill, New Delhi, 2007.
2. David Loshin, "Business Intelligence", Morgan Kaufmann Publishers, San Francisco, Fifth edition, 2007.
- 3.Larissa Terpeluk Moss and Shaku Atre, "Business Intelligence Roadmap", Pearson Education,2007

COURSE DESIGNERS

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1.	Dr. K. Sasikala	Associate Professor	CSE	sasikalak@vmkvec.edu.in
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17CSPI04		BUILDING ENTERPRISE APPLICATIONS								Category	L	T	P	Credit		
										PI	3	0	0	3		
PREAMBLE																
Enterprise Applications are complex systems. They require delicate planning and expertise for the right type of development Enterprise Applications are the instruments of administration, management, and planning for an enterprise																
PREREQUISITE – NIL																
COURSE OBJECTIVES																
1	To teach the students about various ways to build enterprise applications															
2	At the completion of the class, they should understand how to deploy systems to a number of different host platforms															
3	They develop graphical user interfaces, as well as character-oriented screens. They test and debug their system															
COURSE OUTCOMES																
On the successful completion of the course, students will be able to																
CO1. Familiarize with concept of Enterprise Analysis and Business Modeling.												Understand				
CO2. Understand requirements validation, planning and estimation. Design and document the application architecture.												Understand				
CO3. Understand the importance of application framework and designing other application components												Apply				
CO4. Construct and develop different solution layers.												Apply				
CO5. Perform Code review, Code analysis, build process.												Apply				
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES																
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	
CO1	S	M	M	M	M	-	-	-	M	-	M	-	S	M	M	
CO2	S	M	M	M	M	-	-	-	M	-	-	-	S	M	M	
CO3	S	-	M	M	M	-	-	-	M	-	-	M	S	-	M	
CO4	S	M	S	M	S	-	-	-	S	M	M	M	S	M	M	
CO5	S	M	S	M	S	-	-	-	S	S	S	M	S	M	-	
S- Strong; M-Medium; L-Low																

SYLLABUS

Introduction

enterprise applications and their types, software engineering methodologies, life cycle of raising an enterprise application, introduction to skills required to build an enterprise application, key determinants of successful enterprise applications, and measuring the success of enterprise application

Incepting of enterprise applications

Enterprise analysis, business modeling, requirements elicitation, use case modeling, prototyping, non functional requirements, requirements validation, planning and estimation

Architecting and Designing enterprise applications

Concept of architecture, views and viewpoints, enterprise architecture, logical architecture, technical architecture- design, different technical layers, best practices, data architecture and design – relational, XML, and other structured data representations, Infrastructure architecture and design elements - Networking, Internetworking, and Communication Protocols, IT Hardware and Software, Middleware, Policies for Infrastructure Management, Deployment Strategy, Documentation of application architecture and design

Constructing of enterprise applications

Construction readiness of enterprise applications - defining a construction plan, defining a package structure, setting up a configuration management plan, setting up a development environment, introduction to the concept of Software Construction Maps, construction of technical solutions layers, methodologies of code review, static code analysis, build and testing, dynamic code analysis – code profiling and code coverage

Testing and Rolling out enterprise applications

Types and methods of testing an enterprise application, testing levels and approaches, testing environments, integration testing, performance testing, penetration testing, usability testing, globalization testing and interface testing, user acceptance testing, rolling out an enterprise application.

TEXT BOOKS

1. Raising Enterprise Applications – Published by John Wiley, authored by Anubhav Pradhan, Satheesha B. Nanjappa, Senthil K. Nallasamy, Veerakumar Esakimuthu
2. Building Java Enterprise Applications – Published by O'Reilly Media, authored by Brett McLaughlin

REFERENCE BOOK

1. Software Requirements: Styles & Techniques – published by Addison-Wesley Professional
2. Software Systems Requirements Engineering: In Practice – published by McGraw-Hill/Osborne Media
3. Managing Software Requirements: A Use Case Approach, 2/e – published by Pearson
4. Software Architecture: A Case Based Approach – published by Pearson

