MUTHAYAMMAL ENGINEERING COLLEGE

(An Autonomous Institution)

(Approved by AICTE, New Delhi, Accredited by NAAC, NBA & Affiliated to Anna University)

Rasipuram - 637 408, Namakkal Dist., Tamil Nadu.

Estd. 2000

Programme Code : CY

Programme Name : B.E-Computer Science & Engineering(Cyber Security)

Regulation : R-2021

MUTHAYAMMAL ENGINEERING COLLEGE

(An Autonomous Institution)

(Approved by AICTE, Accredited by NAAC & NBA, Affiliated to Anna University)

Rasipuram - 637 408, Namakkal Dt, Tamil Nadu.

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Rasipuram - 637 408, Namakkal Dist., Tamil Nadu

Estd. 2000

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING (CYBER SECUITY)

VISION

To educate and prepare technocrats in Cyber Security with global standard

MISSION

M1: To prepare the students with excellence and ethics in Cyber Security

M2: To inculcate of life learning through best practice

M3: To excel in academic and research through innovation

Program Educational Objectives (PEOs)

PEO1: Graduates will be able to exhibit as Cyber Security Professional in global standard

PEO2: Graduates will be able to successfully adapt to new technologies, tools and methodologies for career development

PEO3: Graduates will be able to provide technical leadership and service to their business, profession and society

Program Specific Outcomes (PSOs)

PSO1: Graduates should be able to analyze and resolve security issues in networks and computer systems to secure an IT infrastructure

PSO2: Graduates should be able to recognize professional responsibilities and computing practice based on legal and ethical principles

PSO3: Graduates should be able to develop policies and procedures to manage enterprise security risk.

Program Outcome (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.

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Rasipuram- 637408, Namakkal Dist. Tamil Nadu

B.E - COMPUTER SCIENCE & ENGINEERING (CYBER SECURITY)

GROUPING OF COURSES

1. Humanities and Social Sciences (HS)

S. No.	Course Code	CourseTitle	Category	Contact Hours	Instruction Hours/Week			C
					L	T	P	
1.	21HSS01	Business English	HS	2	2	0	0	2
2.	21HSS02	English Communicative Skills Laboratory	HS	2	0	0	2	1
3.	21HSS03	Life Skill and Work Place Psychology	HS	2	2	0	0	2
4.	21HSS04	Technical English For Engineers	HS	2	2	0	0	2
5.	21HSS05	Communicative English for Engineers	HS	2	2	0	0	2
6.	21HSS06	Basics of Japanese Language	HS	2	2	0	0	2
7.	21HSS07	Basics of French Language	HS	2	2	0	0	2
8.	21HSS08	Professional Ethics and Human Values	HS	3	3	0	0	3

2. Basic Sciences (BS)

S. No.	Course Code	CourseTitle	Category	Contact Hours	Instruction Hours/Week			C
					L	T	P	
1.	21BSS01	Engineering Physics	BS	3	3	0	0	3
2.	21BSS02	Physics and Chemistry Laboratory	BS	2	0	0	2	1
3.	21BSS03	Bio and Nanomaterial's Sciences	BS	3	3	0	0	3
4.	21BSS04	Material Sciences	BS	3	3	0	0	3
5.	21BSS05	Physics for Mechanical Engineers	BS	3	3	0	0	3
6.	21BSS11	Engineering Chemistry	BS	3	3	0	0	3
7.	21BSS12	Environmental Science and Engineering	BS	3	3	0	0	3
8.	21BSS13	Organic Chemistry	BS	3	3	0	0	3
9.	21BSS14	Physical Chemistry	BS	3	3	0	0	3

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10.	21BSS15	Applied Chemistry	BS	3	3	0	0	3
11.	21BSS16	Organic Chemistry Laboratory	BS	2	0	0	2	1
12.	21BSS17	Physical Chemistry Laboratory	BS	2	0	0	2	1
13.	21BSS21	Algebra and Calculus	BS	4	3	1	0	4
14.	21BSS22	Differential Equations and Vector Analysis	BS	4	3	1	0	4
15.	21BSS23	Transform and Partial DifferentialEquations	BS	4	3	1	0	4
16.	21BSS24	Discrete Mathematics	BS	4	3	1	0	4
17.	21BSS25	Statistical and Queuing Model	BS	4	3	1	0	4
18.	21BSS26	Numerical Methods	BS	4	3	1	0	4
19.	21BSS27	Probability and Random Processes	BS	4	3	1	0	4
20.	21BSS28	Statistic and Numerical Methods	BS	4	3	1	0	4

3. General Engineering Science (GES)

Sl. No.	Course Code	CourseTitle	Category	Contact Hours	Instruction Hours/Week			C
					L	T	P	
1.	21GES01	Programming for Problem Solving Using C	GES	3	3	0	0	3
2.	21GES02	Programming for Problem Solving Technique	GES	3	3	0	0	3
3.	21GES03	Programming in C Laboratory	GES	2	0	0	2	1
4.	21GES04	Programming in C and Python Laboratory	GES	2	0	0	2	1
5.	21GES05	Electrical and Electronic Sciences	GES	3	3	0	0	3
6.	21GES06	Mechanical and Building Sciences	GES	3	3	0	0	3
7.	21GES07	Computer Aided Drafting Laboratory	GES	2	0	0	2	1
8.	21GES08	Python Programming	GES	3	3	0	0	3
9.	21GES09	Programming in Python Laboratory	GES	2	0	0	2	1
10.	21GES10	Soft Skills Laboratory	GES	2	0	0	2	1
11.	21GES11	Electronic Devices	GES	3	3	0	0	3
12.	21GES12	Electronic Simulation Laboratory	GES	2	0	0	2	1
13.	21GES13	Electric Circuits	GES	3	2	1	0	3
14.	21GES14	Electric Circuits Laboratory	GES	2	0	0	2	1
15.	21GES15	Manufacturing Process	GES	3	3	0	0	3
16.	21GES16	Manufacturing Process Laboratory	GES	2	0	0	2	1
17.	21GES17	Mechanical and Building Sciences Laboratory	GES	2	0	0	2	1

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18.	21GES18	Construction Materials	GES	3	3	0	0	3
19.	21GES19	Concepts in Product Design	GES	3	3	0	0	3
20.	21GES20	Renewable Energy Sources	GES	3	3	0	0	3
21.	21GES21	Electrical Drives and Control	GES	3	3	0	0	3
22.	21GES22	Electrical Drives and Control Laboratory	GES	2	0	0	2	1
23.	21GES23	Analog and Digital Communication	GES	3	3	0	0	3
24.	21GES24	Digital Principles and System Design	GES	3	3	0	0	3
25.	21GES25	Digital Principles and System Design Laboratory	GES	2	0	0	2	1
26.	21GES26	Engineering Drawing	GES	5	1	0	4	3
27.	21GES27	Engineering Geology	GES	3	3	0	0	3
28.	21GES28	Engineering Mechanics	GES	4	3	1	0	4
29.	21GES29	Wireless Communication	GES	3	3	1	0	3
30.	21GES30	Electronics and Microprocessor	GES	3	3	0	0	3
31.	21GES31	Electronics and Microprocessor Laboratory	GES	2	0	0	2	1
32.	21GES32	Data Structures using Python	GES	3	3	0	0	3

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4. Professional Core (PC)

Sl. No.	Course Code	CourseTitle	Category	Contact Hours	Instruction Hours/Week			C
					L	T	P	
1.	21CYC01	Data Structures	PCC	3	3	0	0	3
2.	21CYC02	Data Structures Laboratory	PCC	2	0	0	2	1
3.	21CYC03	Object Oriented Programming using JAVA	PCC	3	3	0	0	3
4.	21CYC04	Object Oriented Programming using JAVA Laboratory	PCC	2	0	0	2	1
5.	21CYC05	Computer Networks	PCC	3	3	0	0	3
6.	21CYC06	Computer Organization and Architecture	PCC	3	3	0	0	3
7.	21CYC07	Database Management Systems	PCC	3	3	0	0	3
8.	21CYC08	Database Management Systems Laboratory	PCC	2	0	0	2	1
9.	21CYC09	Cryptography and Network Security	PCC	3	3	0	0	3
10.	21CYC10	Cryptography and Network security Laboratory	PCC	2	0	0	2	1
11.	21CYC11	Operating Systems	PCC	3	3	0	0	3
12.	21CYC12	Operating Systems Laboratory	PCC	2	0	0	2	1
13.	21CYC13	Information security	PCC	3	3	0	0	3
14.	21CYC14	Digital Forensics	PCC	3	3	0	0	3
15.	21CYC15	Introduction to Cyber Laws	PCC	3	3	0	0	3
16.	21CYC16	Cyber Crime Investigations and Digital Forensics	PCC	3	3	0	0	3
17.	21CYC17	Cloud Computing	PCC	3	3	0	0	3
18.	21CYC18	Cloud Computing Laboratory	PCC	2	0	0	2	1
19.	21CYC19	Web and mobile application security	PCC	3	3	0	0	3
20.	21CYC20	Web and mobile application Laboratory	PCC	2	0	0	2	1
21.	21CYC21	Wireless sensor network security	PCC	3	3	0	0	3
22.	21CYC22	Wireless sensor network Laboratory	PCC	2	0	0	2	1
23.	21CYC23	Forensic Analysis Tools	PCC	3	3	0	0	3
24.	21CYC24	Forensic Analysis Tools Laboratory	PCC	2	0	0	2	1
25.	21CYC25	Data Base Security	PCC	3	3	0	0	3
26.	21CYC26	Data Base Security Laboratory	PCC	2	0	0	2	1
27.	21CYC27	Cyber Defense	PCC	3	3	0	0	3
28.	21CYC28	Risk Management	PCC	3	3	0	0	3
29.	21CYC29	Intrusion Detection and Prevention System	PCC	3	3	0	0	3

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30.	21CYC30	Intrusion Detection and Prevention System Laboratory	PCC	3	3	0	0	3
31.	21CYC31	Software Engineering	PCC	3	3	0	0	3
32.	21CYC32	Object Oriented Programming	PCC	3	3	0	0	3
33.	21CYC33	Object Oriented Programming Laboratory	PCC	2	0	0	2	1
34.	21CYC34	Design and Analysis of Algorithms	PCC	3	3	0	0	3
35.	21CYC35	Design and Analysis of Algorithms Laboratory	PCC	2	0	0	2	1
36.	21CYC36	Block chain Technology	PCC	3	3	0	0	3
37.	21CYC37	Mobile Communication	PCC	3	3	0	0	3
38.	21CYC38	Internet of Things	PCC	3	3	0	0	3
39.	21CYC39	Internet of Things Laboratory	PCC	2	0	0	2	1
40.	21CYC40	Artificial Intelligence	PCC	3	3	0	0	3
41.	21CYC41	Principles of Compiler Design	PCC	3	3	0	0	3
42.	21CYC42	Compiler Design Laboratory	PCC	2	0	0	2	1
43.	21CYC43	Data warehousing and Data Mining	PCC	3	3	0	0	3
44	21CYC44	Machine Learning	PCC	3	3	0	0	3
45	21CYC45	Cyber Laws and Ethics	PCC	3	3	0	0	3
46	21CYC46	Virtualization and Cloud Security	PCC	3	3	0	0	3
47	21CYC47	Foundation on Computer Security	PCC	3	3	0	0	3

5. Professional Elective (PE)

Sl. No.	Course Code	CourseTitle	Category	Contact Hours	Instruction Hours/Week			C
					L	T	P	
1.	21CYE01	C# and .Net Framework	PEC	3	3	0	0	3
2.	21CYE02	Software Project Management	PEC	3	3	0	0	3
3.	21CYE03	Salesforce CRM and Platform	PEC	3	3	0	0	3
4.	21CYE04	Salesforce CRM and Platform Laboratory	PEC	2	0	0	2	1
5.	21CYE05	Biometric Systems & Biometric Image Process	PEC	3	3	0	0	3
6.	21CYE06	AWS Academy Cloud Developing	PEC	3	3	0	0	3
7.	21CYE07	AWS Academy Cloud Developing Laboratory	PEC	2	0	0	2	1

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8.	21CYE08	AWS Academy Cloud Architecting	PEC	3	3	0	0	3
9.	21CYE09	AWS Academy Cloud Architecting Laboratory	PEC	2	0	0	2	1
10.	21CYE10	AWS Academy Cloud Foundation	PEC	3	3	0	0	3
11.	21CYE11	AWS Academy Cloud Foundation Laboratory	PEC	2	0	0	2	1
12.	21CYE12	Ethical Hacking And Cyber Forensics	PEC	3	3	0	0	3
13.	21CYE13	Ethical hacking Laboratory	PEC	2	0	0	2	1
14.	21CYE14	Computer Forensics Analysis&Investigation	PEC	3	3	0	0	3
15.	21CYE15	Computer Forensics Laboratory	PEC	2	0	0	2	1
16.	21CYE16	Semantic Web	PEC	3	3	0	0	3
17.	21CYE17	Network Programming and Management	PEC	3	3	0	0	3
18.	21CYE18	Business Intelligence	PEC	3	3	0	0	3
19.	21CYE19	Wireless Sensor Networks	PEC	3	3	0	0	3
20.	21CYE20	Information Retrieval Techniques	PEC	3	3	0	0	3
21.	21CYE21	Service Oriented Architecture	PEC	3	3	0	0	3
22.	21CYE22	Agile Technology	PEC	3	3	0	0	3
23.	21CYE23	Social Network Analysis	PEC	3	3	0	0	3
24.	21CYE24	Game Programming	PEC	3	3	0	0	3
25.	21CYE25	Natural Language Processing	PEC	3	3	0	0	3
26.	21CYE26	Big data Analytics	PEC	3	3	0	0	3
27.	21CYE27	Ad hoc and Sensor Networks	PEC	3	3	0	0	3
28.	21CYE28	Management Information System	PEC	3	3	0	0	3
29.	21CYE29	Software Quality Assurance	PEC	3	3	0	0	3
30.	21CYE30	Bioinformatics	PEC	3	3	0	0	3
31.	21CYE31	Docker and Kubernetes	PEC	3	3	0	0	3
32.	21CYE32	Open Stack Essentials	PEC	3	3	0	0	3
33.	21CYE33	User Centric Design	PEC	3	3	0	0	3
34.	21CYE34	Software Testing	PEC	3	3	0	0	3
35.	21CYE35	Soft computing	PEC	3	3	0	0	3

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36.	21CYE36	Real Time Systems	PEC	3	3	0	0	3
37.	21CYE37	Communication Security and Encryption	PEC	3	3	0	0	3
38.	21CYE38	High Speed Networks	PEC	3	3	0	0	3
39	21CYE39	Malware Analysis	PEC	3	3	0	0	3
40	21CYE40	IT Security Engineering	PEC	3	3	0	0	3
41	21CYE41	Ethical Hacking and Brute Force Attack	PEC	3	3	0	0	3
42	21CYE42	Information Security Management	PEC	3	3	0	0	3
43	21CYE43	Network Troubleshooting Tools	PEC	3	3	0	0	3
44	21CYE44	Secure Interconnecting systems	PEC	3	3	0	0	3
45	21CYE45	Statistics and analytics using R Programming	PEC	3	3	0	0	3
46	21CYE46	Compiler Design	PEC	3	3	0	0	3
47	21CYE47	Theory of Computation	PEC	3	3	0	0	3

6. Employability Enhancement Courses (EEC)

Sl. No.	Course Code	CourseTitle	Category	Contact Hours	Instruction Hours/Week			C
					L	T	P	
1.	21CYP01	Project Work Phase I	EEC	6	0	0	6	5
2.	21CYP02	Project Work Phase II	EEC	18	0	0	12	10
3.	21CYP03	Design Project	EEC	4	0	2	2	2
4.	21CYP04	Technical Seminar	EEC	4	0	4	0	2
5.	21CYP05	Entrepreneurship Development	EEC	3	3	0	0	3
6.	21CYP06	Professional Practices	EEC	6	0	0	6	3
7.	21CYM01	NPTEL- Internetwork Security	Mandatory Course	-	-	-	-	-
8.	21CYM02	NPTEL- Systems and Usable Security	Mandatory Course	-	-	-	-	-
9.	21CYM03	NPTEL- Multicore Computer Architecture Storage and Interconnects	Mandatory Course	-	-	-	-	-
10.	21CYM04	NPTEL-Computer Networks and Internet Protocol	Mandatory Course	-	-	-	-	-

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11	21CYM05	NPTEL-Software Testing	Mandatory Course	-	-	-	-	-
12.	21CYA01	Indian Constitution	Audit Course	-	-	-	-	-
13.	21CYA02	Value Education	Audit Course	-	-	-	-	-
14.	21CYA03	Disaster Management	Audit Course	-	-	-	-	-
15.	21CYA04	Pedagogy Studies	Audit Course	-	-	-	-	-
16.	21CYA05	Stress Management by Yoga	Audit Course	-	-	-	-	-

7. Open Electives (OE)

Sl. No.	Course Code	CourseTitle	Category	Contact Hours	Instruction Hours/Week			C
					L	T	P	
1.	21MEE07	Industrial Automation Robotics	OEC	3	3	0	0	3
2.	21ITC28	Web Development using Angular and Bootstrap	OEC	3	3	0	0	3
3.	21MEC26	Total Quality Management	OEC	3	3	0	0	3
4.	21ECE06	Telecommunication Switching Networks	OEC	3	3	0	0	3
5.	21ECE08	Mobile Ad-Hoc Networks	OEC	3	3	0	0	3
6.	21ADC26	Data & Information Security	OEC	3	3	0	0	3
7.	21CEE05	Health Monitoring of Structures	OEC	3	3	0	0	3

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Department	Computer Science & Engineering (Cyber Security)
Programme	B.E

SEMESTER–I

Sl. No.	Course Code	CourseName	Category	Hours/Week			Credit	Contact Hrs
				L	T	P	C	
1.	21HSS01	Business English	HS	2	0	0	2	2
2.	21BSS01	Engineering Physics	BS	3	0	0	3	3
3.	21BSS11	Engineering Chemistry	BS	3	0	0	3	3
4.	21BSS21	Algebra and Calculus	BS	3	1	0	4	4
5.	21GES01	Programming for Problem Solving Using C	GES	3	0	0	3	3
6.	21GES06	Mechanical and Building Sciences	GES	3	0	0	3	3
PRACTICAL								
7.	21HSS02	English Communicative Skills Laboratory	HS	0	0	2	1	2
8.	21BSS02	Physics and Chemistry Laboratory	BS	0	0	2	1	2
9.	21GES03	Programming in C Laboratory	GES	0	0	2	1	2
		Total Credits					**21**	

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Department	Computer Science & Engineering (Cyber Security)
Programme	B.E

SEMESTER–II

Sl. No.	Course Code	CourseName	Category	Hours/Week			Credit	Contact Hrs
				L	T	P	C	
1	21HSS03	Life Skill and Work Place Psychology	HS	2	0	0	2	2
2.	21BSS12	Environmental Science and Engineering	BS	3	0	0	3	3
3.	21BSS22	Differential Equations and Vector Analysis	BS	3	1	0	4	4
4.	21BSS03	Bio and Nano materials Sciences	BS	3	0	0	3	3
5.	21GES19	Concepts in Product Design	GES	3	0	0	3	3
6.	21GES08	Python Programming	GES	3	0	0	3	3
PRACTICAL								
7.	21GES09	Programming in Python Laboratory	GES	0	0	2	1	2
8.	21GES10	Soft Skills Laboratory	GES	0	0	2	1	2
		Total Credits					**20**	

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Department	Computer Science & Engineering (Cyber Security)
Programme	B.E

SEMESTER–III

Sl. No.	Course Code	CourseName	Category	Hours/Week			Credit	Contact Hrs
				L	T	P	C	
1.	21BSS23	Transform and Partial Differential Equations	BS	3	1	0	4	4
2.	21GES24	Digital Principles and System Design	GES	3	0	0	3	3
3.	21CYC47	Foundation on Computer Security	PCC	3	0	0	3	3
4.	21CYC01	Data Structures	PCC	3	0	0	3	3
5.	21CYC03	Object Oriented Programming using JAVA	PCC	3	0	0	3	3
6.	21CYC05	Computer Networks	PCC	3	0	0	3	3
PRACTICAL								
7.	21GES25	Digital Principles and System Design Laboratory	GES	0	0	2	1	2
8.	21CYC02	Data Structures Laboratory	PCC	0	0	2	1	2
9.	21CYC04	Object Oriented Programming using JAVA Laboratory	PCC	0	0	2	1	2
Total Credits							22	

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SEMESTER–IV

Sl. No.	Course Code	CourseName	Category	Hours/Week			Credit	Contact Hrs
				L	T	P	C	
1.	21BSS24	Discrete Mathematics	BS	3	1	0	4	4
2.	21CYC07	Database Management Systems	PCC	3	0	0	3	3
3.	21CYC09	Cryptography and Network Security	PCC	3	0	0	3	3
4.	21CYC11	Operating Systems	PCC	3	0	0	3	3
5.	21CYC13	Information Security	PCC	3	0	0	3	3
6.	21CYC15	Introduction to Cyber Laws	PCC	3	0	0	3	3
PRACTICAL								
7.	21CYC08	Database Management Systems Laboratory	PCC	0	0	2	1	2
8.	21CYC10	Cryptography and Network Security Laboratory	PCC	0	0	2	1	2
9.	21CYC12	Operating Systems Laboratory	PCC	0	0	2	1	2
Total Credits							22	

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Rasipuram, Namakkal Dist 637 408.