COURSE DESIGNERS

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17CSP105	INTERNET AND WEB TECHNOLOGY										Category	L	T	P	Credit
											PI	3	0	0	3
PREAMBLE															
This course is intended to teach the basics involved in publishing content on the World Wide Web. This includes the ‘language of the Web’ – HTML, the fundamentals of how the Internet and the Web function, a basic understanding of graphic production with a specific stress on creating graphics for the Web, and a general grounding introduction to more advanced topics such as programming and scripting.															
PREREQUISITE – NIL															
COURSE OBJECTIVES															
1	To introduce basic concepts of internet														
2	To learn about HTML & XML														
3	To learn about internet security														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1 . Analyze a web page and identify its elements and attributes.												Analyze			
CO2. Create web pages using XHTML and Cascading Style Sheets.												Apply			
CO3. Build dynamic web pages using JavaScript (Client side programming).												Apply			
CO4. Create XML documents and Schemas												Apply			
CO5. Build interactive web applications using JSP												Apply			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	L	-	M	-	-	-	M	-	-	M	S	M	M
CO2	S	M	L	-	M	-	-	-	M	-	-	-	S	M	M
CO3	S	M	L	-	L	-	-	-	M	-	-	L	S	M	M
CO4	S	M	L	-	M	-	-	-	M	-	-	-	S	M	M
CO5	S	M	L	-	M	-	-	-	M	-	-	L	S	M	M
S- Strong; M-Medium; L-Low															

SYLLABUS

INTRODUCTION TO INTERNET

Introduction, Evolution of Internet, Internet Applications, Internet Protocol -TCP/IP, UDP, HTTP, Secure Http(Shttp)
Internet Addressing – Addressing Scheme – Ipv4 & IPv6, Network Byte Order, Domain Name Server and IP
Addresses, Mapping . Internet Service Providers, Types Of Connectivity Such As Dial-Up Leaded Vsat Etc. Web
Technologies: Three Tier Web Based Architecture; Jsp, Asp, J2ee, .Net Systems

HTML CSS AND SCRIPTING

HTML – Introduction, Sgml, Dtd(Document Type Definition, Basic Html Elements, Tags and usages, HTML Standards
, Issues in HTML Dhtml: Introduction Cascading Style Sheets: Syntax ,Class Selector, Id Selector Dom (Document
Object Model) & Dso (Data Source Object) Approaches To Dynamic Pages: Cgi, Java Applets, Plug Ins, Active X, Java
Script – Java Script Object Model, Variables-Constant – Expressions, Conditions- Relational Operators- Data Types –
Flow Control – Functions & Objects-events and event handlers – Data type Conversion & Equality – Accessing HTML
formelements

XML

What is XML – Basic Standards, Schema Standards, Linking & Presentation Standards, Standards that build on XML,
Generating XML data, Writing a simple XML File, Creating a Document type definition, Documents & Data ,Defining
Attributes & Entities in the DTD ,Defining Parameter Entities & conditional Sections, Resolving a naming conflict,
Using Namespaces, Designing an XML data structure, Normalizing Data, Normalizing DTDS

INTERNET SECURITY & FIREWALLS

Security Threats From Mobile Codes, Types Of Viruses, Client Server Security Threats, Data & Message Security,
Various electronic payment systems, Introduction to EDI,Challenges–Response System, Encrypted Documents And
Emails , Firewalls: Hardened Firewall Hosts, Ip- Packet Screening, Proxy Application Gateways, Aaa (Authentication
,Authorization And Accounting).

WEBSITE PLANNING & HOSTING

Introduction, Web Page Lay-Outing, Where To Host Site, Maintenance Of Site, Registration Of Site On Search Engines
And Indexes, Introduction To File Transfer Protocol, Public Domain Software, Types Of Ftp Servers (Including
Anonymous),FtpClients Common Command. Telnet Protocol, Server Domain, Telnet Client, Terminal Emulation.
Usenet And Internet Relay Chat

TEXT BOOKS

1. Internet & Intranet Engineering, - Daniel Minoli, TMH.
- 2 .Alexis Leon and Mathews Leon – Internet for Every One, Tech World.

REFERENCES

1. Eric Ladd, Jim O'Donnel –“Using HTML 4, XML and JAVA”-Prentice Hall of India-1999.
2. “Beginning Java Script “– Paul Wilton – SPD Publications–2001

Course Designers:

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17CSPI06	LEARNING IT ESSENTIALS BY DOING										Category	L	T	P	Credit
											PI	3	0	0	3
PREAMBLE															
The proposed elective course exposes the non-CS/IT students to IT Essentials. The core modules of this Elective includes programming , Database and web Technology amongst other related topics. This course refers to the basic tools and technologies for the right type of website development and enable student to create simple web applications															
PREREQUISITE – NIL															
COURSE OBJECTIVES															
1	To learn about the essentials of Information Technology														
2	To get an idea about the scripting languages.														
3	To get an idea about the internet protocols														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1 Understand the networking concept internet protocols, network routing												Understand			
CO2. Understand the fundamentals of web applications and its modeling												Understand			
CO3. Understand and learn the scripting languages with design of web applications												Understand			
CO4. Analyze the process of mobile communication and network technologies												Analyze			
CO5. Build simple interactive applications, database applications and multimedia applications.												Analyze			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	M	M	-	-	-	-	-	-	-	M	S	M	M
CO2	S	M	M	M	-	-	-	-	-	-	-	M	S	-	M
CO3	S	M	M	M	-	-	-	-	-	-	-	M	S	M	M
CO4	M	M	M	M	M	-	-	-	-	-	-	M	S	M	-
CO5	M	M	M	M	S	-	-	-	-	-	-	M	-	M	M
S- Strong; M-Medium; L-Low															

SYLLABUS

Fundamentals of Computer architecture

introduction-organization of a small computer -Central Processing Unit - Execution cycle – Instruction categories – measure of CPU performance Memory – Input/output devices - BUS-addressing modes. System Software – Assemblers – Loaders and linkers – Compilers and interpreters

Operating system

Introduction – memory management schemes Process management Scheduling – threads. Problem solving with algorithms- Programming styles – Coding Standards and Best practices - Introduction to C -Programming Testing and Debugging. Code reviews -System Development Methodologies – Software development Models -User interface Design – introduction – The process – Elements of UI design & reports.

RDBMS

Data processing – the database technology – data models-ER modeling concept –notations – Extended ER features -Logical database design - normalization -SQL – DDL statements – DML statements – DCL statements

Writing Simple queries – SQL Tuning techniques – Embedded SQL - OLTP

Objected oriented concepts

Object oriented programming -UML Class Diagrams– relationship – Inheritance – Abstract classes – polymorphism-Object Oriented Design methodology - Common Base class -Alice Tool – Application of OOC using Alice tool.

Client server computing

Internetworking – Computer Networks – Working with TCP/IP – IP address – Sub netting – DNS – VPN – proxy servers World Wide Web – Components of web application - browsers and Web Servers URL – HTML – HTTP protocol – Web Applications - Application servers – Web Security.

REFERENCES

1. Andrew S. Tanenbaum, Structured Computer Organization, PHI, 3rd ed.,1991
2. Silberschatz and Galvin, Operating System Concepts, 4th ed., Addison-Wesley,1995
3. Dromey R.G., How to solve it by Computers, PHI, 1994
4. Kernighan, Ritchie, ANSI C languagePHI,1992
5. Wilbert O. Galitz, Essential Guide to User Interface Design, John Wiley, 1997
6. Alex Berson, Client server Architecture, Mc Graw Hill International,1994
7. Rojer Pressman, Software Engineering-A Practitioners approach, McGraw Hill, 5th ed.,2001
8. Alfred V Aho, John E Hopcroft, Jeffrey D Ullman, Design and Analysis of Computer Algorithms, Addison Wesley Publishing Co.,1998
9. Henry F Korth, Abraham Silberschatz, Database System Concept,2nd ed. McGraw-Hill International editions,1991
10. Brad J Cox, Andrew J.Novobilski, Object – Oriented Programming– An evolutionary approach, Addison – Wesley,1991

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17CSP107	ESSENTIALS OF INFORMATION TECHNOLOGY										Category	L	T	P	Credit
											PI	3	0	0	3
PREAMBLE															
This course aims to provide the fundamental concepts of Computer operations like hardware and software installation, and emphasizing principles application packages. This course aims at facilitating the student to understand the various concepts and functionalities of Database Management Systems, the method and model to store data and how to manipulate them through query languages, the effective designing of relational database and how the system manages the concurrent usage of data in multi user environment..															
PREREQUISITE – NIL															
COURSE OBJECTIVES															
1	To provide basic knowledge of hardware and software components of computers.														
2	To study Problem solving Techniques and program development cycle.														
3	Design and test simple programs in C language														
4	Document artifacts using common quality standards														
5	Design simple data store using RDBMS concepts and implement														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1 Basic knowledge on hardware and software terminologies.												Understand			
CO2. Apply the knowledge of mathematics, science and computing in the core information technologies												Apply			
CO3. Understand Program Devolvement Cycle and apply various Problem Solving Techniques												Apply			
CO4. Develop the function programs with all the concepts in c												Analyze			
CO5. Build and manipulate relational database using Structured Query Language and relational languages												Analyze			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	M	M	M	-	-	-	-	-	-	-	S	M	M
CO2	S	M	M	M	M	-	-	-	-	-	-	-	S	M	M
CO3	S	M	M	M	M	-	-	-	-	-	-	-	S	M	M
CO4	S	M	M	M	M	-	-	-	-	-	-	-	S	M	M
CO5	S	M	M	M	M	-	-	-	-	-	-	-	S	M	M
S- Strong; M-Medium; L-Low															