	MUTHAYAMMAL ENGINEERING COLLEGE (Approved by AICTE & Affiliated to Anna University), RASIPURAM–637408	CURRICULUM UGR-2021

Department	Computer Science & Engineering (Cyber Security)
Programme	B.E

SEMESTER–V

Sl. No.	Course Code	CourseName	Category	Hours/Week			Credit	Contact Hrs
				L	T	P	C	
1.	21CYC45	Software Engineering	PCC	3	0	0	3	3
2.	21CYC16	Cyber Crime Investigations and Digital Forensics	PCC	3	0	0	3	3
3.	21CYC38	Internet of Things	PCC	3	0	0	3	3
4.	21CYC44	Machine Learning	PCC	3	0	0	3	3
5.	21CYE10	Elective – I AWS Academy Cloud Foundation	PEC	3	0	0	3	3
6	NPTEL	Google Cloud Computing Foundation	Mandatory course	-	-	-	-	-
PRACTICAL								
6	21CYC39	Internet of Things Laboratory	PCC	0	0	2	1	2
7	21CYE11	Elective – I AWS Academy Cloud Foundation Laboratory	PEC	0	0	2	1	2
		Total Credits					17	

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Department	Computer Science & Engineering (Cyber Security)
Programme	B.E

SEMESTER–VI

Sl. No.	Course Code	CourseName	Category	Hours/Week			Credit	ContactHrs
				L	T	P	C	
1.	21CYC29	Intrusion Detection and Prevention System	PCC	3	0	0	3	3
2.	21CYC19	Web and Mobile Application Security	PCC	3	0	0	3	3
3.	21CYC36	Blockchain Technology	PCC	3	0	0	3	3
4.		Elective-III	PEC	3	0	0	3	3
5.		Elective-IV	PEC	3	0	0	3	3
6.		Open Elective-I	OEC	3	0	0	3	3
PRACTICAL								
7.	21CYP03	Design Project	EEC	0	2	2	2	4
8.	21CYC24	Intrusion Detection and Prevention System Laboratory	PCC	0	0	2	1	2
9.	21CYC26	Web and Mobile Application Security Laboratory	PCC	0	0	2	1	2
		Total Credits					22	

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Department	Computer Science & Engineering (Cyber Security)
Programme	B.E

SEMESTER–VII

Sl. No.	Course Code	CourseName	Category	Hours/Week			Credit	ContactHrs
				L	T	P	C	
1.	21HSS08	Professional Ethics and Human Values	HS	3	0	0	3	3
2.	21CYC40	Artificial Intelligence	PCC	3	0	0	3	3
3.	21CYE37	Communication Security and Encryption	PEC	3	0	0	3	3
4.	21ADC26	Data and Information Security	PEC	3	0	0	3	3
5.	21MEE07	Industrial Automation & Robotics	OEC	3	0	0	3	3
6.	NPTEL	Software Engineering	Mandatory course	-	-	-	-	-
PRACTICAL								
7.	21CYP01	Project Work–Phase-I	EEC	0	0	6	5	6
Total Credits							20	

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Department	Computer Science & Engineering (Cyber Security)
Programme	B.E

SEMESTER–VIII

Sl. No.	Course Code	CourseName	Category	Hours/Week			Credit	Contact Hrs
				L	T	P	C	
1.		MandatoryCourse(NPTEL)	-	-	-	-	-	-
PRACTICAL								
2.	21CYP02	Project work-Phase-II	EEC	0	0	12	10	18
Total Credits							10	

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COURSE COMPONENT SUMMARY

S.No.	Subject Area	CreditsPerSemester								Credits total	Percentage Credits
		I	II	III	IV	V	VI	VII	VIII		
1.	HS	3	2					3		8	5
2.	BS	11	10	4						25	15.62
3.	GES	7	8	4	4					26	16.25
4.	PCC			14	18	13	11	3		56	35
5.	PEC					8	6	6		20	12.5
6.	EEC						2	5	10	17	10.62
7.	OEC						3	6		9	5.62
TOTAL		**21**	**20**	**22**	**22**	**21**	**22**	**23**	**10**	**161**	

Total Credits: 16

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21HSS01 - BUSINESS ENGLISH

L	T	P	C
2	0	0	2

COURSE OBJECTIVES

- To make effective communication in business situations.
- To use English accurately, appropriately and fluently in different situations (academic, social and professional) and familiarize themselves with all speech sounds in English
- To inculcate the effective email writing skills for better business communication.
- To ensure that learners to understand the fundamentals of Business writing and interviews.
- To prepare for and participate in presentations on business topics.

COURSE OUTCOMES

- Execute strategies to become a successful employee or employer in the workplace.
- Write cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic.
- Execute to use electronic technology in business communication
- Exemplify lectures, talks and interviews on business topics delivered by authentic business specialists
- Choose phrases and sentences clearly during their presentation and communication.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-
CO2	-	-	-	-	-	-	-	-	-	X	-	X	-	-	-
CO3	-	-	-	-	-	-	-	-	-	X	-	X	-	-	-
CO4	-	-	-	-	-	-	-	X	X	X	X	X	-	-	-
CO5	-	-	-	-	-	-	-	X	X	X	X	-	-	-	-

UNIT I COMMUNICATION AND BUSINESS ENGLISH 6

Communication - Objectives - Importance - Process of Communication - Barriers to Communication - Effective Communication - Text about Business- Business Operations - Conversation - Situational Role Play - between examiner and candidate, teacher and student, customer and sales manager, hotel manager and organizer, team leader and team member, - Reading Comprehension (Reading short passages and answering multiple choice and open-ended questions)

UNIT II GRAMMAR & VOCABULARY 6

Phrases & Clauses - Kinds of Sentences - Sentence Patterns - GRE Vocabulary - Prefix & Suffix - Synonyms - Antonyms - Word Formation - Error Spotting - Idioms and Phrases - 'If' Conditionals - Numerical Expressions

UNIT III WRITING CV AND LETTER OF APPLICATION 6

Writing for communicative purposes [Letters - Official and Personal, Messages / Notices, Reports, Emails, Advertisements - Application for a job (covering letter and CV) - Creative Writing
(Stories, Poems, Dialogues) - Academic Writing [Paragraphs, Essays]

UNIT IV JOB INTERVIEWS AND RECRUITMENT 6

Job Interviewing - Appearance and Body language - Attending Interviews - Public Speaking - Overcome Nervousness- Listening to different kinds of Interviews (face-to-face, radio, TV and telephone interviews) - Recruitment

UNIT V PRESENTATION AND GRAMMAR USAGE 6

Presentation - Types and Importance of Presentation - First Impressions in Presentations - Simple Present, Past and Future - Standards of Punctuation - Subject-Verb Agreement

TOTAL HOURS: 30

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Lesikar, Bamford	Basic Business Communication"	1st Canadian Edition (IRWIN DORSEY), Von Hoffmann Press,	1993
2.	Simon Sweeney	English For Business	Cambridge University Press	2008

REFERENCE BOOKS:

SL.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Mindscapes	English For Technologists and Engineers	Department of English, Anna University, Chennai,	2012
2.	Rutherford, Andrea.	J Basic Communication Skills for Technology.	Pearson New Delhi.	2001
3.	Viswamohan, Aysha.	English for Technical Communication	Tata McGraw-Hill, New Delhi.	2008
4.	Aspinall Tricia, Bethell George.	Test your Business Vocabulary in Use.	Cambridge University Press	2003
5.	Cambridge ESOL.	BEC 1, 3.	Cambridge University Press,	2001

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21HSS02- COMMUNICATIVE ENGLISH PRACTICES LABORATORY

L	T	P	C
0	0	2	1

COURSE OBJECTIVES

- To instill the basic communication concepts to enhance students' communication skills through various lab sessions.
- To understand the importance of listening and speaking in language acquisition process
- To speak English accurately, appropriately and fluently in different situations (academic, social and professional) and familiarize themselves with all speech sounds in English
- To help students develop the ability to communicate effectively in spoken English and develop their soft skills and interpersonal skills.
- To increase employability by developing students' communication skills in English.

COURSE OUTCOMES

- Speak clearly, confidently, comprehensibly, and communicate with one or many listeners using appropriate communicative strategies.
- Understand the basic narrative techniques to converse confidently and comprehensibly.
- Write cohesively and flawlessly by avoiding grammatical errors and organizing their ideas logically.
- Comprehend different spoken discourses/excerpts in different accents during presentation
- Communicate with others confidently in interviews.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	X	X	X	-	X	-	-	-
CO2	-	-	-	-	-	-	-	-	X	X	-	X	-	-	-
CO3	-	-	-	-	-	-	-	-	-	X	-	X	-	-	-
CO4	-	-	-	-	-	-	-	X	X	X	-	X	-	-	-
CO5	-	-	-	-	-		-	X	X	X	-	X	-	-	-

UNIT I FORMAL & INFORMAL CONVERSATION PRACTICE

Role Play conversations - With family members, neighbors, friends, relatives etc. Simple expressions - agreeing / disagreeing, persuading, wishing, consoling, advising, arguing, expressing opinions etc.- Professional dialogues with superiors - Conversation with different professionals in government and corporate Offices, Official Meetings, educational Institutions, (At the railway junction, malls, post office, bank) etc- every day usage of English.

UNIT II ORAL REVIEW, RADIO SHOW & NARRATIVE TECHNIQUES

Oral review of books - Presentation of various radio programs like news, announcements, advertisements, entertainment programs etc. as a team activity. Understanding the basic narrative techniques - Narrating short stories. Narrating real life experiences, Interpretation of charts, tables, graphs.

UNIT III RESUME / LETTER WRITING

Preparation of Resume - Structure - Types of resume - Writing the Vision Statement - Objectives - Types of Letter - Job Application - accepting / declining a Job offer.

UNIT IV PRESENTATION SKILLS & GROUP DISCUSSION

Elements of Effective Presentation - Structure of a Presentation - Speech Acts - Effective use to Presentation Tools - Audience Analysis - Preparing the PPT slides - Video samples- Importance of GD – in the selection process - Structure of a GD - Moderator - led and other GDs - Strategies in GD – Team work - Body Language - Mock GD - Video samples

UNIT V INTERVIEW SKILLS

Kinds of Interviews – One to one, Group interview, Telephone interview, Online interview, Stress interview - Required Skills – Corporate culture – Mock interviews-Video samples.

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Sobana.S, Manivannan.R and Immanuel. G,	Communication and Soft Skills	VK Publications, Sivakasi.	2016

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Anderson, P.V.	Technical Communication	Thomson Edition, New Delhi	2007
2.	Rizvi, Ashraf. M	Effective Technical Communication	Tata McGraw-Hill, New Delhi	2005
3.	Dutt, Kiranmai P and Geetha Rajeevan	Basic Communication Skills .	Foundation Books, New Delhi.	2007

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21HSS03 - LIFE SKILLS AND WORKPLACE PSYCHOLOGY

L	T	P	C
2	0	0	2

COURSE OBJECTIVES

- To inculcate critical thinking process and to prepare them on problem solving skills.
- To enable learners to perform in a team.
- To learn leadership qualities and practice them.
- To make the learners to use grammar error free sentences.
- To introduce the essentials of psychology at workplace and gain insights about work place behavior.

COURSE OUTCOMES

- Able to think critically on a particular problem.
- Implement of good performance in a team.
- Turn into an effective leader.
- Write cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic.
- Execute their knowledge in psychology in the process of employment.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	X	-	X	-	X	-	-	-
CO2	-	-	-	-	-	-	-	-	X	X	-	X	-	-	-
CO3	-	-	-	-	-	-	-	-	X	X	-	X	-	-	-
CO4	-	-	-	-	-	-	-	-	-	X	-	X	-	-	-
CO5	-	-	-	-	-		-	X	X	X	-	X	-	-	-

UNIT I LIFE SKILLS & THINKING SKILLS 6

Life Skills based education, Creativity, Lateral thinking, Critical thinking, Multiple Intelligence, Problem Solving, Six thinking hats of Mind Mapping & Analytical Thinking.

UNIT II TEAMWORK 6

Group Vs Teams, Team or Group Formation Process, Group Dynamics, Managing Team Performance & Team Conflicts.

UNIT III LEADERSHIP SKILLS 6

Leadership, Qualities of a leader, Levels of Leadership, Types of leadership, Professional Etiquette.

UNIT IV GRAMMAR & VOCABULARY 6

Single Word substitutes – Verb patterns- – Voices – comparative Adjectives – Nominal Compounds – Articles – Use of Prepositions - Phrasal Verbs – British and American vocabulary – Abbreviations and Acronyms - Instructions – Recommendation- Use of Dialogue writing – Checklist.

UNIT V WORKPLACE PSYCHOLOGY 6

Nature and Development of Industrial/Work Psychology - Employee Selection Techniques, Fair Employment Practices- Biographical Information, Interviews, Job Analysis and its Types, - Interpreting Visual Information - Flow Chart, Pie Chart, (Transcoding).

TOTAL HOURS: 30

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1.	Lesikar, Bamford	Basic Business Communication"	1st Canadian Edition (IRWIN DORSEY), Von Hoffmann Press,	1993
2.	Simon Sweeney	English For Business	Cambridge University Press	2008

REFERENCE BOOKS:

SL.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Mindscapes	English For Technologists and Engineers	Department of English, Anna University, Chennai,	2012
2.	Rutherford, Andrea.	J Basic Communication Skills for Technology.	Pearson New Delhi.	2001
3.	Viswamohan, Aysha.	English for Technical Communication	Tata McGraw-Hill, New Delhi.	2008
4.	Aspinall Tricia, Bethell George.	Test your Business Vocabulary in Use.	Cambridge University Press	2003
5.	Cambridge ESOL.	BEC 1, 3.	Cambridge University Press,	2001

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21HSS04- TECHNICAL ENGLISH FOR ENGINEERS

L	T	P	C
2	0	0	2

COURSE OBJECTIVES

- To enable learners of Engineering and Technology develop their basic communication skills in English.
- To emphasize specially the development of speaking skills amongst learners of Engineering and Technology.
- To ensure that learners use the electronic media such as internet and supplement the learning materials used in the classroom.
- To inculcate the habit of reading and writing leading to effective and efficient communication.
- To make the learners to use the phrase and clauses error free.

COURSE OUTCOMES

- Speak clearly, confidently, comprehensibly, and communicate with one or many listeners using appropriate communicative strategies.
- Write cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic.
- Read different genres of texts adopting various reading strategies.
- listen/view and comprehend different spoken discourses/excerpts in different accents

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	X	-	X	-	-	-
CO2	-	-	-	-	-	-	-	-	-	X	-	X	-	-	-
CO3	-	-	-	-	-	-	-	X	X	X	-	X	-	-	-
CO4	-	-	-	-	-	-	-	X	-	X	-	X	-	-	-
CO5	-	-	-	-	-	-	-	-	-	X	-	X	-	-	-

UNIT I GRAMMAR & VOCABULARY 6

Word formation with prefixes and suffixes – synonyms and antonyms – verb patterns – tenses – voices – use of conditionals – comparative adjectives (affirmative and negative) – expanding– nominal compounds – articles – use of prepositions - phrasal verbs – British and American vocabulary.

UNIT II LISTENING 6

Extensive listening – listening for general content – listening to fill up gapped texts – intensive listening – listening for specific information: retrieval of factual information – listening to identify topic, context, function, speaker's opinion, attitude, etc. – global understanding skills and ability to infer, extract gist and understand main ideas

UNIT III SPEAKING 6

Verbal and nonverbal communication – speech sounds – syllables – word stress (structures and content words) – sentences stress – intonation – pronunciation drills, tongue twisters –developing confidence – introducing oneself – asking for or eliciting objects — giving instructions

UNIT IV READING 6

Exposure to different reading techniques – reading for gist and global meaning – predicting the content – text – identifying the topic sentence and its role in each paragraph – scanning – inferring / identifying lexical and contextual meanings – transfer of information / guided note-making – understanding discourse coherence – sequencing of sentences – cloze reading.

UNIT V WRITING 6

Introductions to the characteristics of technical style – writing definitions and descriptions –paragraph writing (topic sentence and its role, unity, coherence and use of cohesive expressions) – process description (use of sequencing connectives) – comparison and contrast – formal letter writing (letter to the editor, letter for seeking practical training, and letter for undertaking project works in industries)

TOTAL HOURS: 30

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Raman, Meenakshi & Sangeetha Sharma.	Technical Communication: Principles and Practice. Oxford University Press,	Oxford University Press, New Delhi.	2011
2	Rizvi, Ashraf. M.	Effective Technical Communication.	Tata McGraw-Hill, New Delhi.	2005

REFERENCE BOOKS:

Sl. No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Regional Institute of English	English for Engineers.	Cambridge University Press, New Delhi.	2006
2	Mindscapes	English For Technologists and Engineers	Department of English, Anna University, Chennai,	2012
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4	Viswamohan, Aysha.	English for Technical Communication.	Tata McGraw-Hill, New Delhi.	2008
5	Raman, Meenakshi & Sangeetha Sharma.	Technical Communication: Principles and Practice. Oxford University	Press, New Delhi.	2011

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21HSS05- COMMUNICATIVE ENGLISH FOR ENGINEERS

L	T	P	C
2	0	0	2

COURSE OBJECTIVES

- To understand the importance of listening and speaking in language acquisition process
- To engage in conversation intelligibly
- To use English accurately, appropriately and fluently in different situations (academic, Social and professional) and familiarize themselves with all speech sounds in English
- To write academic, communicative and creative pieces of writing
- To devise different tasks / methods to enhance their learners' communication skills

COURSE OUTCOMES

- Speak clearly, confidently, comprehensibly, and communicate with one or many listeners using appropriate communicative strategies.
- Write cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic.
- Read different genres of texts adopting various reading strategies.
- listen/view and comprehend different spoken discourses/excerpts in different accents

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	X	-	X	-	-	-
CO2	-	-	-	-	-	-	-	-	-	X	-	X	-	-	-
CO3	-	-	-	-	-	-	-	X	X	X	-	X	-	-	-
CO4	-	-	-	-	-	-	-	-	-	X	-	X	-	-	-
CO5	-	-	-	-	-	-	-	X	-	X	-	X	-	-	-

UNIT I GRAMMAR & VOCABULARY 6

Phrases & Clauses- Kinds of Sentences - Types of sentences and sentence patterns – GRE Vocabulary - Word Formation- Error Spotting- Sentence Correction- Word Analogy- Idioms and Phrases- Direct and Indirect Speech- 'If' Conditionals

UNIT II LISTENING 6

Listening processes: top-down and bottom-up skills - Listening strategies - Sounds of English: Consonants, vowels and diphthongs - Phonemic transcription, tongue twisters, words often mispronounced - Word stress and sentence stress: content words, structural words, strong forms, weak forms - Intonation patterns - Language functions : [Inviting-accepting/declining invitation - Offering /accepting/ refusing help - Thanking/ responding to thanks - Congratulating , Complimenting - Apologizing/ accepting an apology

UNIT III SPEAKING 6

Greeting - Introducing Oneself -Invitation - Making Request - Expressing Gratitude - Complimenting and Congratulating - Expressing Sympathy - Apologizing - Asking for Information - Seeking Permission - Complaining and Expressing Regret - Using English in Real Life Situation [At the Bank/ post office/ College office - At the Green Grocer - At the Temple - At the College Canteen or Restaurant - At the Police station - At the Railway Station/ Bus Station - At the Medical Shop - At the Library

UNIT IV READING 6

Importance of Reading - Why develop reading habits among students and How - Reading techniques [Skimming , Scanning , Intensive reading , Extensive] Reading different text types [Menu ,Email , Letters , Cartoons , Advertisements, Recipe , Articles , Literary texts – stories, plays, poems, Biographies] – identifying lexical and Contextual meaning- Understanding Discourse Coherence – sequencing of sentences

UNIT V WRITING 6

Developing Proficiency in Writing - Writing for communicative purposes [Letters – official and personal, Messages / Notices, Reports, Emails, Advertisements, Application for a job (covering letter and CV) - Creative Writing (Stories, Poems, and Dialogues)

TOTAL HOURS: 30

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2	Rizvi, Ashraf. M	Effective Technical Communication.	Tata McGraw-Hill New Delhi.	2005

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2	Dr.Gunasekaran,	Technical English Work Book.	Vishnu "Print Media, Krishna Publications	2011
3	Rutherford, Andrea.	J Basic Communication Skills for Technology.	Pearson, New Delhi.	2001
4	Viswamohan, Aysha.	English for Technical Communication.	Tata McGraw-Hill, New Delhi.	2008
5	Raman, Meenakshi & Sangeetha	Technical Communication: Principles and Practice.	Oxford University Press, New Delhi	2011

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21HSS06- BASICS OF JAPANESE LANGUAGE

L	T	P	C
2	0	0	2

COURSE OBJECTIVES

- To develop the reading skill of the students and to familiarize them with Japanese language.
- To instill the communication concepts and enhance the students' conversational skill through various practice sessions.
- To familiarize them with a variety of words and pronunciation.
- To develop the receptive skills such as listening, writing, reading and to make the students well-versed in speaking.
- To assist them in improving their vocabulary in Japanese.

COURSE OUTCOMES

- Learn and write Japanese alphabet.
- Develop their pronunciation skill in Japanese language.
- Enrich the vocabulary in Japanese language.
- Speak in Japanese at various occasions.
- Understand and communicate by constructing sentences.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	X	-	X	-	X	-	-	-
CO2	-	-	-	-	-	-	-	X	-	X	-	X	-	-	-
CO3	-	-	-	-	-	-	-	-	-	X	-	X	-	-	-
CO4	-	-	-	-	-	-	-	-	-	X	-	X	-	-	-
CO5	-	-	-	-	-	-	-	X	X	X	-	X	-	-	-

UNIT I INTRODUCTION OF JAPANESE LANGUAGE 6

Introduction about Japan - Japanese people - Language and their culture - Importance of Japanese Language Learning - Japanese writing system – Hiragana - Basic Hiragana syllables - Hiragana with Diacritical Marks - Hiragana words and pronunciation – Katakana - Basic Katakana syllables - Katakana with Diacritical Marks – Katakana words and pronunciation.

UNIT II BASIC WORDS 6

Japanese Greetings and daily expressions - Culture and Behavior of Japanese People and body language – bowing - Time of the day; calendar; counting using Japanese numerical classifiers.

UNIT III PHRASES & CLAUSES 6

Grammar - Sentence patterns and examples - Making Sentences – Present, Past and Future, Progressive & Perfect Tense - Time- Asking question for numbers and time - Telephone number practice - Translate English into Japanese practice - Describe each person using given cues – Self-Introduction about students -Time and Age making comparisons; talking of daily activities; giving and receiving; shopping; making requests.

UNIT IV BASIC TENSES 6

Grammar - Making Sentences – Present, Past and Future, Progressive & Perfect Tenses-verb and its forms- particles - pattern and examples -Adverbs - using frequency adverbs -Sentence making using time and verb with direct object - Translate English sentence to Japanese sentence - Making question sentence and answers.

UNIT - V KEY BELIEFS AND VALUES OF JAPANESE SOCIETY 6

Japanese social interaction - Harmony – Order - Self-development – the three of the most important values. Basic ideas about self and the nature of human society- several religious and philosophical traditions.

TOTAL HOURS: 30

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TEXT BOOKS:

SL.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	George Trombley , Yukari Takenaka	Japanese from Zero! 1: Proven Techniques to Learn Japanese for Students and Professionals Volume 1) 6th Edition	Bay Foreign Language Books Ltd,	2015
2	Helen Gilhooly	Complete Japanese	John Murray Press	November 12, 2010

REFERENCE BOOKS:

S.No	Author(s)	Title of the Book	Publisher	Year of Publication
1	Dr.Paul Pimsleur	Japanese Level 1 CD: Learn to Speak and Understand Japanese with Pimsleur Language Programs Pimsleur	Pimsleur 3rd edition (Comprehensive)	2002
2	Dr.Paul Pimsleur	Japanese Level 2 CD: Learn to Speak and Understand Japanese with Pimsleur Language Programs Pimsleur	Pimsleur; 3 edition	October 1, 2002
3	Dr.Paul Pimsleur	Japanese Level 3 CD: Learn to Speak and Understand Japanese with Pimsleur Language Programs Pimsleur	Pimsleur; 3 edition	October 1, 2002
4	Eriko Sato	Practice Makes Perfect Basic Japanese 1st Edition, McGraw-Hill Education	Pimsleur; 1 edition	April 1, 2014
5	Mr Tae K Kim,	A Guide to Japanese Grammar: A Japanese approach to learning Japanese grammar ,	Create Space Independent Publishing Platform	January23, 2014

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21HSS07-BASICS OF FRENCH LANGUAGE

L	T	P	C
2	0	0	2

COURSE OBJECTIVES

- To develop the reading skill of the students and to familiarize them with French language.
- To instill the communication concepts and enhance the students' conversational skill through various practice sessions.
- To familiarize them with a variety of words and pronunciation.
- To develop the receptive skills such as listening, writing, reading and to make the students well-versed in speaking.
- To assist them in improving their vocabulary in French.

COURSE OUTCOMES

- Learn and write French alphabet.
- Develop their pronunciation skill in French language.
- Enrich the vocabulary in French language.
- Speak in French at various occasions.
- Understand and communicate by constructing sentences.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	X	-	X	-	X	-	-	-
CO2	-	-	-	-	-	-	-	-	-	X	-	X	-	-	-
CO3	-	-	-	-	-	-	-	-	-	X	-	X	-	-	-
CO4	-	-	-	-	-	-	-	-	X	X	-	X	-	-	-
CO5	-	-	-	-	-	-	-	X	X	X	-	X	-	-	-

UNIT I BASIC GRAMMAR 6

Alphabets - Numbers 0-31 - Nouns - Definite articles - Indefinite articles - verbs - Greetings- adjectives - possessive adjectives - countries and nationality - months of the year

UNIT II BASIC VOCABULARY 6

Personality- dresses - colors - interests - adjectives: masculine / feminine - singular / plural - negation - regular verbs

UNIT III BASIC PHRASES 6

Time - days of the week - house - numbers 32-69 - irregular verbs: alley, faire, Pender - negation: ne.... jamais - questions - near future - pronominal verbs - pronoun: 'on'

UNIT IV SPEAKING 6

Name of dishes - shopping - at the restaurant - recipe - numbers: 70 - 1000 - portative articles: du, de la, de l', des - passé compose and negation - irregular past participles- preposition à + definite article

UNIT V CULTURE AND SOCIETY 6

Town – directions - public transport - preposition à/en + transport - irregular past participles - adverbs

TOTAL HOURS: 30

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TEXTBOOK:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Régine Mérieux and Yves Loiseau.	Connexions 1	Didier	2004
2.	Rosemary Schell	French for Beginners	Maanu Graphics	2013

REFERENCE BOOKS:

Sl. No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	R.de Roussy de Sales	French Verbs Drills 5th Edition	McGraw-Hill Education	2017
2.	Annie Heminway	Complete French Grammar	McGraw-Hill Education	2016
3.	David M.Srillman and Ronni L.Gordon	French Vocabulary Drills	McGraw-Hill Education	2014
4.	Frederic Bibard	Fluent in French	Talk in French	2016
5.	Gaelle Graham	Complete French	Teach Yourself	2010

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Course Code & Course Name	:	21HSS08- PROFESSIONAL ETHICS AND HUMAN VALUES	L	T	P	C
			3	0	0	3

Course Objectives

1.	To introduces about the ethics
2.	To understand about the various morals, and values for professional excellence.
3.	To know the different ideas of engineering ethics
4.	To understand about the various responsibilities and rights of professional.
5.	To make the students to understand and aware about global issues of ethics and its applicability

Course Outcomes

1.	Know the concept and importance of engineering ethics
2.	Aware about the overall ethical aspects of engineering
3.	Able to apply the ethics in engineering
4.	Insight the responsibility in this society
5.	Realize engineering ethical issues at global level

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
21HSS08.CO1	x	-	-	-	-	x	-	-	x	x	x	x	x	-	-
21HSS08.CO2	x	x	x	-	-	x	x	-	x	-	-	x	x	x	x
21HSS08.CO3	x	-	x	-	x	-	x	x	-	x	x	x	-	x	x
21HSS08.CO4	x	x	-	x	-	x	x	-	-	x	x	x	-	x	x
21HSS08.CO5	x	x	x	-	-	-	x	-	x	-	x	x	x	-	x

Unit-I : HUMAN VALUES	9

Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self-confidence – Character – Spirituality – Introduction to Yoga and meditation for professional excellence and stress management.

Unit-II : ENGINEERING ETHICS	9

Senses of 'Engineering Ethics' – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Models of professional roles - Theories about right action – Self-interest – Customs and Religion– Uses of Ethical Theories

Unit-III : ENGINEERING AS SOCIAL EXPERIMENTATION	9

Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law

Unit-IV : SAFETY, RESPONSIBILITIES AND RIGHTS	9

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk - Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination.

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Unit-V : GLOBAL ISSUES	9
Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors Moral Leadership –Code of Conduct – Corporate Social Responsibility.	
Total :	**45**

Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1	Mike W. Martin and Roland Schinzinger	Ethics in Engineering	Tata McGraw Hill, Fifth Edition	2003
2	Govindarajan M, Natarajan S, Senthil Kumar V. S	Engineering Ethics	Prentice Hall of India	2004

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1	Charles B. Fleddermann	Engineering Ethics	Pearson Prentice Hall	2004
2	Charles E. Harris, Michael S. Pritchard and Michael J. Rabins	Engineering Ethics – Concepts and Cases	Cengage Learning	2009
3	John R Boatright, "Ethics and the Conduct of Business	Ethics and the Conduct of Business	Pearson Education	2003
4	Edmund G Seebauer and Robert L Barry	Fundamentals of Ethics for Scientists and Engineers	Oxford University Press	2001
5	Laura P. Hartman and Joe Desjardins	Business Ethics: Decision Making for Personal	Mc Graw Hill education	2013

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21BSS01 ENGINEERING PHYSICS

L	T	P	C
3	0	0	3

COURSE OBJECTIVES

- To acquire the knowledge in acoustical engineering and ultrasonic
- To enrich the principles involved in laser technology and its applications
- To acquire the knowledge on applications of fiber optics
- To acquire the knowledge on classification and properties of different types of crystal structures
- To understand the concepts in elasticity and transfer of heat energy through materials

COURSE OUTCOMES (COS):

CO1 Implement the contemporary issues on acoustics and ultrasonic studies
CO2 Associate the properties of laser technology for engineering applications
CO3 Illustrate the types of optical fibers and its applications
CO4 Summaries the atomic structure in crystalline materials
CO5 Describe the elastic and thermal conductivity properties of materials

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	X	X	X	-	X	X	-	-	-	-	-	X	-	-	-
CO2	X	X	-	-	X	X	X	-	-	-	-	X	-	-	-
CO3	X	X	X	-	X	-	X	-	-	-	-	X	-	-	-
CO4	X	X	X	X	-	X	X	-	-	-	-	X	-	-	-
CO5	X	X	-	X	-	X	X	-	-	-	-	X	-	-	-

UNIT I ACOUSTICS AND ULTRASONICS 9

Introduction of acoustics – Classification of sound-Weber-Fechner law- Reverberation – Reverberation time – Factors affecting acoustics of building and its remedy - Absorption coefficient – Measurement of Absorption coefficient. Introduction– properties - Detection of ultrasonic waves, Magnetostriction effect - Magnetostriction generator – piezoelectric effect - piezoelectric generator— Cavitations - – SONAR - Non Destructive Testing – pulse echo system, through transmission and reflection modes.

UNIT II LASERS 9

Introduction – Principle of Spontaneous emission and stimulated emission. Population inversion - pumping methods. Einstein's A and B coefficients – derivation - Types of lasers – He-Ne, Nd-YAG, Semiconductor lasers (homojunction & heterojunction) - Industrial Applications - Lasers in welding, cutting, heat treatment – Medical applications - Holography (construction & reconstruction).

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UNIT III **FIBRE OPTICS AND ITS APPLICATIONS** **9**

Principle and propagation of light in optical fibers – Numerical aperture and Acceptance angle - Classification based on materials, refractive index profile – Double crucible technique of fibre drawing – Splicing - Loss in optical fiber – attenuation, dispersion, bending - Fibre optical communication system (Block diagram) – Fiber optic Light sources - Detectors - Endoscope.

UNIT IV **CRYSTAL PHYSICS** **9**

Lattice – Unit cell – Bravais lattice – Lattice planes – Miller indices – d spacing in cubic lattice – Calculation of number of atoms per unit cell – Atomic radius –Coordination number – Packing factor for SC, BCC, FCC and HCP structures –Crystal defects – point, line and surface defects- Burger vector.

UNIT V **PROPERTIES OF MATTER AND THERMAL PHYSICS** **9**

Elasticity – Hook's law – Relationship between three modulii of elasticity (Qualitative) – stress and strain diagram – Poisson's ratio – factors affecting elasticity – bending moment – depression of a cantilever – young's modulus by uniform bending – I shaped girders. Modes of heat transfer – thermal conductivity – Newton's law of cooling – linear heat flow – lee's disc method – radial heat flow – rubber tube method – conduction through compound media (series and parallel method)

TOTAL: 45 Hours

TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	B.N.Sankar & S.O.Pillai,	Engineering Physics I	New Age International Publishers	2015
2	Rajagopal K	Engineering Physics	PHI, New Delhi	2011

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Tamilarasan.K &Prabhu.K	Engineering Physics-I	Mc Graw Hill Education	2015
2	Palanisamy P.K	Engineering Physics	SCITECH Publications	2011
3	Senthilkumar G	Engineering Physics I	VRB Publishers	2011
4	Gaur R.K. and Gupta S.L.	Engineering Physics	Dhanpat Rai publishers	2009
5	Sudarmozhi.G.	Engineering Physics I	Bharathi Publishers	2015

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21BSS02 PHYSICS AND CHEMISTRY LABORATORY

L	T	P	C
0	0	2	1

COURSE OBJECTIVES

- The students will understand the ultrasonic sounds in liquid medium
- The students can demonstrate laser and its propagation through optics
- To understand thermal conductivity of bad conductors
- The students familiar with characteristics of water and able to estimate hardness and alkalinity of water sample
- The students will understand the basic concepts condunctometric and pH metric titrations

COURSE OUTCOMES

- Ability to determine the velocity of ultrasonic sound in any liquid
- Capable of understanding the concept of laser and its propagation through Optical fiber
- Ability to determine the thermal conductivity of the bad conductor and determine the modulus of elasticity
- Able to analyze hardness and alkalinity of water sample
- Able to estimate the amount of acid by conductometric, potentiometric and pH metric titrations

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	X	X	-	-	X	-	X		-	-	-	X	-	-	-
CO2	X	X	-	X	X	-	-	-	X	-	-	X	-	-	-
CO3	X	X	-	X	X	-	-	-	X	-	-	X	-	-	-
CO4	X	X	X	-	X	X	X	X	-	-	-	X	-	-	-
CO5	X	X	X	-	X	-	-	-	X	-	-	X	-	-	-

LIST OF EXPERIMENTS IN PHYSICS

1. (a) Determination of Wavelength and particle size using Laser, (b) Determination of acceptance angle in an optical fiber
2. Determination of Velocity of sound and Compressibility of liquid – Ultrasonic Interferometer
3. Determination of Thermal Conductivity of a bad conductor – Lee's Disc method
4. Determination of Young's Modulus by uniform bending method
5. Determination of Moment of Inertia by rigidity modulus

LIST OF EXPERIMENTS IN CHEMISTRY

1. Determination of hardness of water by EDTA Method
2. Determination of alkalinity in water sample
3. Conductometric titration of HCl vs NaOH
4. Estimation of hydrochloric acid by pH meter
5. Determination of molecular weight of polymer using Oswald Viscometer

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REFERENCE BOOKS

Sl. No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Dr.G.Senthilkumar	Physics Laboratory Manual	VRB Publishers	2017
2.	Dr.P.Mani	Engineering Physics Practical	Dhanm Publictions	2017
3.	R.Veeraswamy, V.Venkateswaran	Basic Principles of Practical Chemistry	Sultan Chand & Sons	2013
4.	P.Meena Sundari	Engineering Chemistry Laboratory Manual	KKS Publishers	2015

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21BSS03 BIO AND NANOMATERIALS SCIENCE

L	T	P	C
3	0	0	3

COURSE OBJECTIVES

- To underastand the classification of materials based on conductiviy
- To acquire the knowledge in basics of magnetic and superconductors
- To understand the applications of biomaterials
- To understand the synthesis techniques of nanomaterials.
- To educate the basic concepts of carbon nanotubes

Course Outcomes:

- Summaries the properties of conducting and semiconducting materials
- Describe the classification and application of magnetic and superconducting materials
- Explain the applications of biomaterials
- Illustrate the synthesize of nanomaterials
- Explain the structure and properties of Carbon nanotubes

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	X	-	X	-	-	-	-	-	-	-	-	X	-	-	-
CO2	X	X	-	-	-	-	-	-	-	-	-	X	-	-	-
CO3	X	-	X	-	-	-	-	-	-	-	-	X	-	-	-
CO4	X	-	-	-	X	-	-	-	-	-	-	X	-	-	-
CO5	X	-	-	-	X	-	-	-	-	-	-	X	-	-	-

UNIT I Conducting and Semiconducting Materials 9

Conducting Materials: Classical free electron theory of metals- Electrical conductivity –Thermal conductivity - Wiedemann-Franz law - Lorentz number - Draw backs of classical free electron theory.

Semiconducting Materials: Classification of semiconducting materials:-elemental-compound-intrinsic-extrinsic semiconductors-properties- Hall effect: Theory and experimental determination of Hall coefficient and Applications.

UNIT II Magnetic and Superconducting Materials 9

Magnetic Materials: Classification - Domain theory of ferromagnetism – Hysteresis-Hysteresis loss - Soft and hard magnetic materials – applications

Superconducting materials: Properties of superconductors - Type I and Type II superconductors – BCS theory-Application of superconductors: Magnetic levitation-cryotron.

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UNIT III **Biomaterials and its applications** 9

Definition of biomaterials and biocompatibility- classification of biomaterials- Metallic implant materials- properties and application of alumina- polymers in biomedical use- schematic diagram and working of heart lung machine. Materials for ophthalmology: contact lens, Intraocular lens.

UNIT IV **Nanomaterials and its applications** 9

Introduction- -Definition-Classification of nanostructures-surface to volume ratio-properties
Synthesis of Nanomaterials : Bottom up and top down process-Electro deposition method
Chemical vapour deposition-Pulsed laser deposition method-Applications.
Characterization Of Nanomaterials: Scanning electron microscope principle, construction and working - Transmission electron microscope: principle, construction and working

Unit V **Carbon Nano Materials** 9

Bonding in carbon structures–Carbon nanotube types - Single walled and multi walled carbon nanotubes-structure and properties – Synthesis of carbon nanotube: arc discharge- chemical vapour deposition method –Applications.

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	V Rajendran	Materials Science	Tata McGraw Hill publications	2008
2	Sujata V. Bhatt	Biomaterials	Second Edition Narosa Publishing House	2005
3	T.Pradeep	TheEssentials:Understanding Nanoscience and Nanotecnology	TataMcGraw-Hill PublishingCompany Limited,NewDelhi,	2008

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	James F. Shackelford, Madanapalli K. Muralidhara	Introduction to Materials Science for Engineers	Sixth Edition, Pearson Education Inc.	2007
2	C.M.Agrawal, J.L.Ong, M.R.Appleford ,Gopinath Mani	Introduction to Biomaterials basic theory with Engineering Applications	Cambridge University PressNew York	2014
3	B.D. Ratner, A.S. Hoffman F.J. Schoen, J.E. Lemons	Biomaterials Science an Introduction to Materials in Medicine	2nd Edition Elsevier Academic Press, California, USA	2004
4	C.P. Poole and F.J. Owens.	Introduction to Nanotechnology	Wiley, New Delhi	2007
5	M. Meyyappan	Carbon Nanotubes Science & Applications	CRC Pres, Boca Ranton, London, New York, Washington D.C	2005

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21BSS04	MATERIALS SCIENCE	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To understand the types of atomic structures in crystalline materials
- To understand the basic concepts in magnetism and superconductivity
- To impart knowledge on conducting and semiconducting materials
- To educate the concept of dielectric materials
- To understand the basic concepts in modern engineering materials

COURSE OUTCOMES

- Explain the types of crystalline structure
- Describe the classification conducting and semiconducting materials
- Associate the properties and applications of magnetic and superconducting materials
- Describe the concept of dielectric materials
- Summaries the synthesis techniques in advanced engineering materials

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	X	-	X	-	-	-	-	-	-	-	-	X	-	-	-
CO2	X	X	-	-	-	-	-	-	-	-	-	X	-	-	-
CO3	X	-	X	-	-	-	-	-	-	-	-	X	-	-	-
CO4	X	-	-	-	X	-	-	-	-	-	-	X	-	-	-
CO5	X	-	-	-	X	-	-	-	-	-	-	X	-	-	-

UNIT I CRYSTAL PHYSICS 9

Lattice – Unit cell – Bravais lattice – Lattice planes – Miller indices – d spacing in cubic lattice – Calculation of number of atoms per unit cell – Atomic radius –Coordination number – Packing factor for SC, BCC, FCC and HCP structures – Diamond and Graphite structures (Qualitative) – Crystal growth techniques – Bridgeman technique and Czochralski method.

UNIT II CONDUCTORS AND SEMICONDUCTORS 9

Classical free electron theory of metals – Electrical and thermal conductivity – Wiedemann-Franz law – Quantum theory - Fermi distribution function – Effect of temperature on Fermi Function – Density of energy states – Properties of semiconductors - classification – Elemental and Compound semiconductors – Intrinsic and Extrinsic semiconductors - carrier concentration derivation in intrinsic semiconductors - band gap determination - Hall effect – Determination of Hall coefficient –Experimental method - Applications of Hall Effect.

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UNIT III MAGNETIC AND SUPERCONDUCTING MATERIALS 9

Origin of magnetic moment – Types – Dia, para, Ferro, anti ferromagnetic materials – Domain theory – Hysteresis – Soft and hard magnetic materials – Ferrites – preparation, properties and applications. Properties of superconducting materials - BCS theory of superconductivity (Qualitative) - Types of super conductors – High T_c superconductors – Applications of superconductors – SQUID, Cryotron, Magnetic levitation.

UNIT IV DIELECTRIC MATERIALS 9

Basic definitions - Electrical susceptibility – dielectric constant – Types of polarization - electronic, ionic, orientational and space charge polarization – frequency and temperature dependence of polarization – internal field – Claussius –Mosotti relation (derivation) – dielectric loss – dielectric breakdown – uses of dielectric materials(capacitor and transformer) – ferroelectricity and applications

UNIT V ADVANCED ENGINEERING MATERIALS 9

Metallic glasses: Preparation, properties and applications – metallic glasses as transformer cores. Shape memory alloys (SMA): Types and Characteristics - properties of NiTi alloy- advantages and disadvantages of SMA - applications. Nanomaterials: Synthesis– Eleectro deposition, Plasma arcing - properties of nanoparticles and applications. Carbon nanotubes: Types - Single walled and multi walled nanotubes – Synthesis of carbon nanotube - pulsed laser deposition, chemical vapour deposition – Properties and applications

TOTAL: 45 Hours

TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Palanisamy P K	Materials Science	Scitech Publishers	2007
2	V Rajendran	Materials Science	Tata McGraw Hill publications	2008

REFERENCE BOOKS:

Sl. No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Arumugam,	Materials Science	Anuradha Publications	2010
2	William Smith	Materials science	Tata McGraw Hill publications	2015
3	Raghavan V	Materials science	Prentice Hall India Ltd.	2007
4	O.P.Kanna	Material Science and Metallurgy	Dhanpat Rai Publications	2012
5	G.Sudarmozhi	Material Science	Bharathi Publishers	2015

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21BSS05	PHYSICS FOR MECHANICAL ENGINEERS	L T P C 3 0 0 3

COURSE OBJECTIVES

- Define the various moduli of elasticity and explain streamline and turbulent flow of liquid and apply Poiseuille's formula to determine the coefficient of viscosity of a liquid.
- Describe experimental methods to determine thermal conductivity and state the laws of thermodynamics and their applications in the field of Engineering.
- Define and explain electrical and thermal conductivity of conducting materials.
- Explain the theory of semi-conducting materials and its applications.
- Recognize the novel properties of new engineering materials

COURSE OUTCOMES

- Implement the contemporary issues on elasticity and hydrodynamics
- Describe the thermal conductivity and thermodynamics process
- Explain the conducting properties of metals
- Describe the classification of semiconducting materials
- Illustrate the synthesis techniques and applications of new engineering materials

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	X	-	X	-	-	-	-	-	-	-	-	X	-	-	-
CO2	X	X	-	-	-	-	-	-	-	-	-	X	-	-	-
CO3	X	-	X	-	-	-	-	-	-	-	-	X	-	-	-
CO4	X	-	-	-	X	-	-	-	-	-	-	X	-	-	-
CO5	X	-	-	-	X	-	-	-	-	-	-	X	-	-	-

UNIT I PROPERTIES OF MATTER AND HYDRODYNAMICS 9

Elasticity - Poisson's ratio and relation between moduli (qualitative) - Stress-strain diagram- Factors affecting elasticity - Bending of beams - Cantilever - expression for bending moment – Measurement of Young's modulus by uniform and non-uniform bending - I shaped girders - Stream line flow - Turbulent flow- Poiseuille's formula for flow of liquid through a capillary tube – Determination of coefficient of viscosity of a liquid

UNIT II HEAT AND THERMODYNAMICS 9

Thermal conductivity - Forbe's and Lee's disc methods- Radial and cylindrical flow of heat -Thermal conductivity of rubber and glass - Thermal insulation of buildings - Thermal insulating materials - Thermal equilibrium - Zeroth law of thermodynamics - Internal Energy - First law of thermodynamics - Indicator diagram - Isothermal process -

Work done in an isothermal expansion - Adiabatic process - Work done in an adiabatic expansion – Reversible and irreversible processes - Second law of thermodynamics - Carnot engine - Efficiency of Canot's cycle - Carnot's cycle as heat engine and refrigerator - Carnot's theorem - Comparative study of Ideal Otto and diesel engines and their efficiency (no derivation) - Entropy - temperature diagram of Carnot's cycle.

UNIT III CONDUCTING MATERIALS **9**

Conductors - classical free electron theory of metals - Electrical and thermal conductivity - Wiedemann-Franz law - Lorentz number - Drawbacks of classical theory - Quantum theory -band theory of solids(qualitative treatment only) - Fermi distribution function - Effect of temperature on Fermi Function - Density of energy states - Carrier concentration in metals - application of conducting materials in induction furnace

UNIT IV SEMICONDUCTING MATERIALS **9**

Intrinsic semiconductors – Energy band diagram – direct and indirect band gap semiconductors -Carrier concentration in intrinsic semiconductors - Fermi level – Variation of Fermi level with temperature – Electrical conductivity – Band gap determination – Extrinsic semiconductors – Carrier concentration in N-type and P-type semiconductors (Qualitative Treatment only) – Variation of Fermi level with temperature and impurity concentration – Compound semiconductors – Hall effect – Determination of Hall coefficient – Hall effect applications - application of semiconductors in strain measurements

UNIT V NEW ENGINEERING MATERIALS **9**

Metallic glasses: Preparation - properties - applications

Shape memory alloys: Characterisitics - properties of Ni-Ti alloy – application- advantages and disadvantages of SMA

Advanced Ceramics: Introduction – characteristics – structural ceramics

Nanoscience and Nanotechnology – significance of the nanoscale - different types of nanostructures (Confinement Dimensions 0-D, 1-D, 2-D and 3-D) - Categories of nanomaterials - Fabrication of nonomaterials - Ball milling method and Chemical vapour deposition technique - Carbon nanotubes - Types of carbon nanotubes - CNT structure – properties and applications.