SYLLABUS

Introduction

Basics of computer systems - Various hardware components - Data storage and various Memory units - Central Processing Unit - Execution cycle - Introduce to software and its classifications. Operating system concepts– Introduction – Memory management - Process management - Intercrosses Communication – Deadlocks - File management -Device management.

Problem Solving Techniques

Introduction to problem solving - Computational problem and it's classification - Logic and its types - Introduction to algorithms - Implementation of algorithms using flowchart - Flowcharts implementation through RAPTOR tool - Searching and sorting algorithms - Introduction and classification to Data Structures - Basic Data Structures - Advanced Data Structures

Programming Basics

Introduction to Programming Paradigms and Pseudo Code - Basic programming concepts - Program Life Cycle - Control Structures - Introduction and Demonstration of 1-D Array and 2-D Array - Searching and Sorting techniques - Demonstration Concept of memory references in arrays –Strings - Compiler Concepts - Code Optimization techniques. Structured Programming – Functions – Structures - File Handling - Introduction to Software Development Life Cycle - Industry Coding Standards and Best Practices - Testing and Debugging - Code Review

Project Preparation

Project Specification - Preparation of High level design and Detailed design document, Unit Test Plan and Integrated Test Plan - Coding and Unit Testing activities - Integration Testing.

RDBMS

Data processing – the database technology – data models-ER modeling concept –notations – Extended ER features- Logical database design - normalization -SQL – DDL statements – DML statements – DCL statements -Joins - Sub queries – Views-Database design Issues.

TEXT BOOKS

1. Information Technology Planning, Blokdyk Gerardus , Pearson 3rd Edition .

REFERENCES

1. “Computer Organization and Architecture” – William Stallings , Pearson 8th Edition
2. “Database System Concepts”- Abraham Silberschatz , Hendry F Korth – Indian 6th Edition.
3. “Computing Fundamentals and C Programming” Paperback – 1 Jul 2017 by E Balagurusamy(Author)
4. “How to solve it by computer “ – R G Dromey, Pearson Edition 2006.
5. “ Software testing “Principle and Practices - Desikan Srinivasan , Gopalaswamy Ramesh, Pearson Edition 2005.

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17CSPI08	INTRODUCTION TO MAIN FRAMES										Category	L	T	P	Credit
											PI	3	0	0	3
PREAMBLE															
The mainframe hardware and z/OS operating system grew up together and are highly complementary for reliability, availability, serviceability, scalability, security, and performance. The operating system taught in this course is z/OS, a widely used mainframe operating system. z/OS is known for its ability to serve thousands of users concurrently and for processing very large workloads in a secure, reliable, and expedient manner..															
PREREQUISITE : NIL															
COURSE OBJECTIVES															
1	To get an idea about the mainframe hardware														
2	To get an idea about z/OS														
3	To learn about JCL														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1 Learn the Concept of Computer Architecture ,Mainframes OS and Terminology												Understand			
CO2. Learn the Concept of virtual storage and its use in z/OS..												Understand			
CO3 Understand Job Control language- Various statements in JCL- JCL procedures												Understand and Apply			
CO4. Build and manipulate relational database using Structured Query Language and relational languages												Apply			
CO5. Analyze various forms of data representation and structures supported by the COBOL language												Apply and Analyze			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	M	M	-	-	-	-	-	-	-	-	S	M	M
CO2	S	M	M	M	-	-	-	-	-	-	-	-	S	-	M
CO3	S	L	M	M	-	-	-	-	-	-	-	-	S	M	-
CO4	S	M	M	M	-	-	-	-	-	-	-	-	S	M	M
CO5	S	M	M	M	-	-	-	-	-	-	-	-	S	M	-
S- Strong; M-Medium; L-Low															

SYLLABUS

UNIT –I EVOLUTION OF MAINFRAME HARDWARE

Overview of Computer Architecture - Classification of Computers - micro, mini, mainframes and super computer – Mainframe computer - key features - benefits - Evolution of Mainframes - Different hardware systems. Mainframes OS and Terminology: Operating systems on mainframes, Batch processing vs. online processing - mainframe operating system. - evolution - concepts of Address space, Buffer management - Virtual storage - paging - swapping – Dataset management in mainframes.