Biomaterials (metals and alloys, ceramics) - classification and applications.

TOTAL: 45Hours

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	B.N.Sankar& S.O.Pillai	Engineering Physics I	New Age International Publishers	2015
2	M. Arumugam,	Materials Science	Anuradha Publications	2006

REFERENCE BOOKS:

Sl. No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	B. K. Pandey and S. Chaturvedi	Engineering Physics	Cengage Learning India Pvt. Ltd., Delhi,	2012
2	Rajendran, V, and Marikani A	Materials science	TMH Publications	2004
3	Jayakumar, S.	Materials science	R.K. Publishers, Coimbatore	2008
4	Palanisamy P.K	Materials science	Scitech Publications (India) Pvt. Ltd	2007
5	Sudarmozhi.G.	Engineering Physics II.	Bharathi Publishers,	2015

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21BSS11	ENGINEERING CHEMISTRY	L T P C 3 0 0 3

COURSE OBJECTIVES

- The students understand the softening of hard water by using various purification techniques
- The students able to apply these principles towards the prevention of corrosion
- The students will understand the basic concepts of polymers chemistry and its applications. The students have sound knowledge of plastics and rubbers
- The students understand the reaction of nuclear fission and fusion reaction and promote the knowledge about process of nuclear reactors. To understand various chemical reactions involved in the batteries
- The students will have knowledge on industrial important abrasives refractories and glass

COURSE OUTCOMES

- Recognize appropriate water purification techniques to convert hard water to soft water
- Apply principles of electrochemistry to prevent corrosion
- Exploit the polymeric materials for various engineering applications
- Utilize batteries and fuel cell in various fields
- Choose suitable abrasives, refractories and glass for various engineering applications

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	X	X	-	-	X	X	-	X	-	-	-	X	-	-	-
CO2	X	-	X	-	X	-	X	-	-	-	-	-	-	-	-
CO3	X	-	X	-	-	-	X	-	-	-	-	X	-	-	-
CO4	X	-	X	-	X	X	-	-	-	-	-	X	-	-	-
CO5	X	-	X	-	X	-	X	-	-	-	-	-	-	-	-

UNIT I WATER TECHNOLOGY **9**

Characteristics of water – hardness of water – types of hardness – estimation of hardness by EDTA method – alkalinity – types of alkalinity – estimation of alkalinity – Biological oxygen demand (BOD) and Chemical Oxygen Demand (COD) – Boiler feed water – requirements – disadvantages of using hard water in boilers – boiler troubles – scale and sludge – priming and foaming – caustic embrittlement – boiler corrosion – internal conditioning (phosphate, calgon, colloidal and carbonate conditioning methods) – external conditioning – zeolite and demineralization process – desalination and reverse osmosis.

UNIT II CORROSION AND CORROSION CONTROL **9**

Corrosion – chemical corrosion – electrochemical corrosion – mechanism of dry and wet corrosion – types of corrosion – galvanic corrosion – differential aeration corrosion – factors influencing rate of corrosion – corrosion control methods – sacrificial anodic method and impressed current cathodic protection method – protective coatings – Introduction, metal coatings: Galvanization and Tinning – Inorganic coatings: Phosphating and Anodising – electroplating – electroless platting

UNIT III POLYMERS **9**

Polymers – definition – polymerization – types of polymerization (addition, condensation and copolymerization only) – mechanism of addition polymerization (free radical mechanism only) – preparation, properties and uses of polyvinyl chloride (PVC), Teflon, polyamides (nylon – 11, nylon – 6 and nylon – 6,6) and polyethylene terephthalate (PET) – Rubber – vulcanization of rubber – preparation, properties, uses of butyl rubber and SBR – Biodegradable Polymers – synthesis and properties of Poly lactic acid, Applications of biodegradable polymers in

medical industry – Photo Conducting Polymers – Synthesis of Poly vinyl carbazole and its applications in laser printing

UNIT IV NON CONVENTIONAL ENERGY SOURCES AND STORAGE DEVICES 9

Nuclear energy – fission and fusion reactions – nuclear chain reactions – characteristics of nuclear chain reaction – light water nuclear reactor for power generation – breeder reactor – solar energy conversion – solar cells – wind energy – Fuel cells – working of hydrogen and oxygen fuel cell – batteries – types of batteries – construction and working of batteries – alkaline battery – lead acid battery, nickel – cadmium battery and lithium battery

UNIT V ENGINEERING MATERIALS 9

Refractories – classification – acidic, basics and neutral refractories – properties – manufacture of alumina, magnesite and zirconia bricks – Abrasives – natural and synthetic abrasives – hardness of abrasives – Mohs scale – manufacture, properties and uses of silicon carbide and boron carbide – application of abrasives – Glass manufacture, properties and uses

TOTAL: 45 Hours

TEXT BOOKS:

Sl. No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	B P.C.Jain and Monica Jain	Engineering Chemistry	Dhanpat Rai Pub, Co., New Delhi	2013
2.	Dr.A.Ravikrishnan	Engineering Chemistry I & II	Sri Krishna Hitech Publishing Company Pvt. Ltd	2016

REFERENCE BOOKS:

Sl. No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Dr.P.Santhi & S.Elavarasan	Engineering Chemistry	Sri Kandhan Publications	Aug 2016
2.	S.S. Dara	A text book of engineering chemistry	S.Chand & Co.Ltd., New Delhi	2013
3.	Shradha Sinha	Advanced Engineering Chemistry	Krishna Prakasan Media (P) Ltd., Meerut	2015
4.	B.Sivasankar	Engineering Chemistry	Tata McGraw-Hill Publishing Company, Ltd., New Delhi	2008
5.	V.R.Gowariker N.V.Viswanathan and Jayadev Sreedhar	Polymer Science	New Age International Pvt. Ltd., Chennai	2006

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21BSS12 ENVIRONMENTAL SCIENCE AND ENGINEERING L T P C
3 0 0 3

COURSE OBJECTIVES

- To give a comprehensive insight into ecosystem, biodiversity and natural recourses
- To create an awareness on the various environmental pollution aspects and issues
- To educate the ways and means to protect the environment from various types of pollution
- To import some fundamental knowledge on human welfare measures
- Discuss the impact of human population on the environment

COURSE OUTCOMES

- Elaborate ecosystem, biodiversity and loss of biodiversity
- Apply equitable use of natural resources for sustainable life style
- Manipulate the sources, effects and control methods of various environmental pollution
- Implement various environmental act and non-government organization for human welfare
- Analyse human population and its impacts on the environment

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	X	X	-	-	-	X	X	-	-	-	-	X	-	-	-
CO2	X	X	X	-	-	X	X	-	-	-	-	X	-	-	-
CO3	X	-	X	-	X	-	X	X	-	-	-	X	-	-	-
CO4	X	-	-	-	-	X	-	X	-	-	-	X	-	-	-
CO5	X	X	-	-	-	X	X	-	-	-	-	X	-	-	-

UNIT I ECOSYSTEMS AND BIODIVERSITY 9

Definition, scope and importance of environment – need for public awareness – concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction to biodiversity definition – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – hot – spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man – wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and exsitu conservation of biodiversity

UNIT II NATURAL RESOURCES 9

Forest resources: Use and over – exploitation, deforestation, cause – effect – control measures – Water resources: Use and over – utilization of surface and ground water, floods, drought, conflicts over water, dams – benefits and problems –Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer – pesticide problems, water logging, salinity – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles

UNIT III ENVIRONMENTAL POLLUTION 9

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution(c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – soil waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – disaster management: floods, earthquake, cyclone and landslides

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UNIT IV **SOCIAL ISSUES AND THE ENVIRONMENT** **9**

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people – environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, – environment protection act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Forest conservation act – role of nongovernmental organization – Public awareness

UNIT V **HUMAN POPULATION AND THE ENVIRONMENT** **9**

Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV/AIDS – women and child welfare – role of information technology in environment and human health

TOTAL: 45 Hours

TEXT BOOKS

Sl. No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Dr.A.Ravikrishnan	Environmental Science and Engineering	Sri Krishna Hitech Publishing Company Pvt. Ltd	June 2016
2.	Gilbert M. Masters	Introduction to Environmental Engineering and Science	Pearson Education Pvt., Ltd., Second Edition. ISBN 81-297-0277-0	2004

REFERENCE BOOKS

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Sl. No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Dharmendra S. Sengar	Environmental Law	Prentice hall of India PVT LTD, New Delhi	2007
2.	R.K.Trivedi	Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol-I and II	BS Publications	2010
3.	R.Rajagopalan	Environmental Studies	From Crisis to Cure, Oxford University Press	2015
4.	Benny Joseph	Environmental Science and Engineering	Tata McGraw-Hill, New Delhi	2006
5.	T.G.Miller	Environmental Science	Wadsworth Publishing Co.	2007

21BSS13 APPLIED CHEMISTRY

L	T	P	C
3	0	0	3

COURSE OBJECTIVES

- The students familiar with characteristics of water and know the specification of boiler feed water. To understand the softening of hard water by using various purification techniques.
- To understand the concept and importance of thermodynamics.
- The students will understand the basic concepts of electrochemistry and its applications.
- The students understand about the fuels and its type and understand the combustion of fuels.
- The students will have knowledge on industrial important abrasives, cement, cement and glass.

COURSE OUTCOMES

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- Acquire knowledge conversant with principles of water characterization and treatment of portable water for industrial purpose.
- An ability to apply principles of thermodynamics.
- Ability to familiarize basic concepts of electrochemistry and its applications.
- Ability to apply basic knowledge on the fuels and its uses and acquire knowledge on the combustion of fuels.
- Acquire knowledge on industrial important abrasives, cement and glass.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	X	-	X	-	X	X	-	-	-	-	-	X	-	-	-
CO2	X	-	X	-	X	-	X	-	-	-	-	X	-	-	-
CO3	X	-	X	-	-	-	X	-	-	-	-	X	-	-	-
CO4	X	-	X	-	X	-	X	-	-	-	-	X	-	-	-
CO5	X	-	X	-	X	-	X	-	-	-	-	X	-	-	-

UNIT I **PHASE RULE AND ALLOYS** **9**

Statement and explanation of terms involved – one component system – water system – condensed phase rule – construction of phase diagram by thermal analysis – simple eutectic systems (lead-silver system only) – alloys – importance, ferrous alloys – nichrome and stainless steel – heat treatment of steel, non-ferrous alloys – brass and bronze.

UNIT II **CHEMICAL THERMODYNAMICS** **9**

Terminology of thermodynamics - Second law: Entropy - entropy change for an ideal gas, reversible and irreversible processes; entropy of phase transitions; Clausius inequality. Free energy and work function: Helmholtz and Gibbs free energy functions; Criteria of spontaneity; Gibbs-Helmholtz equation, Clausius - Clapeyron equation; Maxwell relations – Van't Hoff isotherm and isochore.

UNIT IIII **ELECTROCHEMISTRY** **9**

Electrochemical cells – reversible and irreversible cells – EMF – measurement of emf – Single electrode potential – Nernst equation (problem) – reference electrodes – Standard Hydrogen electrode - Calomel electrode – Ion selective electrode – glass electrode and measurement of pH – electrochemical series – significance – potentiometer titrations (redox - Fe^{2+} versus dichromate) and conduct metric titrations (acid-base – HCI vs, NaOH) titrations.

UNIT IV **FUELS AND COMBUSTION** **9**

Fuel: Introduction- classification of fuels- calorific value- higher and lower calorific values- coal analysis of coal (proximate and ultimate)- carbonization- Otto Hoffmann method - petroleum- manufacture of synthetic petrol (Bergius process)- knocking, octane number - diesel oil- cetane number - natural gas- compressed natural gas(CNG)-liquefied petroleum gases(LPG) - Combustion of fuels: introduction- theoretical calculation of calorific value- ignition temperature- flue gas analysis (ORSAT Method).

UNIT V **ENGINEERING MATERIALS** **9**

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Abrasives: definition, classification or types, grinding wheel, abrasive paper and cloth. Portland cement- manufacture and properties - setting and hardening of cement, special cement- waterproof and white cement– properties and uses. Glass - manufacture, types, properties and uses.

TOTAL: 45

TEXT BOOKS

Sl. No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	B P.C. Jain and Monica Jain	Engineering Chemistry	Dhanpat Rai Pub, Co., New Delhi	2013
2.	Dr.A.Ravikrishnan	Engineering Chemistry I & II	Sri Krishna Hitech Publishing Company Pvt. Ltd	2016

REFERENCE BOOKS

Sl. No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Dr.P.Santhi & S.Elavarasan	Engineering Chemistry	Sri Kandhan Publications	Aug 2016
2.	S.S. Dara	A text book of engineering chemistry	S.Chand & Co.Ltd., New Delhi	2013
3.	Shradha Sinha	Advanced Engineering Chemistry	Krishna Prakasan Media (P) Ltd., Meerut	2015
4.	B.Sivasankar	Engineering Chemistry	Tata McGraw-Hill Publishing Company, Ltd., New Delhi	2008
5.	V.R.Gowariker N.V.Viswanathan and Jayadev Sreedhar	Polymer Science	New Age International Pvt. Ltd., Chennai	2006

21BSS21 ALGEBRA AND CALCULUS

L	T	P	C
3	1	0	4

COURSE OBJECTIVES

- Remember the use of matrix and algebra techniques in engineering applications and to develop for future applications
- Understanding the differential calculus concepts. This is needed in almost all branches of engineering.

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- Applying the knowledge on the functions with several variables which finds applications in many engineering branches
- Students should understand the integral calculus concepts.
- Remember the mathematical tools and is needed in evaluating multiple integrals and their usage.

COURSE OUTCOMES

- This course equips students to have basic knowledge in matrix algebra techniques with its engineering applications..
- The students will have knowledge on functions with several variables.
- This course helps students in understanding the concepts of differential calculus
- The students will gain understanding of the basic techniques of integration.
- The students will have the ability to solve the real time engineering problems with multiple integrals and their usage.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	-	-	-	-	-	-	-	-	3	-	3	-
CO2	3	3	2	-	-	-	-	-	-	-	-	3	-	3	-
CO3	3	3	2	-	-	-	-	-	-	-	-	2	-	2	-
CO4	3	3	3	-	-	-	-	-	-	-	-	2	-	3	-
CO5	3	3	2	-	-	-	-	-	-	-	-	2	-	3	-

UNIT - I MATRICES 9+3

Characteristic equation – Eigenvalues and Eigenvectors – Properties of eigen values and eigen vectors – Cayley-Hamilton Theorem (Without Proof) – Diagonalization - Orthogonal transformation (Symmetric Matrix)– Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of Quadratic form.

UNIT – II GEOMETRICAL APPLICATIONS OF DIFFERENTIAL CALCULUS 9+3

Representation of Functions, Limits, Continuity, Derivatives, Differentiability Rules-Maxima and Minima of functions of one variable- Mean Value Theorem.

UNIT – III FUNCTIONS OF SEVERAL VARIABLES 9+3

Functions of two variables – Taylor series - Partial derivatives – Jacobians - Maxima and minima — Lagrange's multipliers method.

UNIT – IV INTEGRAL CALCULUS 9+3

Definite and Indefinite Integrals-Substitution Rule-Integration by parts-Trigonometric Integrals, Integration of rational and irrational functions by partial fractions -Improper Integrals.

UNIT – V MULTIPLE INTEGRALS 9+3

Double integrals in Cartesian and Polar coordinates – Change of order of integration – Area of double integral - Triple integration in Cartesian coordinates – Volume as triple integrals.

TOTAL: 45 + 15 = 60 Hours

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TEXT BOOKS:

Sl. No	Author(s)	Title of the Book	Publisher	Year of Publication
1	James Stewart	Calculus with Early Transcendental Functions	Cengage Learning, New Delhi	2008
2.	Grewal. B.S	Higher Engineering Mathematics, 43rd Edition	Khanna Publications, Delhi	2014

REFERENCE BOOKS:

Sl. No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Veerarajan. T	Engineering Mathematics for first year	Tata McGraw-Hill Publishing Company Ltd., New Delhi	2015
2.	Erwin Kreyszig	Advanced Engineering Mathematics, 9th Edition	John Wiley and Sons, New Delhi	2018
3.	Jain R.K., Iyengar S.R.K.	Advanced Engineering Mathematics, 4th edition	Alpha Science International Ltd	2014
4.	Bali N. P Manish Goyal	A Text book of Engineering Mathematics, 9th edition	Laxmi Publications Pvt Ltd.	2016
5.	Dass, H.K., Er. RajnishVerma	Higher Engineering Mathematics, 3rd Revised Edition	S. Chand Private Ltd	2014

21BSS22 ADVANCED CALCULUS AND COMPLEX ANALYSIS L T P C
3 1 0 4

COURSE OBJECTIVES

- Remember the student acquire sound knowledge of techniques in solving ordinary differential equations that model engineering.
- Applying the relatively simple quantitative models of change and to deduce their consequences.
- Understand the Laplace transforms and learn the inverse Laplace transformations for solving real time Engineering problems

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- To Apply and understanding of the standard techniques of analytic theory.
- To understand and apply complex integration theory with confidence, in application areas of engineering fields.

COURSE OUTCOMES

- The knowledge gained on ordinary differential equations will provide a strong platform to solve the research problems in model engineering.
- The knowledge gained on vector calculus provides a framework for modeling systems. Use Gauss divergence, Stoke's and Green's theorems to simplify calculations of integrals and prove simple results.
- Using analytical functions for real world problems, Engineer makes models of projects and then simulates its models in real world conditions.
- To enable the student to apply complex integration efficiently solving the problems that occurs in various branches of engineering disciplines.
- This course equips students to have basic knowledge in inverse Laplace transforms with its engineering applications.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	-	-	-	-	-	-	-	-	3	-	3	-
CO2	3	2	2	-	-	-	-	-	-	-	-	3	-	3	-
CO3	3	3	2	-	-	-	-	-	-	-	-	2	-	2	-
CO4	2	3	3	-	-	-	-	-	-	-	-	2	-	3	-
CO5	3	3	2	-	-	-	-	-	-	-	-	2	-	3	-

UNIT - I ORDINARY DIFFERENTIAL EQUATIONS 9+3

Linear differential equations of second and higher order with constant coefficients– Cauchy's and Legendre's linear equations – simultaneous first order linear equations with constant coefficients – Method of variation of parameter – Method of undetermined coefficients.

UNIT - II VECTOR CALCULUS 9+3

Gradient, divergence and curl – Line, Surface and Volume integrals – Green's, Gauss divergence and Stoke's theorem (excluding proofs) – Verification of the above theorems and evaluation of integrals using them

UNIT – III LAPLACE TRANSFORMS 9+3

Laplace transforms – Basic properties – Initial and final value theorems - Problems - Transform of periodic functions. Inverse Laplace transforms – statement of convolution theorem – Partial fraction method – Problems – Solution of linear ODE of second order with constant co-efficients.

UNIT – IV ANALYTIC FUNCTIONS 9+3

Functions of a complex variable – Analytic function– Cauchy-Riemann equations – Properties of analytic function – Harmonic conjugate – Conformal mapping and bilinear transformations.

UNIT – V COMPLEX INTEGRATION 9+3

Cauchy's integral theorem (excluding proof) and Cauchy's integral formula (excluding proof) – Taylor's and Laurent's series expansions (excluding proof) – Singular points – Classifications – Cauchy's residue theorem – Contour integration.

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TOTAL: 45 + 15 = 60 Hours

TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Glyn James	Advanced Modern Engineering Mathematics	Pearson Education, 4th Edition	2016
2.	Grewal. B.S	Higher Engineering Mathematics	Khanna Publications, Delhi, 43rd Edition	2014

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Bali N. P Manish Goyal	A Text book of Engineering Mathematics	Laxmi Publications Pvt Ltd. , 9th edition	2016
2.	Erwin Kreyszig	Advanced Engineering Mathematics	John Wiley and Sons, New Delhi, 9th edition	2014
3.	Tony Croft, Anthony Croft, Robert Davison, Martin Hargreaves, James Flint	Engineering Mathematics: A Foundation for Electronic, Electrical, Communications and Systems Engineers	Pearson Education, 4th Revised Edition	2012
4.	Peter V. O.Neil	Advanced Engineering Mathematics	Cengage learning, 7th edition	2012
5.	Dass.H.K. , Er. RajnishVerma	Higher Engineering Mathematics,	S. Chand Private Ltd , 3rd Revised Edition	2014

21BSS23 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS **L T P C**

3 1 0 4

COURSE OBJECTIVES

- To introduce the effective mathematical tools for the solutions of partial differential equations that model several physical processes
- To introduce Fourier series analysis which is central to many applications in engineering
- To develop the basic knowledge in solving the boundary value problems
- To acquaint the student with Fourier transform techniques used in wide variety of situations.

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- To develop Z transform techniques for discrete time systems

COURSE OUTCOMES

- It equips students to find the solutions of partial differential equations that model real time processes
- Provides the students to have sound knowledge Fourier series analysis.
- The students will have the ability to solve boundary value problems
- This course enables the students to apply Fourier transform techniques to many engineering problems.
- Using this course, a student develops Z transform techniques for discrete time systems for real world problems.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	-	-	-	-	-	3	-	2	-
CO2	3	3	3	-	-	-	-	-	-	-	-	3	-	3	-
CO3	2	2	-	-	-	-	-	-	-	-	-	2	-	2	-
CO4	3	3	3	-	-	-	-	-	-	-	-	3	-	3	-
CO5	3	2	-	-	-	-	-	-	-	-	-	2	-	2	-

UNIT – I PARTIAL DIFFERENTIAL EQUATIONS 9+3

Formation of partial differential equations – Singular integrals – Solutions of standard types of first order partial differential equations - Lagrange"s linear equation - Linear partial differential equations of second and higher order with constant coefficients of homogeneous.

UNIT - II FOURIER SERIES 9+3

Dirichlet's conditions – General Fourier series – odd and even functions – Half range sine series – Half range cosine series – Parseval"s identity – Harmonic analysis

UNIT – III BOUNDARY VALUE PROBLEMS 9+3

Classification of PDE - Solutions of one dimensional wave equation – One dimensional equation of heat conduction – Fourier series solution in Cartesian coordinates – Steady state solution of two dimensional heat equation (excluding insulated edges) on finite square plates (excluding circular plates).

UNIT – IV FOURIER TRANSFORMS 9+3

Statement of Fourier integral theorem - Fourier transforms pair – Fourier sine and cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval's identity – Problems.

UNIT – V Z - TRANSFORMS AND DIFFERENCE EQUATIONS 9+3

Z- transforms - Elementary properties – Initial and final value theorem – Inverse Z - transforms – Partial fraction method – Residue method – Convolution theorem - Formation of difference equations – Solution of difference equations using Z - transforms

TOTAL: 45 + 15 = 60Hrs

TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication

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1.	Erwin Kreyszig	Advanced Engineering Mathematics, 9th Edition	John Wiley and Sons, New Delhi	2014
2.	Grewal. B.S	Higher Engineering Mathematics, 43rd Edition	Khanna Publications, Delhi	2014

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Glyn James	Advanced Modern Engineering Mathematics, 4th Edition	Pearson Education	2016
2.	Bali N. P Manish Goyal	A Text book of Engineering Mathematics, 9th edition	Laxmi Publications Pvt Ltd.	2016
3.	Datta.K.B.	Mathematical Methods of Science and Engineering	Cengage Learning India Pvt Ltd, Delhi	2013
4.	Ray Wylie. C, Barrett.L.C	Advanced Engineering Mathematics, 6th Edition	Tata Mc Graw Hill Education Pvt Ltd, New Delhi	2012
5.	Ramana.B.V.	Higher Engineering Mathematics	Tata Mc Graw Hill Publishing Company, New Delhi	2008

21BSS24 **DISCRETE MATHEMATICS** **L T P C**

3 1 0 4

COURSE OBJECTIVES

- To extend student's Logical and Mathematical maturity.
- To deal with abstraction and the counting principles.
- To identify the basic properties of graphs and model simple applications.
- To study the concepts and properties of algebraic structures.
- To learn discrete objects and their properties.

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COURSE OUTCOMES

- Have knowledge of the concepts needed to test the logic of a program.
- Ability to distinguish between the notion of discrete and continuous mathematical structures
- Have an understanding in identifying structures on many levels.
- Be aware of the counting principles.
- Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	-	-	-	-	-	-	-	-	3	-	2	-
CO2	3	3	2	-	-	-	-	-	-	-	-	3	-	3	-
CO3	3	3	2	-	-	-	-	-	-	-	-	3	-	2	-
CO4	3	3	3	-	-	-	-	-	-	-	-	3	-	3	-
CO5	3	3	-	-	-	-	-	-	-	-	-	3	-	2	-

UNIT - I LOGIC AND PROOFS 9+3

Propositional Logic – Propositional equivalences - Rules of inference-introduction to Proofs-Proof Methods and strategy, Predicates and quantifiers.

UNIT – II COMBINATORICS 9+3

Mathematical inductions - Strong induction and well ordering. The basics of counting-The pigeonhole principle – Permutations and combinations-Recurrence relations-Solving Linear recurrence relations-generating functions-inclusion and exclusion and applications.

UNIT – III GRAPHS 9+3

Graphs and graph models-Graph terminology and special types of graphs-Representing graphs and graph isomorphism - connectivity-Euler and Hamilton paths.

UNIT – IV ALGEBRAIC STRUCTURES 9+3

Algebraic systems-Semi groups and monoids-Groups-Subgroups and homomorphisms - Cosets and Lagrange's Theorem - Ring & Fields (Definitions and examples)

UNIT – V LATTICES AND BOOLEAN ALGEBRA 9+3

Partial ordering-Posets-Lattices as Posets- Properties of lattices-Lattices as Algebraic systems –Sub lattices –direct product and Homomorphism-Some Special lattices- Boolean algebra.

TOTAL: 45 + 15 = 60Hrs

TEXT BOOKS:

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Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Narsingh Deo	Graph Theory with Applications to Engineering and Computer Science, Reprint edition	Dover Publications Inc.	2016
2.	Tremblay J.P, Manohar R	Discrete Mathematical Structures with application to computer science,30th Reprint	Tata Mc Graw Hill Pub.Co.Ltd,New Delhi,	2011

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Bernard Kolman , Robert C.Busby, Sharan Culter Ross	Discrete Mathematical Structures, 6th Edition	Pearson Education Pvt Ltd. ,New Delhi	2015
2.	Richard Johnsonbaugh	Discrete Mathematics , 7th Edition	Pearson Education Asia, New Delhi	2014
3.	Seymour Lipschutz, Mark Lipson, Varsha H. Patil	Discrete Mathematics Schaum's Outlines , Revised 3rd Edition	Mc Graw Hil Pub.Co.Ltd.,New Delhi	2013
4.	Ralph. P.Grimaldi	Discrete and combinatorial Mathematics : An Applied Introduction, 5th Edition	Pearson Education Asia,Delhi	2012
5.	Kenneth H. Rosen	Discrete Mathematics and its Applications, 7th Edition	Tata Mc Graw Hill Pub . co.Ltd.,New Delhi,Special Indian Edition	2011

21BSS25 STATISTICS AND QUEUING MODEL

L T P C
3 1 0 4

COURSE OBJECTIVES

- To understand concepts of testing of hypothesis
- To develop design of experiments model for research problems
- To understand the basic concepts of Control charts for measurements.
- Identify the concept of queuing models and apply in engineering.

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- To understand the significance of advanced queuing models.

COURSE OUTCOMES

- Provides knowledge to apply testing of hypothesis to real life problems.
- This course enhances the students in design of experiments model for research problems
- Apply the concept of Statistical Quality Control in engineering disciplines.
- Acquire skills in analyzing queueing models.
- Understand and characterize phenomenon which evolve with respect to time in a probabilistic manner

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	-	-	-	-	-	-	-	-	3
CO2	3	3	2	-	-	-	-	-	-	-	-	3
CO3	3	3	2	-	-	-	-	-	-	-	-	3
CO4	3	3	3	-	-	-	-	-	-	-	-	3
CO5	3	3	2	-	-	-	-	-	-	-	-	3

UNIT I TESTING OF HYPOTHESIS **9 + 3**

Sampling distributions - Estimation of parameters - Statistical hypothesis -Tests based on t, Chi-square and F distributions for mean, variance and proportion - Contingency table (test for independent) - Goodness of fit.

UNIT II DESIGN OF EXPERIMENTS **9 + 3**

One way and Two way classifications - Completely randomized design – Randomized block design – Latin square design.

UNIT III STATISTICAL QUALITY CONTROL **9 + 3**

Control charts for measurements (X and R charts) – Control charts for attributes (p, c and np charts) – Tolerance limits - Acceptance sampling.

UNIT IV QUEUEING MODELS **9+ 3**

Markovian queues – Birth and death processes – Single and multiple server queueing models – Little's formula – Queues with finite waiting rooms – Queues with impatient customers: Balking and reneging.

UNIT V ADVANCED QUEUEING MODELS **9+3**

Finite source models – M/G/1 queue – Pollaczek Khinchin formula – M/D/1 and M/EK/1 as special cases – Series queues – Open Jackson networks.

TOTAL: 45 + 15 = 60Hrs

TEXT BOOKS:

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Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Devore. J.L.,	"Probability and Statistics for Engineering and the Sciences	Cengage Learning, New Delhi	2014
2.	John F. Shortle, James M.Thompson, Carl M. Harris Donald Gross	Fundamentals of Queueing Theory, 4th Edition	Wiley	2012

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Douglas C. Montgomery, George C. Runger	Applied Statistics and Probability for Engineers (International Student Version)", 6th Edition	John Wiley & Sons, Inc.	2016
2.	Spiegel. M.R., Schiller. J., Srinivasan.R.A.	Schaum's Outlines on Probability and Statistics, 4th Edition	Tata McGraw Hill Education	2013
3.	Johnson. R.A., and Gupta. C.B.	Miller,Freund's Probability and Statistics for Engineers,11th Edition	Pearson Education, Asia	2011
4.	Yates, R.D. and Goodman. D. J	"Probability and Stochastic Processes"	Wiley India Pvt. Ltd., Bangalore	2012
5.	Trivedi.K.S.,	Probability and Statistics with Reliability, Queueing and Computer Science Applications, 2nd Edition	John Wiley and Sons	2008

21BSS26 **NUMERICAL METHODS** **L T P C**
3 1 0 4

COURSE OBJECTIVES

- Remember the algebraic equations representing steady state models formed in engineering problems.
- Students understand the interpolation and approximation for the application of finite element analysis.
- Apply the trend information from discrete data set through numerical differentiation and summary information through numerical integration.
- Understand the system dynamic behavior through solution of Ordinary Differential Equations modeling the system.

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- Remember and apply the Partial Differential Equation models representing spatial and temporal variations in physical systems through numerical methods.

COURSE OUTCOMES

- The students will have a clear perception of the power of numerical techniques.
- The students will have the ability to solve a set of algebraic equations representing steady state models formed in engineering problems.
- The students can deal with interpolation and approximation for the application of finite element analysis.
- It equips the knowledge in numerical differentiation and numerical integration.
- This course makes students easy in solving initial and boundary value problems.

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2	-	-	-	-	-	-	-	2	3
CO2	2	3	2	-	-	-	-	-	-	-	2	3
CO3	3	3	2	-	-	-	-	-	-	-	2	2
CO4	3	3	3	-	-	-	-	-	-	-	2	2
CO5	3	3	1	-	-	-	-	-	-	-	2	2

UNIT - I SOLUTION OF EQUATIONS AND EIGEN VALUE PROBLEMS 9+3

Solution of algebraic and transcendental equations – Newton- Raphson method – Solution of linear system of an equations - Gauss elimination method – Gauss Jordon method - Iterative methods of Gauss Jacobi and Gauss-Seidel -Eigen values of a matrix by power method

UNIT – II INTERPOLATION AND APPROXIMATION 9+3

Interpolation with unequal intervals – Lagrange's interpolation – Newton's divided difference interpolation – Interpolation with equal intervals – Newton's forward and backward difference formulae.

UNIT – III NUMERICAL DIFFERENTIATION AND INTEGRATION 9+3

Approximation of derivatives using interpolation polynomials – Numerical integration using Trapezoidal, Simpson's 1/3 rule – Two point and three point Gaussian quadrature formulae – Evaluation of double integrals by trapezoidal and Simpsons's 1/3 rules.

UNIT – IV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS 9+3

Single step methods – Taylor's series method – Euler's method – Modified Euler's method – Fourth order Runge-Kutta method for solving first order equations – Multi step methods – Milne's and Adam's-Bash forth predictor corrector methods for solving first order equations.

UNIT – V BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS 9+3

Finite difference methods for solving two-point linear boundary value problems – Finite difference techniques for the solution of Laplace's and Poisson's equations on rectangular domain – one dimensional heat equation by explicit and implicit (Crank Nicholson) methods – One dimensional wave equation by explicit method.

TOTAL: 45 + 15 = 60 Hrs

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	S. K. Gupta	Numerical Methods for Engineers	New Age International Pvt Ltd Publishers , 3rd Edition	2015
2.	Chapra. S.C., Canale.R.P.	Numerical Methods for Engineers	Tata McGraw Hill, , New Delhi, 6th Edition	2012

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Grewal. B.S.	Numerical Methods in Engineering & Science: with Programs in C and C++	Khanna Publishers, New Delhi, 10th Edition	2010
2.	M.K.Jain	Numerical Methods for Scientific & Engineering Computation	New Age International Publishers, 6th Edition	2010
3.	Sankara Rao. K.	Numerical methods for Scientists and Engineers	Prentice Hall of India Private, New Delhi , 3rd Edition	2007
4.	Brian Bradie	A friendly introduction to Numerical analysis	Pearson Education, Asia, New Delhi, 1st edition	2007
5.	Gerald. C. F. Wheatley. P. O.	Applied Numerical Analysis	Pearson Education, Asia, New Delhi, 6th Edition	2006

21BSS27 PROBABILITY AND RANDOM PROCESSES L T P C

3 1 0 4

COURSE OBJECTIVES

- Analyze random or unpredictable experiments and investigate important features of random experiments.
- Construct probabilistic models for observed phenomena through distributions which play an important role in many engineering applications.

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- To acquire the knowledge the concept of convergence of random sequence and the study of random signals
- To be familiar with application of auto correlation and cross correlation functions.
- To learn the concept of spectral density

COURSE OUTCOMES

- The students will have a fundamental knowledge of the probability concepts.
- It helps to use standard distributions to the real life problems.
- Associate random variables by designing joint distributions and correlate the random variables.
- It also helps to understand and characterize phenomenon which evolve with respect to time in a probabilistic manner.
- Gained knowledge in correlation and spectral densities

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	-	-	-	-	-	-	-	-	3
CO2	3	3	2	-	-	-	-	-	-	-	-	3
CO3	3	3	2	-	-	-	-	-	-	-	-	3
CO4	3	3	3	-	-	-	-	-	-	-	-	3
CO5	3	3	2	-	-	-	-	-	-	-	-	3

UNIT - I PROBABILITY AND RANDOM VARIABLES **9+3**

Axioms of probability–conditional probability– Baye's theorem, random variables– Discrete and continuous random variables – MGF

UNIT – II STANDARD DISTRIBUTIONS **9+3**

Discrete distributions: Binomial, Poisson, Geometric, Negative Binomial and their properties – Continuous distributions: Uniform, Exponential, Gamma, Normal distributions and their properties

UNIT – III TWO - DIMENSIONAL RANDOM VARIABLES **9+3**

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and regression – Transformation of random variables

UNIT – IV RANDOM PROCESSES **9+3**

Classification – Stationary process – Markov process - Poisson process – Discrete parameter Markov chain – Chapman Kolmogorov equations

UNIT – V CORRELATION AND SPECTRAL DENSITIES **9+3**

Auto correlation - Cross correlation - Properties – Power spectral density – Cross spectral density - Properties – Wiener-Khintchine relation – Relationship between cross power spectrum and cross correlation function

TOTAL: 45 + 15 = 60Hrs

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Oliver. C Ibe.	Fundamentals of Applied Probability and Random Processes, 2nd Edition	Academic Press	2014
2.	Stark. H., Woods. J.W.	Probability and Random Processes with Applications to Signal Processing, 4th Edition	Pearson Education, Asia	2014

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	HweiP.Hsu	Schaum"s Outline of Theory and Problems of Probability, Random Variables and Random Processes	Mc Graw Hill Publishing Company, New Delhi	2014
2.	Henry Stark , John W. Woods	Probability, Statistics, and Random Processes for Engineers" , 2nd Edition	Pearson Education	2014
3.	Miller. S.L., Childers. D.G.	Probability and Random Processes with Applications to Signal Processing and Communications , 2nd Edition	Academic Press (E!sevier)	2012
4.	Yates. R.D., Goodman. D.J.	Probability and Stochastic Processes, 2nd Edition	Wiley India Pvt. Ltd., Bangalore	2012
5.	Peyton Peebles	Problems and Solutions in Probability, Random Variables and Random Signal Principles (SIE), 1st Edition	Mc Graw Hill Publishing Company, New Delhi	2012

21BSS28 STATISTICS AND NUMERICAL METHODS

L	T	P	C
3	1	0	4

COURSE OBJECTIVES

- To understand concepts of testing of hypothesis

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- To develop design of experiments model for research problems
- To find the trend information from discrete data set through numerical differentiation and summary information through numerical integration
- To predict the system dynamic behavior through solution of ODEs modeling the system
- To introduce numerical tools for the solutions of ordinary differential equations that model several physical processes

COURSE OUTCOMES

- Determine testing of hypothesis to real life problems
- Enhance design of experiments model for research
- Demonstrate the applications of numerical techniques to various engineering fields
- Equip the knowledge in numerical differentiation and numerical integration
- Implement the ordinary differential equations to real life problems.

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	-	-	-	-	-	-	-	2	3
CO2	2	3	2	-	-	-	-	-	-	-	2	3
CO3	3	3	2	-	-	-	-	-	-	-	2	2
CO4	3	3	3	-	-	-	-	-	-	-	2	2
CO5	3	3	2	-	-	-	-	-	-	-	2	2

UNIT - I TESTING OF HYPOTHESIS 9+3

Sampling distributions - Tests for single mean, Difference of means (large and small samples) – Tests for single variance and equality of variances – chi-square test for goodness of fit – Independence of attributes.

UNIT – II DESIGN OF EXPERIMENTS 9+3

Completely randomized design – Randomized block design – Latin square design – One way- Two way Classification.

UNIT – III SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS 9+3

Newton-Raphson method- Gauss Elimination method – Gauss-Jordan methods – Iterative methods of Gauss-Jacobi and Gauss-Seidel - Horner's Method – Eigen values of a matrix by Power method.

UNIT – IV INTERPOLATION, NUMERICAL DIFFERENTIATION AND NUMERICAL INTEGRATION 9+3

Lagrange's and Newton's divided difference interpolation –Newton's forward and backward difference interpolation - Approximation of derivatives using interpolation polynomials - Numerical integration using Trapezoidal and Simpson's 1/3 rules

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UNIT – V NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS 9+3

Taylor's series method - Euler's method - Modified Euler's method - Fourth order Runge-Kutta method for solving first and second order equations – Adam's and Milne's predictor corrector methods for solving first order equations

TOTAL: 45 + 15 = 60Hrs

TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	S. K. Gupta	Numerical Methods for Engineers , 3rd Edition	New Age International Pvt Ltd Publishers	2015
2.	Walpole. R.E., Myers. R.H., Myers. S.L., Ye. K.	Probability and Statistics for Engineers and Scientists, 8th Edition	Pearson Education, Asia	2013

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Douglas C. Montgomery, George C. Runger	Applied Statistics and Probability for Engineers (International Student Version)", 6th Edition	John Wiley & Sons, Inc.	2016
2.	Spiegel. M.R., Schiller. J., Srinivasan.R.A.	Schaum's Outlines on Probability and Statistics, 4th Edition	Tata McGraw Hill Education	2013
3.	Chapra. S.C., Canale.R.P.	Numerical Methods for Engineers, 6th Edition	Tata McGraw Hill, , New Delhi	2012
4.	Johnson. R.A., and Gupta. C.B.	Miller, Freund's Probability and Statistics for Engineers,11th Edition	Pearson Education, Asia	2011
5.	Grewal. B.S.	Numerical Methods in Engineering & Science: with Programs in C and C++, 10th Edition	Khanna Publishers, New Delhi	2010

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21GES02 **PROGRAMMING FOR PROBLEM SOLVING TECHNIQUES** L T P C
3 0 0 3

COURSE OBJECTIVES

- To understand basic programming concepts
- To provide knowledge for problem solving through programming
- To provide hands-on experience with the concepts

COURSE OUTCOMES:

At the end of the course, the students will able to

CO1 Understand the fundamentals of C programming

CO2 Summarize the looping statement and decision making statements to work out various C programs.

CO3 Implement different Operations on arrays and Use functions to pass the arguments.

CO4 Develop Simple Python Programs using basic data types, Control Structures, looping statements and Functions.

CO5 Apply String, Tuples, List, and Dictionary concepts in real time applications.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	x	-	x	x	-	-	-	-	-	x	-	x	x	x	x
CO2	x	x	-	-	x	-	-	-	-	-	-	-	x	-	-
CO3	x	x	x	x	x	-	-	-	-	-	x	x	x	x	-
CO4	x	-	x	x	x	-	-	-	x	-	-	-	x	-	x
CO5	x	-	x	x	x	-	-	-	x	-	-	x	x	x	x

UNIT I **INTRODUCTION TO C PROGRAMMING** 9

Introduction to computer software, Program Design Tools: Algorithms, Flowcharts, Pseudo codes, Structure of a C program, Writing the first C program, Keywords, Identifiers, Basic Data Types in C, Variables, Constants, Input / Output Statements in C, Operators in C Arithmetic, Relational, Logical, Conditional, Type conversion and Typecasting.

UNIT II **CONDITIONAL AND LOOPING STATEMENTS** 9

Conditional branching statements, if, if-else, if-else-if and switch statements, Iterative statements, while, do-while and for loop statements, Nested loops, the break and continue statements.

UNIT III **FUNCTIONS AND ARRAYS** 9

Functions: Function Declaration/Function Prototype, Function definition, Function call, passing parameters to functions. Arrays: Declaration of arrays, accessing the elements of an array, storing values in arrays, operations on 1-d arrays – Inserting an Element of an array, Deleting an Element from an Array, searching for a Value in an Array, two-dimensional arrays, operations on two dimensional arrays – Sum, Difference.

UNIT IV **INTRODUCTION TO PYTHON PROGRAMMING** 9

Introduction- Python interpreter and interactive mode- Creating and executing Python program- Data types: Numeric, Boolean, string, List, tuple and Dictionary-Comments- Expressions- Conditional statements: if, if-else and if-elif-else- Iterative statements: while, for, continue and pass- Functions- Fruitful functions- Recursive functions- Illustrative programs: Linear search and Binary search

UNIT V **STRINGS, LISTS, TUPLES AND DICTIONARIES** 9

Strings: Assignment- String slices and String methods- Lists: List operations and list methods-Tuples: Tuple assignment and Tuple operations- Dictionaries: Operations and methods. Illustrative Programs: Quick sort and Merge sort.

TOTAL : 45

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TEXT BOOKS:

Sl.No	AUTHOR(s)	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	Reema Thareja	Computer Fundamentals and Programming in C	Oxford University Press	Second Edition
2.	John V Guttag	Introduction to Computation and Programming Using Python	Revised and expanded Edition, MIT Press	2013

REFERENCE BOOKS:

Sl.No	AUTHOR(s)	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	Reema Thareja	Programming in C	Oxford University Press	Second Edition
2.	Robert Sedgewick, Kevin Wayne, Robert Dondero	Introduction to Programming in Python: An Inter-disciplinary Approach	Pearson India Education Services Pvt. Ltd.,	2016
3.	Timothy A. Budd	Exploring Python	Mc-Graw Hill Education (India) Private Ltd	2015
4.	Kenneth A. Lambert	Fundamentals of Python: First Programs	CENGAGE Learning	2012.

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21GES03 PROGRAMMING IN C LABORATORY

COURSE OBJECTIVES

- Write a basic C Program
- Learn the knowledge about Array.
- Execute the programs using String.
- Understand the concept about Structure and pointer.
- Develop the program using File concept.

COURSE OUTCOMES:

At the end of the course, the students will able to

CO1	Summarize the looping statement and decision making statements to work out various C programs.
CO2	Illustrate one dimensional and two dimensional array for matrix.
CO3	Construct Structures and Union to store information in a single name.
CO4	Formulate to handling string operations.
CO5	Implement file handling operations to read and write the files

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	x	x	x	-	-	-	-	-	-	-	-	-	x	x	-
CO2	x	x	x	-	-	-	-	-	-	-	-	-	-	x	x
CO3	x	x	x	-	-	-	-	-	-	-	-	-	-	x	x
CO4	-	x	x	-	x -	-	-	-	-	-	-	-	-	x	x
CO5	-	x	x	-	x	-	-	-	-	-	-	-	-	x	x

LIST OF EXPERIMENTS

1. Develop a program to find the largest of three numbers.
2. Develop an interactive program to calculate roots of quadratic equation by accepting the coefficients.
3. Develop a program to sum the series: 1/1! + 4/2! + 27/3! +….. Using functions.
4. Develop a program to insert a number at a given location in an array.
5. Develop a program to read a two dimensional array "marks" which stores marks of 5 students in three subjects. Display the highest marks in each subject
6. Develop a program to concatenate two strings and determine the length of the concatenated string
7. Develop a program to read and display the information about a student using structures.
8. Develop a program to read and display the information about an employee using Union.
9. Implement a program to enter a character and then determine whether it is a vowel or not using pointers.
10. Develop a program to read data from the keyboard, write it to a file called "Input", again read the same data from the "Input" file and display it on the screen.