UNIT-II Z/OS AND ITS FEATURES

Z-operating system (Z/OS) - Virtual storage - Paging process - storage Managers - Program execution modes - Address space - Multiple virtual system(MVS) , MVS address space, Z/OS address space - Dataset - sequential and partial dataset - Direct access storage device(DASD) -Access methods - Record formats - Introduction to virtual storage access methods(VSAM) - Catalog –VTOC.

UNIT-III INTRODUCTION TO JCL

Introduction to Job Control language - Job processing – structure of JCL statements - Various statements in JCL - JOB statement - EXEC statement – DD statement - JCL procedures and IBM utility programs.

UNIT-IV COBOL PROGRAMMING

Introduction – History, evolution and Features, COBOL program Structure, steps in executing COBOL. Language Fundamentals – Divisions, sections, paragraphs, sections, sentences and statements, character set, literals, words, figurative constants, rules for forming user defined words, COBOL coding sheet.. Data division – Data names, level numbers, PIC and VALUE clause, REDEFINES, RENAME and USAGE clause. Procedure Division – Input / Output verbs, INITIALIZE verb, data movement verbs, arithmetic verbs, sequence control verbs.

UNIT-V OVERVIEW OF DB2

Introduction to DB2 – System Service component, Database Service component, Locking Service component, Distributed Data Facility Services component, Stored Procedure component, catalogs and optimizer. DB2 Objects and Data Types - DB2 Objects Hierarchy, Storage groups, Database, Table space, Table, Index, Clustered index, Synonyms and aliases, Views, Data Types. DB2 SQL programming – Types of SQL statements, DCL, DDL, DML, SPUFI utility. Embedded SQL programming – Host variable, DECLGEN utility, SQLCA, single/multiple row manipulation, cursors, and scrollable cursors.

TEXT BOOKS

1. Gabrielle Wiorkowski & David Kull, DB2 Design & Development Guide, Addison Wesley, 1992.
2. Gary DeWard Brown, JCL Programming Bible (with z/OS) fifth edition, Wiley India Dream Tech, 2002.
3. M.K. Roy and D. Ghosh Dastidar, “Cobol Programming”, Tata McGraw Hill, New York, 1973.

REFERENCES

1. MVS JCL, Doug Lowe, Mike Murach and Associates.
2. AS/400 Architecture and Application – The Database Machine by Jill T. Lawrence (SPD Publications)
3. Gary DeWard Brown, JCL Programming Bible (with z/OS) fifth edition, Wiley India Dream Tech, 2002.
4. z/OS V1R4.0 MVS JCL Reference found online at