TOTAL: P: 30

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21GES04	PROGRAMMING IN C AND PYTHON LABORATORY	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES

- Write a basic C Program and Python program.
- Learn the knowledge about Array in C.
- Execute the Matrix programs using C.
- Understand the concept about list in Python.
- Analysis searching techniques in python.

COURSE OUTCOMES:

At the end of the course, the students will able to

CO1 Implement the program using loop and functions in C.

CO2 Illustrate two dimensional array in C.

CO3 Work out various basic programs in Python.

CO4 Print the maximum number from the list using python.

CO5 Build searching using python

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	x	x	x	x	x	x	x		x	-	x	x	x	x	x
CO2	x	x	x	x	x	x	x		x	x	x	x	x	x	x
CO3	x	x	x	x	x	x	x	x	-	x	x	x	x	x	x
CO4	x	x	x	x	x	x	x	-	-	x	x	x	x	x	x
CO5	x	x	x	x	x	x	x	-	-	-	x	x	x	x	x

LIST OF EXPERIMENTS

1. Develop a C program to find the largest of three numbers.
2. Develop an interactive C program to calculate roots of quadratic equation by accepting the coefficients.
3. Develop a C program to sum the series: 1/1! + 4/2! + 27/3! +….. using functions.
4. C program to insert a number at a given location in an array.
5. Implement a C program to perform a Fibonacci series.
6. Develop a C program to read a two dimensional array "marks" which stores marks of 5 students in three subjects. Display the highest marks in each subject.
7. Write a Python program to find GCD of two numbers.
8. Write a Python Program to find the square root of a number by Newton's Method.
9. Write a Python program to find the exponentiation of a number.
10. Write a Python Program to find the maximum from a list of numbers.
11. Write a Python Program to perform Linear Search.

TOTAL: P: 30

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21GES05 ELECTRICAL AND ELECTRONICS SCIENCES

L	T	P	C
3	0	0	3

COURSE OBJECTIVES

- To impart knowledge on DC & AC circuits and its analysis
- To impart knowledge of measuring instruments.
- To study the operation of electrical machines.
- To impart the fundamentals of semiconductor.
- To understand the principles of micro computing.

COURSE OUTCOMES

- Able to analyze DC and AC circuits
- Able to explain the different type of measuring instruments
- Able to exhibit the operation of electrical machines
- Able to demonstrate the operation of rectifier and DAC/ADC
- Able to explain the principles of micro computing

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	x	x	-	x	-	-	-	-	-	x	-	x	x	x	-
CO2	x	x	-	x	-	-	-	-	-	x	-	x	x	x	-
CO3	x	x	-	x	-	-	-	-	-	x	-	x	x	x	-
CO4	x	x	-	x	-	-	--	-	-	x	-	x	x	x	-
CO5	x	x	-	x	-	-		-	-	x	-	x	x	x	-

UNIT I ELECTRICAL CIRCUITS 9

Ohm's law - Kirchhoff's laws - Resistors in series and parallel circuits (simple problem) - Introduction to ac circuits and its parameters - Three phase power supply – Star connection – Delta connection – Balanced and Unbalanced Loads.

UNIT II MEASUREMENTS AND INSTRUMENTATION 9

Operating principles of Moving Coil and Moving Iron instruments - Principles of Electrical Instruments, Multimeters, Oscilloscopes - Static and Dynamic Characteristics of Measurement – Errors in Measurement – Transducers - Classification of Transducers

UNIT III ELECTRICAL MACHINES 9

Construction, Principle of operation, Basics equation, of DC Motor and Generators - Single phase Induction motors, Construction, Types and speed control methods - Single Phase Transformer, voltage regulation and efficiency (Qualitative & Quantitative treatment only)

UNIT IV SEMICONDUCTOR DEVICES AND DIGITAL ELECTRONICS 9

Operation and characteristics of PN Junction Diode - Half wave Rectifiers - Full wave Rectifiers - Bipolar Junction Transistor - Binary Number System - Logic Gates - Boolean algebra - Half and Full Adders - Registers and Counters - A/D and D/A Conversion.

UNIT V INTRODUCTION TO MICROCOMPUTING 9

Architecture of 8051 – instruction set – addressing mode – serial port programming - interrupts – ADC/DAC

TOTAL: 45 Hours

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	D P Kothari and I.J Nagarath	Basic Electrical and Electronics Engineering	McGraw Hill Education(India) Private Limited	2016
2.	S.K.Bhattacharya	Basic Electrical and Electronics Engineering	Pearson India	2011

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Giorgio Rizzoni	Principles and Applications of Electrical Engineering	McGraw Hill Education(India) Private Limited	2010
2.	A.E.Fitzgerald, David E Higginbotham and Arvin Grabel,	Basic Electrical Engineering	McGraw Hill Education(India) Private Limited	2009
3.	Mittle N	Basic Electrical Engineering	Tata McGraw Hill Edition	2016
4.	Rajendra Prasad	Fundamentals of Electrical engineering	Prentice Hall of India	2006
5.	Del Toro	Electrical Engineering Fundamentals	Pearson Education, New Delhi	2015

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21GES06 MECHANICAL AND BUILDING SCIENCES L T P C
3 0 0 3

COURSE OBJECTIVES

- Summaries the basic infrastructure services MEP, HVAC, elevators, escalators and ramps.
- Differentiate Materials for engineering applications
- Demonstrate the metal joining, removing and addition process.
- To posses knowledge about Surveying
- To know about the Civil Engineering materials.
- To get the knowledge on various type of Building Elements.

COURSE OUTCOMES

CO1 To summarise the basic infrastructure services of Refrigeration, pumps and basic drives
CO2 To select appropriate materials for engineering applications
CO3 To perform welding, machining and 3D printing operations
CO4 Understand the principles of field measurement in surveying.
CO5 Acquired knowledge in civil engineering materials.
CO6 Familiarize on about the of Building Elements.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	X	X	-	-	-	X	-	-	-	X	-	X	X	-	-
CO2	X	X	-	-	-	X	-	-	-	X	-	X	X	-	-
CO3	X	X	-	-	X	X	-	-	-	-	-	X	X	-	-
CO4	X	X	-	-	-	X	-	-	-	-	-	X	X	-	-
CO5	X	X	-	-	-	X	-	-	-	-	-	X	X	-	-
.CO6	X	X	-	-	-	X	-	-	-	-	-	X	X	-	-

A. MECHANICAL ENGINEERING

UNIT I REFRIGERATION 9

Unit of refrigeration, reversed Carnot cycle, COP, vapour compression cycle (only description and no problems); Definitions of dry, wet & dew point temperatures, specific humidity and relative humidity, Cooling and dehumidification, Layout of unit and central air conditioners. Description about working with sketches of: Reciprocating pump, Centrifugal pump, Pelton turbine, Francis turbine and Kaplan turbine. Description about working with sketches of: Belt and Chain drives, Gear and Gear trains, Single plate clutches.

UNIT II BASICS OF ENGINEERING MATERIALS 9

Metals-Stainless steel, Magnesium, Titanium-properties, applications ceramics-Alunima,SiO2,PZT-properties,applications, and polymeric materials-PMMA,PEEK,PTFE- properties, applications, metal matrix composites-types, fabrication methods, properties and applications.

UNIT III: METAL JOINING PROCESSES 9

List types of welding, Description with sketches of Arc Welding, Soldering and Brazing and their applications. Basic Machining operations: Turning, Drilling, Milling and Grinding. Principle of CAD/CAM, and 3 D printing.

B. BUILDING SCIENCES

UNIT IV FUNDAMENTALS OF SURVEYING

Surveying – Objectives – Divisions – Classification – Principles – Measurements of distances – Angles – Leveling

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UNIT V **BUILDING MATERIALS** **7**

Civil Engineering Materials: Bricks – Stones – Sand – Cement – Concrete – Steel Sections – Timber – Modern Materials.

UNIT VI **BUILDING ELEMENTS** **8**

Substructure: Foundation – Types of foundation – Requirement of good foundation – Plinth beam.
Superstructure: Brick masonry – Stone masonry – Beams – Columns – Lintels – Roofing – Flooring – Plastering.

TOTAL: 45 Hours

TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Shanmugam G and Palanichamy M S	Basic Civil and Mechanical Engineering	McGraw Hill Publishing Co., New Delhi	1996
2.	Ramamrutham S	Basic Civil Engineering	DhanpatRai Publishing Co. (P) Ltd.	2015

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Benjamin,J.,	Basic Mechanical Engineering	Pentex Books,9th Edition	2018
2.	G Shanmugam, M S Palanichamy	Basic Civil and Mechanical Engineering	McGraw Hill Education; First edition	2018
3.	Clifford, M., Simmons, K. and Shipway, P.,	An Introduction to Mechanical Engineering Part I	CRC Press	2009
4.	Seetharaman S	Basic Civil Engineering	Anuradha Agencies	2015
5.	SatheeshGopi	Basic Civil Engineering	Pearson Publishers	2009

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21GES07	COMPUTER AIDED DRAFTING LABORATORY	L T P C 0 0 3 1

COURSE OBJECTIVES

- To construct various curves in engineering applications.
- To understand the principles of projection to project points, lines and planes.
- To draw the orthographic views of solids.
- To draw the projection of solids in simple position and with their axis inclined.
- To be able to construct the development of surfaces.

COURSE OUTCOMES

CO1	Understand the basics of drawing instruments and standards.
CO2	Construct various curves used in engineering applications.
CO3	Comprehend and draw orthographic vies of various solids
CO4	Explain and draw the projection of points, lines and planes
CO5	Draw the projection of solids and development of surfaces using CAD software.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	X	-	-	-	X	X	-	-	-	X	-	X	X	-	-
CO2	X	-	-	-	X	X	-	-	-	X	-	X	X	-	-
CO3	X	-	-	-	X	X	-	-	-	-	-	X	X	-	-
CO4	X	-	-	-	X	X	-	-	-	-	-	X	X	-	-
CO5	X	-	-	-	X	X	-	-	-	X-	-	X	X	-	-

CONCEPTS AND CONVENTIONS 4

(Not for Examination) Importance of graphics in engineering applications, Use of drafting instrument, BIS conventions and specifications - Size, layout and folding of drawing sheets, Lettering and dimensioning.

COMPUTER AIDED DRAFTING (Not for Examination) 6

Importance 2d Drafting, sketching, modifying, transforming and dimensioning

UNIT I **PLANE CURVES** 10

Curves used in engineering practices, Conics, Construction of ellipse, Parabola and hyperbola by eccentricity method, Construction of cycloid, construction of involutes of square and circle, Drawing of tangents and normal to the above curves.

UNIT II **PROJECTION OF POINTS, LINES AND PLANES** 10

General Principles of Orthographic projection, Need for importance of multiple views and their placement, First angle projection, layout of views, Projection of points, Projection of straight lines located in the first quadrant, Projection of polygonal surface inclined to both reference planes.

UNIT III **ISOMETRIC TO ORTHOGRAPHIC VIEWS** 10

Representation of three dimensional objects, Developing visualization skills through free hand sketching of multiple views from pictorial views of objects, Drawing orthographic views of various solids, Dimensioning.

UNIT IV **PROJECTION OF SOLIDS** 10

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane.

UNIT V **SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES** 10

Sectioning of simple solids like prisms, pyramids, cylinder and cone in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other, Development of lateral surfaces of simple and truncated solids, Prisms, pyramids, cylinders and cones.

****NOTE: Students have to give descriptive answers to the questions from first two units and need to draw the answer figures using CAD software for the questions from the last three units in end semester exam.**

TOTAL: 60 Hours

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Natrajan K.V	A text book of Engineering Graphics	Dhanalakshmi Publishers, Chennai	2015
2.	Basant Agrawal and C.M. Agrawal	Engineering Drawing	McGraw Hill Education; Second edition	2013

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Gopalakrishnan K.R	Engineering Drawing (Vol. I&II combined)	Subhas Stores Bangalore	2007
2	Luzzader, Warren.J. and Duff,John M	Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production	Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi	2005
3	Shah M.B., and Rana B.C	Engineering Drawing	Pearson, 2nd Edition	2009
4	Venugopal K. and Prabhu Raja V	Engineering Graphics	New Age International (P) Limited	2008
5	Bhatt N.D. and Panchal V.M	Engineering Drawing	Charotar Publishing House, 50th Edition	2010

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21GES08	PYTHON PROGRAMMING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES

- To understand basic programming concepts using C
- To know about function and string
- Python data types Lists, Tuples and Dictionaries
- To construct file handling operations, modules and packages using python.
- To Exemplify the concept of Tensorflow and Keras

COURSE OUTCOMES:

At the end of the course, the students will able to

CO1	Understand the fundamental concepts of python programming.
CO2	Classify various string operations and passing arguments using function.
CO3	Explicate python data types Lists, Tuples and Dictionaries
CO4	Implement file handling operations and exception handling.
CO5	Exemplify the concept of Tensorflow and Keras.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	x	x	-	-	x	x	-	x	x	-	x	-	x	x	-
CO2	x	x	x	x	x	x	-	x	-	x	x	x	x	x	x
CO3	x	x	-	x	-	x	-	x	x	x	x	-	x	-	x
CO4	x	x	x	x	x	-	x	x	-	x	x	x	-	x	x
CO5	x	x	x	x	-	-	x	x	x	x	x	x	x	x	x

UNIT I INTRODUCTION 9

The way of programming-What is programming- debugging – formal and natural languages - Python: Features - Installing - Running – Python interpreter and interactive mode. Values and types: int, float, Boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass;

UNIT II FUNCTIONS, STRINGS 9

Functions, function definition and use, flow of execution. Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays.

UNIT III LISTS, TUPLES, DICTIONARIES 9

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension

UNIT IV FILES, MODULES, PACKAGES 9

Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages.

UNIT V TENSOR FLOW, KERAS 9

Tensorflow : Introduction to Tensorflow, Tensorflow - graphs, Variables, placeholders. Download and install Tensorflow. Keras – Introduction to Keras, Keras installation, Keras layers and modules.

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TOTAL: L: 45

TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Allen B. Downey	Think Python: How to Think Like a Computer Scientist	O'Reilly Publishers	2016
2.	Guido van Rossum and Fred L. Drake Jr	An Introduction to Python	Network Theory Ltd	2011
3	Matthew Scarpino	TensorFlow For Dummies	Wiley Publication	2018
4	Antonio Gulli, Sujit Pal	Deep Learning with Keras	Packt Publishing	2017

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Charles Dierbach	Introduction to Computer Science using Python: A Computational Problem-Solving Focus	Wiley India Edition	2013
2.	John V Guttag	Introduction to Computation and Programming Using Python	MIT Press	2013
3.	Kenneth A. Lambert	Fundamentals of Python: First Programs	CENGAGE Learning	2012
4.	Paul Gries, Jennifer Campbell and Jason Montojo	Practical Programming: An Introduction to Computer Science using Python 3	Pragmatic Programmers,LLC	2013
5.	Timothy A. Budd	Exploring Python	Mc-Graw Hill Education (India) Private Ltd	2015

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21GES09 **PROGRAMMING IN PYTHON LABORATORY** L T P C
0 0 2 1

COURSE OBJECTIVES

- Write basic Python program.
- Learn the knowledge about searching and sorting techniques.
- Understand command line arguments.
- Simulate the game.
- To illustrate Tensorflow and Keras.

COURSE OUTCOMES:

At the end of the course, the students will able to

CO1 Summarize the basic programs using python.
CO2 Build various searching and sorting techniques
CO3 Implement the coding for matrices.
CO4 Evaluate Command line arguments.
CO5 Simulate game using python program.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	x	x	-	x	x	x	-	x	x	x	x	x	x	x	-
CO2	x	x	x	x	x	x	-	x	-	x	x	x	x	x	x
CO3	x	x	-	-	x	x	-	x	x	x	x	-	x	-	x
CO4	x	x	x	x	x	-	x	x	-	x	x	x	-	x	x
CO5	x	x	x	x	-	-	x	x	x	-	x	x	X	x	x

LIST OF EXPERIMENTS

1. Compute the GCD of two numbers.
2. Find the square root of a number (Newton's method)
3. Develop a python program for Exponentiation (power of a number)
4. Find the maximum of a list of numbers
5. Develop a python program to Selection sort, Insertion sort
6. Implement divide and conquer method using Merge sort
7. Find first n prime numbers using python
8. Implement matrix multiplication using 2 dimensional array.
9. Programs that take command line arguments (word count)
10. Find the most frequent words in a text read from a file
11. Simulate elliptical orbits in Pygame
12. Simulate bouncing ball using Pygame
13. Object detection using Tensorflow.
14. Object detection using Keras.

PLATFORM NEEDED

Python 3 interpreter for Windows/Linux

TOTAL: P : 30

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21GES10	SOFT SKILLS LABORATORY	L T P C 0 0 2 1

COURSE OBJECTIVES

- To Analyse the Strength and Weakness of an Individual
- To build an effective team in work place
- To develop effective Time Management Skills
- To describe the qualities of an Effective Presenter
- To improve Health and Social life

COURSE OUTCOMES

- Identifying the Career Path
- Developing the leadership Qualities for the betterment of the team
- Developing Effective Time Management Skill
- Understanding the importance of Effective Communication
- Handling Stress and Developing Problem Solving Skill

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	X	X	X	-	X	-	-	-
.CO2	-	-	-	-	-	-	-	-	X	X	-	X	-	-	-
CO3	-	-	-	-	-	-	-	-	-	X	-	X	-	-	-
CO4	-	-	-	-	-	-	-	X	X	X	-	X	-	-	-
.CO5	-	-	-	-	-		-	X	X	X	-	X	-	-	-

UNIT I Self Analysis

SWOT Analysis – Intra Personal Skill – Inter Personal Skill

UNIT II Team Work

Importance of a Team Player – Leadership Quality – Decision Making Skill

UNIT III Time management

Effective Planning – Goal Setting – Spending right time on right job

UNIT IV Presentation skill

Verbal Communication – Non Verbal Communication

UNIT V Stress Management

Eustress – Distress – Emotional Intelligence – Fear Management (Crowd Fear, Exam Fear, Stage Fear)

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21GES11	ELECTRONIC DEVICES	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To understand the basics of Semiconductor Diodes
- To impart knowledge on the working principle and characteristics of BJT.
- To learn the operation and characteristics of FET.
- To familiarize the biasing techniques of BJT and FET.
- To understand the working principle of special diodes and optoelectronic devices.

COURSE OUTCOMES:

After the completion of the course, the students can able to

CO1 Explain the construction and operation of semiconductor diodes
CO2 Demonstrate the characteristics of BJT
CO3 Demonstrate the characteristics of BJT
CO4 Explain the biasing techniques of BJT and FET
CO5 Explain the construction and principle of special purpose diodes

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

UNIT I SEMICONDUCTOR DIODES 9

Review of Semiconductor Physics-Drift and diffusion currents-Continuity Equation-Theory of PN Junction Diode-Diode Current Equation-Current Voltage Characteristics-Effect of Temperature on PN Junction diodes-Diffusion Capacitance-Applications: Rectifiers, Clippers, Clampers-Avalanche Breakdown Mechanism-Zener Diode as a Voltage Regulator.

UNIT II BIPOLAR JUNCTION TRANSISTORS 9

Bipolar Junction Transistor Operations-Configurations: CC, CB, CE-Transistor Current Components-Ebermoll's Model of Transistor-Small Signal Low Frequency Hybrid-High Frequency Effects-Transistor as an Amplifier and Switch.

UNIT III FIELD EFFECT TRANSISTORS 9

Operation and Characteristics of JFET-Configurations of JFET-JFET as Amplifier, Switch, Voltage Variable Resistor-Metal Oxide Semiconductor Field Effect Transistor (MOSFET)-Enhancement and Depletion Mode MOSFET-Characteristics of n-MOS and p-MOS-Introduction to CMOS.

UNIT IV BIASING OF BJT AND FET 9

DC operating point and Load line-Q point-Bias Stability-Transistor Biasing Methods: Fixed Bias-Collector to Base Bias-Self biasing, Thermal Runaway, Thermal Stability-FET biasing methods: Self bias-Source bias-Voltage divider bias-Biasing MOSFETs.

UNIT V SPECIAL DIODES AND OPTO ELECTRONIC DEVICES 9

Theory and Characteristics of Schottky Diode-Tunnel Diode-Varactor Diode-SCR-TRIAC-LDR-UJT-Photoemissivity and Photoconductivity-Photoconductive Cell-Photo Voltaic Cell-Photodiode-Phototransistors-Construction and Characteristics of LCD and LED-LASER Diodes- Opto Couplers, FINFET.

TOTAL: 45

TEXT BOOKS

Sl. No	Author(s)	Title of the Book	Publisher	Year of Publication
1	Jacob Millman, Christos Halkias & Satyabrata Jit, Millman's	Electronic Devices and Circuits	McGraw Hill	2008
2	Robert L. Boylestad, Louis Nashelsky	Electronic Devices and Circuit Theory	Pearson education	2012

REFERNCE BOOKS

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1	Allen Mottershead	Electronic Devices and Circuits	Prentice Hall of India	2008
2	Douglas. A.Pucknell, Kamran Eshraghian	Basic VLSI Design, Principles and Application	Prentice Hall of India	2009
3	S.Salivahanan, N.Sureshkumar and A.Vallavaraj	Electronic Devices and Circuits	Tata McGraw Hill	2008
4	Donald A. Neamen	Semiconductor Physics and Devices	Tata McGraw Hill	2017
5	S. M. Sze	Semiconductor Devices: Physics and Technology	Wiley	2016

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21GES13 **ELECTRIC CIRCUITS**

L	T	P	C
2	1	0	3

COURSE OBJECTIVES

- To communicate the knowledge on DC circuits and its analysis.
- To impart knowledge on AC circuits and its analysis.
- To impart knowledge on solving circuits equations using network theorems.
- To introduce the concept of resonance circuits and transient response in circuits.
- To impart knowledge on balanced and unbalanced in three phase circuits.

COURSE OUTCOMES

- Able to analyze DC circuits
- Able to give details on the AC circuits and analyze.
- Able to solve the different type of network problems
- Able to implement the resonance condition in the power circuits.
- Able to analyze the different type of load in three phase circuits.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	x	x	x	x	-	-	-	-	-	x	-	x	-	-	-
CO2	x	x	x	x	-	-	-	-	-	x	-	x	-	-	-
CO3	x	x	x	x	-	-	-	-	-	x	-	x	-	-	-
CO4	x	x	x	x	-	-	-	-	-	x	-	x	-	-	-
CO5	x	x	x	x	-	-	-	-	-	x	-	x	-	-	-

UNIT I **DC CIRCUITS** 9

Basic circuit elements - Ohm's law - Resistors in series and parallel circuits - Voltage division and current division - Kirchhoff's laws - Source transformation - Star-Delta conversion - Mesh and nodal analysis.

UNIT II **AC CIRCUITS** 9

Introduction to AC circuits- Form Factor - Phase and phase difference - Sinusoidal Voltage and Current - Single phase AC circuits - Series and parallel RL, RC and RLC circuits - Power - Power factor.