<http://www-ibm.com/support/docview.wss?uid=pub1sa22759706>

5.z/OS V1R1.0 MVS JCL Reference found online

athttp://publibz.boulder.ibm.com/cgi-bin/bookmgr_OS390/BOOKS/iea2b600/CCONTENT

S

6. COBOL - Language Reference, Ver 3, Release 2, IBMRedbook.

7. COBOL - Programming Guide, Ver 3, Release 2, IBMRedbook.

8. Complete CL The Definitive Control Language Programming Guide by Ted Holt and Ernie Malaga (SPD Publication).

9. Nancy Stern & Robert A Stern, “Structured Cobol Programming”, John Wiley & Sons, New York,1973.

10. M.K. Roy and D. Ghosh Dastidar, “Cobol Programming”, Tata McGraw Hill, New York,1973.

11. Newcomer and Lawrence, Programming with Structured COBOL, McGraw Hill Books, New York,1973.

12. Craig S Mullins, DB2 Developer’s Guide, Sams Publishing,1992.

13. Gabrielle Wiorkowski & David Kull, DB2 Design & Development Guide, Addison Wesley, 1992.

14. C J Date & Colin J White, A Guide to DB2, AddisonWesley.

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17CSPI09	MOBILE APPLICATION DEVELOPMENT										Category	L	T	P	Credit
											PI	3	0	0	3
PREAMBLE															
In this modern era almost every hands has a handheld devices. Each handheld device have the computing capability to meet the half the needs of user such as banking, browsing, education and emergency etc. It is a must for a computer engineer to have some basic knowledge about the handheld devices platform and its supporting software development. This course will give adequate knowledge in developing a mobile applications for different such as Android, iOS, Windows.															
PRE REQUISITE – NIL															
COURSE OBJECTIVES															
1.	Understand system requirements for mobile applications														
2.	Generate suitable design using specific mobile development frameworks														
3.	Generate mobile application design														
4.	Implement the design using specific mobile development frameworks														
5.	Deploy the mobile applications in marketplace for distribution														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Expose to technology and business trends impacting mobile applications												Understand			
CO2. Understand enterprise scale requirements of mobile applications												Understand			
CO3. Familiarize in the Graphics used for Android application development												Apply			
CO4. Competent with the characterization and architecture of mobile applications												Apply			
CO5. Competent with designing and developing mobile applications using one application development framework.												Analyze			
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	M	M	M	-	-	M	-	-	-	M	S	M	M
CO2	S	M	M	M	M	-	-	M	-	-	-	M	S	M	M
CO3	S	M	L	M	L	-	-	M	-	-	-	L	S	M	M
CO4	S	M	M	M	M	-	-	M	-	-	-	M	S	M	M
CO5	S	M	M	M	L	-	-	M	-	-	-	L	S	M	M
S- Strong; M-Medium; L-Low															

SYLLABUS

UNIT I INTRODUCTION

Introduction to mobile applications –Embedded systems -Market and business drivers for mobile applications – Publishing and delivery of mobile applications –Requirements gathering and validation for mobile applications

UNIT II BASIC DESIGN

Introduction –Basics of embedded systems design –Embedded OS -Design constraints for mobile applications, both hardware and software related –Architecting mobile applications –User interfaces for mobile applications –touch events and gestures –Achieving quality constraints –performance, usability, security, availability and modifiability.

UNIT III ADVANCED DESIGN

Designing applications with multimedia and web access capabilities – Integration with GPS and social media networking applications – Accessing applications hosted in a cloud computing environment – Design patterns for mobile applications.

UNIT IV TECHNOLOGY I – ANDROID

Introduction – Establishing the development environment – Android architecture – Activities and views – Interacting with UI –Persisting data using SQLite–Packaging and deployment –Interaction with server side applications –Using Google Maps, GPS and Wifi –Integration with social media applications.

UNIT V TECHNOLOGY II –IOS

Introduction to Objective C –iOS features –UI implementation –Touch frameworks –Data persistence using Core Data and SQLite –Location aware applications using Core Location and Map Kit –Integrating calendar and address book with social media application –Using Wifi -iPhone marketplace.

TEXT BOOKS

1. Jeff McWherter and Scott Gowell, "Professional Mobile Application Development", Wrox, 2012.

REFERENCES

1. Charlie Collins, Michael Galpin and Matthias Kappler, “Android in Practice”, DreamTech, 2012.

2. James Dovey and Ash Furrow, “Beginning Objective C”, Apress, 2012.

3. David Mark, Jack Nutting, Jeff LaMarche and Frederic Olsson, “Beginning iOS 6 Development: Exploring the iOS SDK”, Apress, 2013

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17CHBS01		Environmental Sciences (Common to All Branches)					Category	L	T	P	Credit				
							MC	-	-	-	0				
PREAMBLE Environmental science and Engineering is an interdisciplinary field that integrates physical, chemical, biological, information sciences and provides the basic knowledge of structure and function of ecosystem and better understanding of natural resources, biodiversity and their conservation practices. The course helps to create a concern for our environment that will generate pro-environmental action, including activities we can do in our daily life to protectit.Furthermore, it deals the social issues and ethics to develop quality engineer in our country.															
PREREQUISITE: NIL															
COURSE OBJECTIVES															
1.	Applying Science and Engineering knowledge to protect environment														
2.	To provide comprehensive insight in natural resources and protect natural resources														
3.	To create awareness on the various pollutions and their impact.														
4.	To educate the ways and means to manage natural calamities														
5.	To impart fundamental knowledge on human welfare measures														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Comprehend the impact of engineering solutions in a global and societal context										Understand					
CO2. Illustrate the contemporary issues that results in environmental degradation and would attempt to provide solutions to overcome those problems										Understand					
CO3. Illustrate the importance of ecosystem and biodiversity										Apply					
CO4. Practice to improve the environment and sustainability										Apply					
CO5. Conclude the importance of conservation of resources.										Analyze					
CO6.Estimate the important role of IT in healthy environment for future generations										Analyze					
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M	-	-	-	M	S	S	M	M	-	S	M	-	M
CO2	S	-	-	-	-	S	S	S	-	-	-	S	-	M	M
CO3	S	-	-	-	-	M	S	M	L	-	-	S	-	-	M
CO4	S	-	-	-	-	M	S	S	M	M	-	S	M	-	M
CO5	S	-	-	-	-	M	S	S	M	M	-	S	M	-	M
CO6	S	-	-	-	-	M	S	S	M	M	-	S	M	M	M
S- Strong; M-Medium; L-Low															

SYLLABUS

ENVIRONMENT AND NATURAL RESOURCES

Environment - Definition, scope & importance - Public awareness- Forest resources, mineral resources , water resources, food resources , energy resources (uses, over -exploitation & adverse effects in each case) - Scope & role of environmental engineers in conservation of natural resources - Sustainability development.

ECOSYSTEMS AND BIO – DIVERSITY

Ecosystem - Definition, structure and function - Energy flow -Ecological succession - food chain, food web, ecological pyramids- Introduction, types, characteristics, structure and function of forest, grassland, desert and Aquatic ecosystems - Bio - Diversity :values and uses, hotspots, threats and conservation.

ENVIRONMENTAL POLLUTION

Pollution-Definition,man made impacts and control measures of air, water and land pollution Water quality standards & characterization- Importance of sanitation - Nuclear hazards– Hazardous waste management: Solid waste,waste water and biomedical waste- Prevention of pollution and role of individual– Disastersmanagement:Floods,earthquake,cycloneand. land slides - Clean technology options.

SOCIAL ISSUES AND ENVIRONMENT

Urban problems related to energy - Water conservation – Resettlement and rehabilitation of people - Environmental ethics - Climate change - Global warming - Acid rain - Ozone depletion-Waste land reclamation, Environment Protection Act for air, water, wild life and forests - Pollution Control Board.

HUMAN POPULATION AND ENVIRONMENT

Population growth - Population explosion - Family welfare programme - Environment & human health - Human rights – Value education - Women and child welfare, Role of information technology in environment and human health.

TEXT BOOKS:

1. Environmental Science and Engineering by Dr.A. Ravikrishnan, Sri Krishna Publications,Chennai.

REFERENCES:

1. Wager K.D. "Environmental Management", W.B. Saunders Co. Philadelphia, USA, 1998.
2. Bharucha Erach "The Biodiversity of India" Mapin Publishing Pvt Ltd, Ahmedabad, India
3. Trivedi R.K. "Handbook of Environmental Laws", Rules, Guidelines, Compliances and standards Vol I & II, Enviromedia.
4. Dr.J.Meenambal, Environmental Science and Engineering, MJPPublication, Chennai Gilbert M. Masters.
5. Introduction to Environmental Engineering and Science, Pearson Education Pvt Ltd., II Edition, ISBN 81-297-0277-0, 2004.

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17MBHS11	ESSENCE OF INDIAN KNOWLEDGE TRADITION							Category	L	T	P	Credit			
								MC	-	-	-	0			
PREAMBLE The course aims at imparting basic principles of thought process, reasoning and inferencing. Sustainability is at the core of Indian Traditional knowledge Systems connecting society and nature.															
PREREQUISITE: NIL															
COURSE OBJECTIVES															
1.	To facilitate the students with the concepts of Indian traditional knowledge.														
2.	To understand the Importance of roots of knowledge system														
COURSE OUTCOMES															
On the successful completion of the course, students will be able to															
CO1. Understand the concept of Traditional knowledge and its importance											Understand				
CO2. Know the need and importance of protecting traditional knowledge.											Understand				
CO3. Know the various enactments related to the protection of traditional knowledge											Understand				
CO4. Understand the concepts of Intellectual property to protect the traditional knowledge											Understand				
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	S	M	M	-	-	-	-	-	-	M
CO2	-	-	-	-	-	S	M	M	-	-	-	-	-	-	M
CO3	-	-	-	-	-	S	M	M	-	-	-	-	-	-	M
CO4	-	-	-	-	-	S	M	M	-	-	-	-	-	-	M
S- Strong; M-Medium; L-Low															

17MBHS11	INDIAN CONSTITUTION	Category	L	T	P	Credit
		MC	-	-	-	0
PREAMBLE India is the largest democracy of the world. It is need of the time that a wide spectrum of young people is fully conversant with its Constitution and its successfully working is analyzed in a detailed and systematic way. This course discusses the basic traits of the Constitution of India.						