UNIT III **NETWORK THEOREMS FOR DC AND AC CIRCUITS** 9

Superposition theorem - Thevenin's theorem - Norton's theorem - Maximum power transfer theorem - Reciprocity theorem- Compensation theorem

UNIT IV **RESONANCE CIRCUITS AND TRANSIENT RESPONSE** 9

Series and parallel resonance - Quality factor and bandwidth - Transient response of RL, RC and RLC Circuits using Laplace transform for DC input.

UNIT V **THREE PHASE CIRCUITS** 9

Three phase balanced / unbalanced voltage sources - Analysis of three phase 3-wire and 4-wire circuits with star and delta connected loads, balanced & un balanced loads - Phasor diagram of voltages and currents - Power and Power factor measurements in three phase circuits.

TOTAL: 45 Hours

TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Charles K. Alexander, Mathew N.O. Sadiku	Fundamentals of Electric Circuits	McGraw Hill	2013
2.	William H. Hayt Jr, Jack E. Kemmerly and Steven M. Durbin	Engineering Circuits Analysis	McGraw Hill publishers New Delhi	2013

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Jegatheesan, R	Analysis of Electric Circuits	McGraw Hill	2015
2.	Mahadevan, K., Chitra, C	Electric Circuits Analysis	Prentice-Hall of India Pvt Ltd., New Delhi	2015
3.	Sudhakar A and Shyam Mohan SP	Circuits and Network Analysis and Synthesis	McGraw Hill	2015
4.	M E Van Valkenburg	Network Analysis	Prentice-Hall of India Pvt Ltd, New Delhi	2015
5.	Chakrabarti A	Circuits Theory (Analysis and synthesis)	Dhanpath Rai & Sons, New Delhi	2011

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21GES14	ELECTRIC CIRCUITS LABORATORY	L T P C 0 0 2 1

COURSE OBJECTIVES

- To simulate various electric circuits using Matlab
- To gain practical experience on electric circuits and verification of theorems

COURSE OUTCOMES

- Able to simulate the electrical circuits
- Able to design the circuit and implement in hardware

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		x	x	x	-	-	-	-	-	x	-	x	-	-	-
CO2	x	x	x	x	-	-	-	-	-	x	-	x	-	-	-
CO3	x	x	x	x	-	-	-	-	-	x	-	x	-	-	-
CO4	x	x	x	x	-	-	-	-	-	x	-	x	-	-	-
CO5	x	x	x	x	-	-	-	-	-	x	-	x	-	-	-

LIST OF EXPERIMENTS:

1. Verification of ohm's law
2. Verification of Kirchhoff's voltage and current laws.
3. Verification of Thevenin's theorem
4. Verification of Norton 's theorem
5. Verification of Superposition theorem
6. Verification of Maximum Power Transfer Theorem.
7. Study of CRO and measurement of sinusoidal voltage and frequency.
8. Determination of time constant of series R-C electric circuits.
9. Determination of frequency response of series & parallel RLC circuits.
10. Calibration of single phase energy meter.
11. Determination of power in three phase circuits by two-watt meter method.

TOTAL: 45 Hours

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21GES15 **MANUFACTURING PROCESSES** L T P C
3 0 0 3

COURSE OBJECTIVES

- To introduce the students to the concept of some basic production processes and fabrication techniques.
- Understand the Concept of metal casting processes.
- To understand metal joining processes.
- Understanding metal forming Processes.
- To study the Plastic and composite materialmouldingprocesses

COURSE OUTCOMES

CO1 Understand the concepts of casting processes.
CO2 Study about fabrication processes to join the different metals.
CO3 Understand the concept of bulk deformation process.
CO4 Study about the metal forming processes.
CO5 Understand the process of composite materials.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	X	X	X	-	-	X	-	-	-	-	-	-	X	-	-
CO2	X	X	X	-	-	X	X	X	-	X	-	-	X	-	-
CO3	X	X	-	X	X	X	X	X	-	X	-	-	X	-	-
CO4	X	X	X	X	X	X	-	-	-	-	-	-	X	-	-
CO5	X	X	-	-	X	X	X	X	-	X	-	X	X	X	X

UNIT I **CASTING PROCESSES** 9

Introduction–Patterns, Requirements of a good pattern, pattern materials, types of patterns, pattern allowances–Mould making, types of moulds, moulding processes, types of sand moulding–Coremaking,typesofcores,coreprints,corebox – MouldingSand Properties of mouldings and, types of mouldingsand–Melting equipment, cupola furnace, crucible furnace, electric furnace–Gating system–Casting processes, Sand casting, Shell-mouldcasting, Investment casting, Die casting, centrifugal casting –Defects, Cleaning and Inspection of casting.

UNIT II **FABRICATION PROCESSES** 9

Introduction–Classification of welding processes–Resistance welding, spot, seam, projection, butt welding–Gaswelding,oxy-acetylenewelding,equipments–Arcwelding,shielded arc welding, TIG, MIG, submerged arc welding, electro-slag welding, ultrasonic welding, plasma arc welding, laser beam welding, friction welding–Soldering and Brazing–Testing and Inspection of welded joints, Defects in welds.

UNIT III **BULK DEFORMATION PROCESSES** 9

Introduction–Cold and hot working processes Rolling, classification of rolling, principle, rolling stand arrangement, defects in rolling–Forging, classification of forging, methods of forging, defects in forging–Extrusion, Classification of extrusion, Hot and cold extrusion processes, extrusion defects and equipments–Drawing, Drawing of rods, wire and tubes.

UNIT IV **METAL FORMING PROCESSES** 9

Introduction-Metal stamping and forming, bending, deep drawing, stretch forming, metals pinning, blanking, piercing, embossing and coining, notching, punching, roll forming, rubber press forming, hydro-mechanical forming–Comparison of metal forming processes–Defects in sheet metal formed parts.

UNIT V **PLASTIC AND COMPOSITE MATERIAL PROCESSES** 9

Processing of plastics, compression moulding, transfer moulding, injection moulding, blow moulding, thermo forming and calendaring-advantages of plastic materials–Introduction to composite material–Classification of composite materials–advantages of composite materials.

TOTAL: 45 Hours

TEXT BOOKS:

Sl. No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	RajputR.K	ATextBookofManufacturingTechnology	Laxmipublications(P) Ltd,NewDelhi,	**2008**
2.	SharmaP.C	ATextBookofProductionTechnology	S.ChandandCompany IVEdition,	2004

REFERENCE BOOKS:

Sl. No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	RaoP.N,	ManufacturingTechnologyVol.1	TataMcGrawHillpublishingcompanylimited,NewDelhi,3rdedition,	2009
2.	HajraChoudhury	ElementsofWorkshopTechnologyVol .1&2.	MediapromotersPvtLtd. ,Mumbai	2007.
3.	SeropeKalpajianand Steven R.Schmid	Manufacturing Engineering and Technology	PearsonEducationInc., SecondIndianReprint	2002
4.	JainR.K	Production Technology	KhannaPublications	2001
5.	LuqmanMidhat	Production Processes	CBS; 1ST edition	2010

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21GES16 **MANUFACTURING PROCESSES LABORATORY** **L T P C**
0 0 3 1

COURSE OBJECTIVES

- To introduce the students to the concept of some basic production processes and fabrication techniques.
- Understand the Concept of metal casting proceses
- To understand metal joining processes.
- Understanding metal forming Processes.
- To study the Plastic and composite material moulding processes

COURSE OUTCOMES

CO1 Understand the concepts of casting processes..
CO2 Study about fabrication processes to join the different metals.
CO3 Understand the concept of bulk deformation process.
CO4 Study about the metal forming processes.
CO5 Understand the process of composite materials.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	X	X	X	-	-	X	-	-	-	-	-	-	X	-	-
CO2	X	X	X	-	-	X	X	X	-	X	-	-	X	-	-
CO3	X	X	-	X	X	X	X	X	-	X	-	-	X	-	-
CO4	X	X	X	X	X	X	-	-	-	-	-	-	X	-	-
CO5	X	X	-	-	X	X	X	X	-	X	-	X	X	X	X

List of Experiments

1. Fitting work :Preparation of l joint, v-joint
2. Carpentry work :Preparation of T-Joint, Lap joint, Dovetail Joint
3. Plumbing Work: Basic pipe connections (PVC) involving the fittings like Valves, Taps, and Bends., Mixed pipe (PVC and G.I) connections involving the fitting like Valves, Taps, and Bends
4. Sheet metal Work: Construction of Tray, Funnel and cone
5. Foundry : Solid pattern Moulding, Split pattern Moulding , Core making
6. Welding : Vertical Welding and Horizontal Welding
7. Lathe Work : Plain Turning, Step Turning, Taper Turning, and Knurling operation.

TOTAL: 30 Hours

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21GES17 **MECHANICAL AND BUILDING SCIENCES LABORATORY** **L T P C**
0 0 3 1

COURSE OBJECTIVES:

- At the end of course the student will plan the pipe connections in PVC, G.I pipes.
- Analyze to separate the woods with tools and made of several pieces with proper types of joints using tools and machines.
- Demonstrate and remove materials from metal components and assemble the components.
- Join two metals by melting their edges by electric arc welding.
- Demonstrate Residential house wiring and Fluorescent lamp wiring.

COURSE OUTCOMES

CO1 Able to make different pipe connections using PVC, G.I pipes.
CO2 Demonstrate different types of joints using carpentry and power tools.
CO3 Categories various sheet metal working tools and fitting tools.
CO4 Use welding equipments to join structures.
CO5 Organize household wirings.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	X	-	-	-	X	-	-	-	-	-
CO2	-	-	-	-	-	X	-	-	-	X	-	-	-	-	-
CO3	X	X	-	-	X	X	-	X	-	-	-	X	X	-	-
CO4	X	X	-	-	X	X	-	X	-	-	-	X	X	-	-
CO5	X	X	-	-	X	X	-	X	-	-	-	X	X	X	X

UNIT I **CIVIL ENGINEERING PRACTICE** **25**

1. PLUMBING WORK

1. Study of pipeline joints, its location and functions: valves, taps, couplings, unions, reducers, Elbows and household fittings.
2. Basic pipe connections (PVC) involving the fittings like Valves, Taps, and Bends.
3. Mixed pipe (PVC and G.I) connections involving the fitting like Valves, Taps, and Bends

2. CARPENTRY WORK

1. Study of Carpentry Tools
2. Preparation of T-Joint
   Preparation of Lap joint
3. Preparation of Dovetail Joint

UNIT II **MECHANICAL ENGINEERING PRACTICE** **25**

FITTING WORK

1. Study of Sheet Metal Work.
2. Preparation of L joint
3. Preparation of V-joint
4.

WELDING

1. Study of Welding Equipments and Tools
2. Preparation of Butt joint
3. Preparation of Lap joint
4. Preparation of Tee joint

MACHINE ASSEMBLY PRACTICE

1. Assembly and Dismantling for gear box.
2. Assembly and Dismantling for the two wheeler wheel.
3.

UNIT III **ELECTRICAL ENGINEERING PRACTICE** **10**

1. Residential house wiring
2. Fluorescent lamp wiring.
3. Stair-case Wiring and Door bell wiring

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21GES18 **FUNDAMENTALS OF CIVIL ENGINEERING** **L T P C**
3 0 0 3

Course Objectives

- Learn the fundamentals of civil engineering and unit conversion.
- Gain knowledge about the properties and uses of various materials for constructions.
- To develop a better understanding of aesthetic materials.
- Understand the building sub-structure components.
- Learn the building super-structure elements.

Programme Outcomes (POs)

a. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
c. 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.
d. 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.
e. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
m. An ability to make more sustainable products to meet the demands of the modern society.

Course Outcomes (COs)

1. Understand the scope and importance of civil engineering.
2. Understand the composition, properties and classification of building materials.
3. Analyze the properties of timber, and other building materials used in construction.
4. Explain the various building components and their functions.
5. Differentiate the types of masonry and also enumerate the functions of super-structure.

Articulation Matrix

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

UNIT I **SCOPE OF CIVIL ENGINEERING** **9**

Scope of Civil Engineering- Functions of a Civil Engineer - Types of Building: Residential- Commercial- Industrial & Institutional buildings- Site selection- Units & Unit conversions- Room dimensions as per NBC.

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UNIT II **PRIMARY BUILDING MATERIALS** 9

Bricks: Manufacturing of bricks-Types- Characteristics of Bricks. Stone: Characteristics of Stones- Coarse aggregate- Characteristics of good building stone. Concrete: Definition-Cement-Types. Fine aggregate- M-sand-Manufacturing of M-Sand. Ferrous metals: Iron and steel, basic metallurgy, composition and grades, market forms-Steel as reinforcement – Corrosion of metals and protection.

UNIT III **OTHER BUILDING MATERIALS** 9

Timber: Types of Timber - Seasoning of Timber- Applications. PVC, UPVC, Aluminium, copper, brass, polymers, Glass & Stainless steel types- Applications in construction. Paints: Composition of oil paints-Purpose of paints- Applications. Enamels- Varnishes- Plaster of Paris- Purpose- Applications.

UNIT IV **BUILDING COMPONENTS (SUB-STRUCTURE)** 9

Components of Building- Sub structures- Foundation and its Types- Construction sequence in Building-Design sequence in Building- Ground level- Basement- Plinth level- Sill level- Lintel level- Roof level-Parapet level.

UNIT V **BUILDING COMPONENTS (SUPER-STRUCTURE)** 9

Super-structure - Walls: Types of Stone masonry and Brick masonry walls- Brick bonds- Slab- Beam-Column-Roof- Floor- Door- Windows- Lintel- Parapet.

TOTAL: 45 Hours

Reference(s)

1. S. K. Duggal, Building Materials, New Age International (P) Ltd., 2003
2. P. C. Varghese, Building Materials, PHI Learning Private Limited, New Delhi, 2010
3. S. P. Arora and S. P. Bindra, Textbook of Building Construction, DhanpatRai Publications (P) Ltd., 2003
4. Punmia B. C., Jain A. J. and Jain A. J. Building construction, Laxmi Publications, 2005
5. Shetty .M.S., " Concrete Technology, Theory and Practice", Revised Edition, S. Chand & company Ltd., New Delhi,2006
6. E. Keith Blankenbaker, "Construction and Building Technology", 1st Edition, 2009

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21GES19 **CONCEPTS IN PRODUCT DESIGN** L T P C
3 0 0 3

COURSE OBJECTIVES

- To apply different ideas to manage innovation and development
- To analyze the product specification
- To know the concepts of CAD ,CAM ,CAE

COURSE OUTCOMES

CO1	Apply different ideas enabling people to manage to work with innovation and development in organization.
CO2	Examine the product specification select concept, product performance and manufacturing
CO3	Develop product geometry, layout, fundamental and incidental interaction
CO4	Design the integrated process robust design, conceptualization and management of industrial design.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	X	X	-	-	-	X	-	-	-	X	-	-	X	-	-
CO2	X	X	-	-	-	X	-	-	-	X	-	-	X	-	-
CO3	X	X	-	-	X	X	-	X	-	-	-	X	X	-	-
CO4	X	X	-	-	X	X	-	X	-	-	-	X	X	-	-
CO5	X	X	-	-	X	X	-	X	-	-	-	X	X	X	X

UNIT I: INTRODUCTION 9

Strategic importance of Product development - integration of customer, designer, material supplier and process planner, Competitor and customer - behavior analysis. Understanding customer-promoting customer understanding-involve customer in development and managing requirements

UNIT II: CONCEPT GENERATION, SELECTION AND TESTING 9

Plan and establish product specifications. Task - Structured approaches - clarification – search externally and internally- reflect on the solutions and processes -concept selection - methodology - benefits. Implications - product performance – manufacturability.

UNIT III: PRODUCT ARCHITECTURE 9

Product development management - creation - clustering -geometric layout development - Fundamental and incidental interactions - related system level design issues - secondary systems -architecture of the chunks - creating detailed interface specifications-Portfolio Architecture.

UNIT IV: INDUSTRIAL DESIGN 9

Integrate process design - Managing costs - Robust design - Integrating CAE, CAD, CAM tools – Simulating product performance and manufacturing processes electronically - Need for industrial design-impact – design process - investigation of customer needs – conceptualization- refinement - management of the industrial design process.

UNIT V: DESIGN FOR MANUFACTURING AND PRODUCT DEVELOPMENT 9

Definition - Estimation of Manufacturing cost-reducing the component costs and assembly costs – Minimize system complexity - Prototype basics - Principles of prototyping – Planning for prototypes - Economic Analysis.

TOTAL: 45 Hours

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TEXT BOOKS

Sl. No	Author(s)	Title of the Book	Publisher	Year of Publication
1	Ulrich K.T. and Eppinger S.D	Product Design and Development	McGraw –Hill International Editions	1999
2	Kevin Otto	Product Design	Pearson Education,	2004

REFERENCE BOOKS

Sl. No	Author(s)	Title of the Book	Publisher	Year of Publication
1	Rosenthal S	Business One Orwin Homewood	Business One Orwin, Homewood	1992
2	Rosenthal S	Effective Product Design and Development	Business One Orwin, Homewood	1992
3	Pugh S	Total Design – Integrated Methods for successful Product Engineering	Addison Wesley Publishing	1991
4	Clive L.Dym	Engineering Design: A Project-based Introduction	John Wiley & Sons	2009
5	Yousef Haik	Engineering Design Process	Cengage Learning	2010

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22GES20 **RENEWABLE ENERGY SOURCES** L T P C
3 0 0 3

COURSE OBJECTIVES

- At the end of the course, the students are expected to identify the new methodologies/ technologies for effective utilization of renewable energy sources.
- To understand reverse of energy recourses.
- Understand solar energy production and applications.
- To understand wind energy systems.
- Other energy recourses are studied and learned.

COURSE OUTCOMES

- Understand the fundamentals of energy scenario.
- Illustrate the techniques used in utilization and measurement of solar energy
- Demonstrate the types and performance of wind energy systems
- Comprehend and identify the bio-mass energy sources and applications.
- Outline the utilization techniques of tidal, wave, Hydro, geothermal, fuel cell systems and hybrid system energy sources.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	x	x	x	x	-	-	x	-	x	-	-	x	x	x	-
CO2	x	x	x	x	-	-	x	-	x	-	-	x	x	x	-
CO3	x	x	x	x	-	-	x	-	x	-	-	x	x	x	-
CO4	x	x	x	x	-	-	x	-	x	-	-	x	x	x	-
CO5	x	x	x	x	-	-	x	-	x	-	-	x	x	x	-

UNIT I INTRODUCTION 9

World Energy Use – Reserves of Energy Resources – Environmental Aspects of Energy Utilisation – Renewable Energy Scenario in Tamilnadu, India and around the World - Potentials - Achievements / Applications – Economics of renewable energy systems.

UNIT II SOLAR ENERGY 9

Solar Radiation – Measurements of Solar Radiation - Flat Plate and Concentrating Collectors – Solar direct Thermal Applications – Solar thermal Power Generation - Fundamentals of Solar Photo Voltaic Conversion – Solar Cells – Solar PV Power Generation – Solar PV Applications.

UNIT III WIND ENERGY 9

Wind Data and Energy Estimation – Types of Wind Energy Systems – Performance - Site Selection – Details of Wind Turbine Generator – Safety and Environmental Aspects.

UNIT IV BIO - ENERGY 9

Biomass direct combustion – Biomass gasifiers – Biogas plants – Digesters – Ethanol production – Bio diesel – Cogeneration - Biomass Applications.

UNIT V OTHER RENEWABLE ENERGY SOURCES 9

Tidal energy – Wave Energy – Open and Closed OTEC Cycles – Small Hydro-Geothermal Energy Hydrogen and Storage - Fuel Cell Systems – Hybrid Systems.

TOTAL: L: 45 Hours

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TEXT BOOKS:

Sl. No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	G.D. Rai	Non Conventional Energy Sources,	Khanna Publishers, New Delhi,	2011.
2.	Twidell, J.W. & Weir	A., Renewable Energy Sources	EFN Spon Ltd., UK,	2006

REFERENCE BOOKS:

Sl. No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	David M. Mousdale	Introduction to Biofuels,	CRC Press Taylor & Francis Group, USA	2010
2.	Chetan Singh Solanki	Solar Photovoltaic, Fundamentals, Technologies and Applications,	PHI Learning Private Limited, New Delhi	2009
3.	S.P. Sukhatme	Solar Energy	Tata McGraw Hill Publishing Company Ltd., New Delhi,	1997.
4.	Sinduja S	Renewable Energy Sources	Anuradha Publications	2012
5.	Tasneem abbasi and T.A Abbasi	Renewable Energy Sources: Their Impact on Global Warming and Pollution	Prentice Hall India Learning Private Limited	2010

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21GES21 **ELECTRICAL DRIVES AND CONTROLS** L T P C
3 0 0 3

COURSE OBJECTIVES

- To understand the basics of electrical drives.
- To study the drive motor characteristics,
- To study the different methods of starting D.C motors and Induction Motors.
- To study the Conventional and Solid-State DC Drives.
- To study the Speed Control of AC Drives.

COURSE OUTCOMES

1. Able to explain the basics of electrical drives.
2. Able to describe drive motor characteristics
3. Able to demonstrate the methods of starting D.C motors and Induction Motors.
4. Able to describe speed control of DC drives.
5. Able to explain the conventional and solid state speed control of AC drives.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	x	-	x	-	x	-	-	-	x	x	x	x	-	-	x
CO2	x	-	x	-	x	-	-	-	x	x	x	x	-	-	x
CO3	x	x	x	-	x	-	-	-	x	x	x	x	-	-	x
CO4	x	x	x	-	x	-	-	-	x	x	x	x	-	-	x
CO5	x	x	x	-	x	-	-	-	x	x	x	x	-	-	x

UNIT I INTRODUCTION 9

Basic Elements - Types of Electric Drives - Factors are influencing the choice of Electrical Drives -Heating and Cooling Curves - Loading conditions and classes of duty - Selection of power rating for drive motors with regard to thermal overloading and Load variation factors.

UNIT II DRIVE MOTOR CHARACTERISTICS 9

Dynamics of Motor load system – Multiquadrant operation – DC Motor (Types, Torque Equation, Characteristics and Applications) - Single phase induction motor (Types and Applications) - Three phase induction motors(Types, Characteristics) - Braking of Electric motors.

UNIT III STARTING METHODS 9

Necessity of a starters – Types of DC Motor Starters – Types of 3 phase squirrel cage and slip ring Induction Motor Starters.

UNIT IV CONVENTIONAL AND SOLID STATE SPEED CONTROL OF DC DRIVES 9

Speed control of DC series and shunt motors - Armature and field control - Ward-Leonard control system using controlled rectifiers and DC choppers.

UNIT V CONVENTIONAL AND SOLID STATE SPEED CONTROL OF AC DRIVES 9

Speed control of three phase induction motor - Voltage control, voltage / frequency control and slip power recovery scheme using inverters and AC voltage regulators.