SYLLABUS

INTRODUCTION TO TRADITIONAL KNOWLEDGE: Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge

PROTECTION OF TRADITIONAL KNOWLEDGE: The need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.

LEGAL FRAME WORK AND TK: A: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmer's Rights Act, 2001. (PPVFR Act); B: The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016. Geographical indicators act 2003.

TRADITIONAL KNOWLEDGE AND INTELLECTUAL PROPERTY: Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge.

TRADITIONAL KNOWLEDGE IN DIFFERENT SECTORS: Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK. 139.

TEXT BOOKS:

1. Traditional Knowledge System in India, by Amit Jha, 2009.
2. Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan, 2012.

REFERENCES:

1. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002
2. "Knowledge Traditions and Practices of India" Kapil Kapoor, Michel Danino.
3. <https://www.youtube.com/watch?v=LZP1StpYEPM>
4. <http://nptel.ac.in/courses/121106003>

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PREREQUISITE: NIL

COURSE OBJECTIVES

1.	Understand the need for constitution.
2.	Appreciate the fundamental duties and rights of the citizens of India
3.	Explain the role and amendments of constitution in a democratic society.
4.	Describe the directive principles of state policy and their significance.
5.	List the key features of the constitution, union government and state government.

COURSE OUTCOMES

On the successful completion of the course, students will be able to															
CO1. Create awareness about the constitutional values and objectives written in the Indian constitution.													Understand		
CO2. List fundamental rights and fundamental duties of Indian citizens.													Understand		
CO3. Identify the division of legislative, executive and financial powers between the union and state governments													Understand		
CO4. Understand the working of Indian democracy ,its institutions and processes at the local,state and union levels													Understand		
CO5. Explain the functions and responsibilities of election commission of india and union public service commission													Understand		
MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES															
COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	M	-	M	-	M	-	-	-	-
CO2	-	-	-	-	-	-	M	-	M	-	M	-	-	-	-
CO3	-	-	-	-	-	-	M	-	M	-	M	-	-	-	-
CO4	-	-	-	-	-	-	M	-	M	-	M	-	-	-	-
CO5	-	-	-	-	-	-	M	-	M	-	M	-	-	-	-
S- Strong; M-Medium; L-Low															

SYLLABUS

HISTORY OF MAKING OF THE INDIAN CONSTITUTION

History of Making of the Indian Constitution: Introduction to the constitution of India, the making of the constitution and salient features of the constitution.

PHILOSOPHY OF THE INDIAN CONSTITUTION

Philosophy of the Indian Constitution: Preamble Salient Features, Contours of Constitutional Rights & Duties: Fundamental Rights, Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies, Directive Principles of State Policy, Fundamental Duties, Amendment of the constitutional powers and procedures.

UNION GOVERNMENT

Union Government: Union Government, Union Legislature (Parliament), Lok Sabha and Rajya Sabha (with powers and functions), president of India (with powers and functions), Prime minister of India (With powers and functions), Union judiciary (Supreme court), Jurisdiction of the supreme court.

STATE GOVERNMENT

State Government: State Government, State legislature (Legislative Assembly/ Vidhan Sabha, Legislative council/ Vidhan parishad), powers and functions of the state legislature, State executive, Governor of the state (with powers and functions), The chief Minister of the state (with powers and functions), State Judiciary (High courts)

ELECTION COMMISSION

Election Commission: Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners, State Election Commission: Role and Functioning, Institute and Bodies for the welfare of SC/ST/OBC and women.

TEXT BOOKS:

1. M.V. Pylee, Indian Constitution Durga Das Basu, Human Rights in Constitutional Law, Prentice – Hall of India Pvt. Ltd. New Delhi.
2. Noorani, A.G., (South Asia Human Rights Documentation Centre), Challenges to Civil Right), Challenges to Civil Rights Guarantees in India, Oxford University Press 2012
3. The constitution of India, P.M.Bakshi, Universal Law Publishing Co.,
4. The Constitution of India, 1950 (Bare Act), Government Publication.
5. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.

REFERENCES:

1. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
2. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.
3. H.M.Sreevai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication)
4. nptel.ac.in/courses/109104074/8
5. nptel.ac.in/courses/109104045/
6. [nptel.ac.in/courses/101104065/ 4.](http://nptel.ac.in/courses/101104065/4)
7. www.hss.iitb.ac.in/en/lecture-details
8. www.iitb.ac.in/en/event/2nd-lecture-institute-lecture-series-indian-constitution

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