TOTAL: 45 Hours

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	G. K. Dubey	Fundamentals of Electrical Drives	CRC press	2002
2.	Vedam Subrahmaniam	Electric Drives (Concepts and Applications)	Tata McGraw-Hill	2010

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Gnanavadivel J Karthikeyan J Chitra Selvi S	Electrical Drives and Controls	Anuradha Publishers	2004
2.	Thiyagarajan V	Electrical Drives and Controls	A.R. Publications	2015
3.	Pillai SK	A First Course on Electric Drives	New age international publishers	2013
4.	Jagadeesh Babu V	Electrical Drives and Controls	Scitech Publications	2015
5.	Austin Hughes and Bill Drury	Electric Motors and Drives	Newness Heinemann Publishers	2018

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21GES22 ELECTRICAL DRIVES AND CONTROLS LABORATORY

L	T	P	C
0	0	2	1

OBJECTIVES:

- To study the conventional and solid-state drives
- To study the different methods of starting D.C motors and induction motors.
- To understand the basic concepts of different types of electrical machines and their performance.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	x	-	x	-	x	-	-	-	x	x	x	x	-	-	x
CO2	x	-	x	-	x	-	-	-	x	x	x	x	-	-	x
CO3	x	x	x	-	x	-	-	-	x	x	x	x	-	-	x
CO4	x	x	x	-	x	-	-	-	x	x	x	x	-	-	x
CO5	x	x	x	-	x	-	-	-	x	x	x	x	-	-	x

LIST OF EXPERIMENTS:

1. Load test on DC Shunt & DC Series motor.
2. O.C.C & Load characteristics of DC Shunt and DC Series generator.
3. Speed control of DC shunt motor (Armature, Field control).
4. Load test on single phase transformer.
5. O.C & S.C Test on a single phase transformer.
6. V curves and inverted V curves of synchronous Motor.
7. Load test on three phase squirrel cage Induction motor.
8. Speed control of three phase slip ring Induction Motor.
9. Load test on single phase Induction Motor.
10. Study of DC & AC Starters.

TOTAL: 45 Hours

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21GES23	ANALOG AND DIGITAL COMMUNICATION	L T P C 3 0 0 3

COURSE OBJECTIVES

1. To Understand basic elements of a communication system
2. To Conduct analysis of baseband signals in time domain and in frequency domain
3. To Demonstrate understanding of various analog and digital modulation and demodulation techniques
4. To Analyses the performance of modulation and demodulation techniques in various transmission
5. To appreciate the importance of synchronization in communication systems

COURSE OUTCOMES

1. Explain and apply various types of modulation and demodulation in analog and digital
2. Describe the concept of digital communication techniques.
3. Describe the concept of various digital transmission techniques.
4. Comprehend the Cellular communication techniques.
5. Explain the concepts of Satellite communication and Optical communication

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

UNIT I FUNDAMENTALS OF ANALOG COMMUNICATION 9

Principles of amplitude modulation - AM envelope - frequency spectrum and bandwidth - modulation index and percent modulation - AM Voltage distribution - AM power distribution - Angle modulation - FM and PM waveforms - phase deviation and modulation index - frequency deviation and percent modulation - Frequency analysis of angle modulated waves - Bandwidth requirements for Angle modulated waves.

UNIT II DIGITAL COMMUNICATION 9

Shannon limit for information capacity - Digital amplitude modulation - Frequency Shift Keying - FSK bit rate and baud - FSK transmitter - BW consideration of FSK - FSK receiver - Phase Shift Keying – BPSK, QPSK8- PSK - Quadrature Amplitude modulation – 8-QAM - bandwidth efficiency - Carrier recovery – squaring loop, Costas loop - DPSK.

UNIT III DIGITAL TRANSMISSION 9

Pulse modulation - PCM – PCM sampling - Sampling rate - Signal to Quantization noise rate - Commanding-analog and digital - Delta modulation PCM - Adaptive Delta modulation PCM - Differential PCM – Inter symbol interference - Eye patterns.

UNIT IV CELLULAR COMMUNICATION 9

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Fundamental concept of Cellular telephone - Frequency reuse, Interference - Co-channel Interference, Adjacent channel Interference - Cell splitting - Cell sectoring - Segmentation and Dualization - Roaming and Handoff.

UNIT V **SATELLITE AND OPTICAL COMMUNICATION** **9**

Kepler's Law - Satellite Orbits - Geo synchronous satellites - satellite system link models -Optical Fiber Communication system - Optical Fiber configurations - Optical Fiber classification Losses in Optical fiber cables - Optical sources - LED , Injection laser diode - Light detector - PIN diodes, Avalanche photo diode.

TOTAL: 45 Hours

TEXT BOOK

Sl.No	AUTHOR(s)	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	Wayne Tomasi,	Electronic Communication Systems Fundamentals through Advanced	Pearson Education	2008
2.	H.Taub,D L Schilling,G Saha	Principles of Communication	Pearson Education	2008

REFERENCE BOOK

Sl.No	AUTHOR(s)	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	B.P.Lathi	Modern Analog and Digital Communication systems	Oxford University Press	2008
2.	Blake	Electronic Communication Systems	Thomson Delmar Publications	2002
3.	Martin S.Roden	Analog and Digital Communication System	PHI	2002
4.	B.Sklar	Digital Communication Fundamentals and Applications	Pearson Education	2007
5.	Simon Haykin	Communication Systems	John Wiley & Sons	2010.

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21GES24 DIGITAL PRINCIPLES AND SYSTEM DESIGN

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

- To know about the basics of Boolean Algebra and Logic Gates.
- To Design and Implement Combinational Logic.
- To Design and Implement Synchronous Sequential Logic.
- To Design and Implement of Asynchronous Sequential Logic.
- Be familiar with the theory, construction, and operation of Basic Memory And Programmable Logic.

COURSE OUTCOMES:

- To Learn about the basics of Boolean Algebra and Logic Gates.
- To Learn about the basics Combinational Logic.
- To Learn about the basics Synchronous Sequential Logic.
- To Learn about the basics of Asynchronous Sequential Logic.

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

UNIT I BOOLEAN ALGEBRA AND LOGIC GATES 6

Review of Number Systems –Arithmetic Operations -Binary Codes–Boolean Algebra and Theorems –Boolean Functions–Simplification of Boolean Functions using Karnaugh Map and \Tabulation Methods –Logic Gates–NAND and NOR Implementations.

UNIT II COMBINATIONAL LOGIC 6

Combinational Circuits –Analysis and Design Procedures–Circuits for Arithmetic Operations, Code Conversion –Decoders and Encoders –Multiplexers and Demultiplexers –Introduction to HDL –HDL Models of Combinational circuits.

UNIT III SYNCHRONOUS SEQUENTIAL LOGIC 6

Sequential Circuits –Latches and Flip Flops –Analysis and Design Procedures –State Reduction and State Assignment –Shift Registers–Counters –HDL for Sequential Logic Circuits.

UNIT IV ASYNCHRONOUS SEQUENTIAL LOGIC 6

Analysis and Design of Asynchronous Sequential Circuits–Reduction of State and Flow Tables –Race-free State Assignment–Hazards.

UNIT V MEMORY AND PROGRAMMABLE LOGIC 6

RAM and ROM –Memory Decoding –Error Detection and Correction –Programmable Logic Array –Programmable Array Logic –Sequential Programmable Devices –Application Specific Integrated Circuits.

TOTAL: 30 Hours

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Morris Mano M. and Michael D. Ciletti	Digital Design	Pearson Education	IV Edition, 2008.
2.	John F. Wakerly,	Digital Design Principles and Practices	Pearson Education	IV Edition, 2007

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Charles H. Roth Jr,	Fundamentals of Logic Design	Jaico Publishing House	Fifth Edition–, Mumbai, 2003
2.	Donald D. Givone	Digital Principles and Design	Tata Mcgraw Hill	2003
3.	Kharate G. K	Digital Electronics	Oxford University Press	2010
4.	Thomas L. Floyd	Digital Fundamentals	Pearson Education Inc	10th Edition, 2011
5.	Donald D.Givone	Digital Principles and Design	TMH	2003

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		L	T	P	C
21GES25	DIGITAL PRINCIPLES AND SYSTEM DESIGN LABORATORY	0	0	2	1

COURSE OBJECTIVES:

- To know about the basics of Boolean Algebra and Logic Gates.
- To Design and Implement Combinational Logic.
- To Design and Implement Synchronous Sequential Logic.
- To Design and Implement of Asynchronous Sequential Logic.
- Be familiar with the theory, construction, and operation of Basic Memory And Programmable Logic.

COURSE OUTCOMES:

- To Learn about the basics of Boolean Algebra and Logic Gates.
- To Learn about the basics Combinational Logic.
- To Learn about the basics Synchronous Sequential Logic.
- To Learn about the basics of Asynchronous Sequential Logic.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	x	x	x	x	x				x	x			x	x	x
CO2	x	x	x	x	x				x	x	x		x	x	x
CO3	x	x	x	x	x				x	x	x	x	x	x	x

LIST OF EXPERIMENTS

1. Verification of Boolean theorems using digital logic gates
2. Design and implementation of combinational circuits using basic gates
3. Design and implementation of 4-bit binary adder / subtractor using basic gates and MSI devices.
4. Design and implementation of parity generator / checker using basic gates and MSI devices
5. Design and implementation of magnitude comparator.
6. Design and implementation of application using multiplexers/ Demultiplexers.
7. Design and implementation of Shift registers
8. Design and implementation of Synchronous and Asynchronous counters
9. Design and implementation of Coding combinational / sequential circuits using HDL

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21GES26	ENGINEERING DRAWING	L	T	P	C
		1	0	2	3

COURSE OBJECTIVES

- To construct various curves in engineering applications.
- To draw the projection of three dimensional objects representing machine structure.
- To analyze the principles of projection of various planes by different angle to project points, lines and planes.
- To draw the projection of simple solid when axis is inclined to one reference plane by change of position method.
- To identify the interior components of machinery (or) buildings by sectioning the solid, and to study the development of simple solids for fabrication of sheet metals.

COURSE OUTCOMES

CO1	Construct various curves in engineering applications.
CO2	Draw the projection of three dimensional objects representing machine structure.
CO3	Analyze the principles of projection of various planes by different angle to project points, lines and planes.
CO4	Draw the projection of simple solid when axis is inclined to one reference plane by change of position method.
CO5	Identify the interior components of machinery (or) buildings by sectioning the solid, and to study the development of simple solids for fabrication of sheet metals.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	X	-	-	-	-	-	-	-	-	X	-	-	X	X	-
CO2	X	-	-	-	-	-	-	-	-	X	-	-	X	X	-
CO3	X	-	-	-	-	-	-	-	-	X	-	-	X	X	-
CO4	X	-	-	-	-	-	-	-	-	X	-	-	X	X	-
CO5	X	-	-	-	-	-	-	-	-	X	-	-	X	X	-

CONCEPTS AND CONVENTIONS (Not for Examination) 4

Importance of graphics in engineering applications, Use of drafting instrument, BIS conventions and specifications - Size, layout and folding of drawing sheets, Lettering and dimensioning.

COMPUTER AIDED DRAFTING (Not for Examination) 6

Importance 2d Drafting, sketching, modifying, transforming and dimensioning.

UNIT I PLANE CURVES 13

Curves used in engineering practices, Conics, Construction of ellipse, Parabola and hyperbola by eccentricity method, Construction of cycloid, construction of involutes of square and circle, Drawing of tangents and normal to the above curves.

UNIT II ISOMETRIC TO ORTHOGRAPHIC VIEWS 13

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Representation of three dimensional objects, General Principles of Orthographic projection, Need for importance of multiple views and their placement, First angle projection, layout of views, Developing visualization skills through free hand sketching of multiple views from pictorial views of objects.

UNIT III **PROJECTION OF POINTS, LINES AND PLANE** **13**

(Free hand sketching) Projection of points, Projection of straight lines located in the first quadrant, Determination of true lengths and true inclinations, Projection of polygonal surface and circular lamina inclined to both reference planes.

UNIT IV **PROJECTION OF SOLIDS** **13**

(Free hand sketching) Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method.

UNIT V **SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES** **13**

(Free hand sketching) Sectioning of simple solids like prisms, pyramids, cylinder and cone in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other, (Obtaining true shape of section is not required). Development of lateral surfaces of simple and truncated solids, Prisms, pyramids, cylinders and cones.

TOTAL: L: 15 + P: 60 = 75

TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Natrajan K.V	A text book of Engineering Graphics	Dhanalakshmi Publishers, Chennai	2015
2.	Basant Agrawal and C.M. Agrawal	Engineering Drawing	McGraw Hill Education; Second edition	2013

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Gopalakrishnan K.R	Engineering Drawing (Vol. I&II combined)	Subhas Stores Bangalore	2007
2	Luzzader, Warren.J. and Duff,John M	Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production	Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi	2005
3	Shah M.B., and Rana B.C	Engineering Drawing	Pearson, 2nd Edition	2009
4	Venugopal K. and Prabhu Raja V	Engineering Graphics	New Age International (P) Limited	2008
5	Bhatt N.D. and Panchal V.M	Engineering Drawing	Charotar Publishing House, 50th Edition	2010

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21GES27 **ENGINEERING GEOLOGY** L T P C
3 0 0 3

COURSE OBJECTIVES

- To impart the concepts of geological agents and their processes.
- To provide knowledge on various properties of minerals and their engineering significance.
- To give knowledge on various classifications of rocks.
- To understand the importance of geological investigations and mapping.

COURSE OUTCOMES

- Understand the application of geology knowledge to Civil Engineering construction.
- Understand the concepts of various geological materials.
- Understand the properties, behaviour and engineering significance of different type of rocks and minerals.
- Learned the interpretation skills of geological maps having different type of geological features.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	X	X	X	X	-	X	-	-	-	-	-	X	X	-	-
CO2	X	X	X	X	-	X	-	-	-	-	-	X	X	-	-
CO3	X	X	X	X	-	X	-	-	-	-	-	X	X	-	-
CO4	X	X	X	X	-	X	-	-	-	-	-	X	X	-	-
CO5	X	X	X	X	-	X	-	-	-	-	-	X	X	-	-

UNIT I **PHYSICAL GEOLOGY** 9

Role of Geology in civil engineering – Branches of geology – Earth structures and composition – Elementary knowledge on continental drift and plate tectonics – Earth processes – weathering – soils – Geological work of river, wind and sea – Engineering importance – Earthquake belts in India – Ground water – Mode of occurrence – Prospecting .

UNIT II **MINEROLOGY** 9

Elementary knowledge on symmetry elements of important crystallographic systems – Physical properties of minerals – Study of the rock forming minerals – Quartz family – Feldspar family – Mica – Pyroxene family minerals – Fundamentals of process of formation of ore minerals – Properties, behaviour and engineering significance of clay minerals – Coal and petroleum – Their origin and occurrence in India.

UNIT III **PETROLOGY** 9

Classification of rocks – Distinction between igneous, sedimentary and metamorphic rocks – Occurrence, Engineering properties and distribution – Igneous rocks – Granite, syenite, diorite, gabbro, pegmatite, dolerite and basalt – sedimentary rocks – Sandstone, limestone, shale, conglomerate and breccias – Metamorphic rocks – Quartzite, marble, slate, phyllite, gneiss and schist.

UNIT **STRUCTURAL GEOLOGY AND MAP** 9

Attitude of beds – Outcrops – Contours – Introduction to geological maps – Folds – Faults and joints – Their bearing on engineering construction – Seismic and electrical methods for civil engineering investigations. Study of structures.

UNIT V **GEOLOGICAL INVESTIGATION** 9

Remote sensing for civil engineering applications; Geological conditions necessary for design and construction of Dams, Reservoirs, Tunnels, and Road cuttings. Causes and preventions – Sea erosion and Coastal protection.

TOTAL: 45 hours

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21GES28 **ENGINEERING MECHANICS** L T P C
3 1 0 4

COURSE OBJECTIVES

- To generalize the scalar and vector representation of forces and moments.
- To explore truss, beam, frame and cable problems and respond to the distributed force systems.
- To predict Centroid and Moment of Inertia.
- To realize the Laws of Motion, Principle of Work and Energy, Kinematics & Kinetics of Motion and the interrelationship.
- To comprehend the effect of friction on equilibrium.

COURSE OUTCOMES

CO1 Generalize the scalar and vector representation of forces and moments.
CO2 Explore truss, beam, frame and cable problems and respond to the distributed force systems.
CO3 Predict Centroid and Moment of Inertia.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	X	X	X	X	-	X	-	-	-	-	-	X	X	-	-
CO2	X	X	X	X	-	X	-	-	-	-	-	X	X	-	-
CO3	X	X	X	X	-	X	-	-	-	-	-	X	X	-	-
CO4	X	X	X	X	-	X	-	-	-	-	-	X	X	-	-
CO5	X	X	X	X	-	X	-	-	-	-	-	X	X	-	-

UNIT I BASICS AND STATICS OF PARTICLES 15

Introduction – Units and Dimensions – Laws of Mechanics – Lami's theorem, Parallelogram and triangular Law of forces – Vectorial representation of forces – Vector operations of forces – additions, subtraction, dot product, cross product – Coplanar Forces – rectangular components – Equilibrium of a particle – Forces in space – Equilibrium of a particle in space – Equivalent systems of forces – Principle of transmissibility .

UNIT II EQUILIBRIUM OF RIGID BODIES 15

Free body diagram – Types of supports – Action and reaction forces –stable equilibrium – Moments and Couples – Moment of a force about a point and about an axis – Vectorial representation of moments and couples – Scalar components of a moment – Varignon's theorem – Single equivalent force -Equilibrium of Rigid bodies in two dimensions – Equilibrium of Rigid bodies in three dimensions

UNIT III PROPERTIES OF SURFACES AND SOLIDS 15

Centroids and centre of mass – Centroids of lines and areas – Rectangular, circular, triangular areas by integration – T section, I section, Angle section, Hollow section by using standard formula – Theorems of Pappus – Area moments of inertia of plane areas – Rectangular, circular, triangular areas by integration – T section, I section, Angle section, Hollow section by using standard formula – Parallel axis theorem and perpendicular axis theorem – Principal moments of inertia of plane areas – Principal axes of inertia-Mass moment of inertia

UNIT IV DYNAMICS OF PARTICLES 15

Displacements, Velocity and acceleration, their relationship – Relative motion – Curvilinear motion – Newton's laws of motion – Work Energy Equation – Impulse and Momentum – Impact of elastic bodies.

UNIT V FRICTION 15

Friction force – Laws of sliding friction – equilibrium analysis of simple systems with sliding friction – wedge friction – Rolling – resistance.

TOTAL:L : 45 + T :30 = 75

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Beer, F.P and Johnston. E.R.,	Vector Mechanics for Engineers: Statics and Dynamics	Tata McGraw-Hill Publishing company, New Delhi	2013
2.	S. imoshenko, D.H. Young, J.V. Rao and SukumarPati	Engineering Mechanics	McGraw Hill Education; 5 edition	2013

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Hibbeller, R.C and Ashok Gupta	Engineering Mechanics: Statics and Dynamics	Pearson Education	2010
2	Irving H. Shames and Krishna Mohana Rao. G	Engineering Mechanics – Statics and Dynamics	Pearson Education	2006
3	Meriam J.L. and Kraige L.G	Engineering Mechanics	John Wiley & Sons	2013
4	Rajasekaran S and Sankarasubramanian G	Engineering Mechanics	Vikas Publishing House Pvt. Ltd	2005
5	Bhavikatti, S.S	Engineering Mechanics	New Age International (P) Limited Publishers	2015

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21GES29	WIRELESS COMMUNICATION	3	0	0	3

COURSE CATEGORY : General Engineering Sciences (GES)
PRE-REQUISITE COURSE : Analog and Digital Communication Systems
PREAMBLE : This course provides an introduction to the basic concepts and techniques of cellular radio communication, describes the concepts behind various mobile radio propagation, multiple access schemes and wireless systems.

OBJECTIVES : The course should enable the students to:
1 To introduce the concepts of wireless / mobile communication using cellular environment.
2 To make the students to know about the various propagation models.
3 To make the students to understand multiple access techniques used in the mobile communication.
4 To introduce various wireless network systems and standards.

COURSE OUTCOMES :
CO1 Explain the basic concepts of wireless communication systems
CO2 Design a cellular system
CO3 Characterize wireless channels
CO4 Explain the multiple access techniques with its comparison.
CO5 Describe the wireless systems.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	-	-	-	-	-	-	-	-	-	-			
CO2	3	2	2	-	-	-	-	-	-	-	-	-			
CO3	2	1	1	-	-	-	-	-	-	-	-	-			
CO4	3	1	-	-	2	-	-	-	-	-	-	1			
CO5	2	1	-	-	-	-	-	-	-	-	-	2			

UNIT I **INTRODUCTION TO WIRELESS COMMUNICATION SYSTEM** **9 Hrs**

History and evolution of mobile radio communication – Mobile radio systems around the world – Examples of wireless communication – Generations – 1G, 2G, 3G and 4G – Wireless Local Loop(WLL) – Wireless Local Area Network (WLAN).

UNIT II **THE CELLULAR CONCEPT** **9 Hrs**

Cellular system, Hexagonal geometry cell and concept of frequency reuse, Channel Assignment Strategies Distance to frequency reuse ratio, Channel & co-channel interference reduction factor, S/I ratio consideration and calculation for Minimum Co-channel and adjacent interference, Handoff Strategies, Umbrella Cell Concept, Trunking and Grade of Service, Improving Coverage & Capacity in Cellular System-cell splitting, Cell sectorization, Repeaters, Micro cell zone concept

UNIT III **MOBILE RADIO PROPAGATION** **9 Hrs**

Large scale path loss – Path loss models: Free Space and Two-Ray models -Link Budget design – Small scale fading- Parameters of mobile multipath channels – Time dispersion parameters- Coherence bandwidth – Doppler spread & Coherence time, Fading due to Multipath time delay spread – flat fading – frequency selective fading – Fading due to Doppler spread – fast fading – slow fading.

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UNIT IV MULTIPLE ACCESS SCHEMES 9 Hrs

Introduction, Comparisons of multiple Access Strategies TDMA, CDMA, FDMA, OFDM, CSMA Protocols.

UNIT V WIRELESS SYSTEMS 9 Hrs

GSM system architecture, Radio interface, Protocols, Localization and calling, Handover, Authentication and security in GSM, GSM speech coding, Concept of spread spectrum, Architecture of IS-95 CDMA system, Air interface, CDMA forward channels, CDMA reverse channels, Soft handoff, CDMA features, Power control in CDMA, Performance of CDMA System, RAKE Receiver, CDMA2000 cellular technology, GPRS system architecture.

Total Hours: 45

TEXT BOOKS

S.No.	AUTHOR (S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR
T1	Andrea Goldsmith	Wireless Communications	Cambridge University Press	2007
T2	T.S.Rappaport	Wireless Communications: Principles and Practice	Second Edition, Pearson Education/ Prentice Hall of India, Third Indian Reprint	2003

REFERENCE BOOKS :

S.No.	AUTHOR (S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR
R1	P. MuthuChidambara Nathan	Wireless Communications	PHI, 1st edition	2008
R2	Goldsmith	Wireless Communications	Cambridge University Press, 1st edition	2005
R3	R. Blake	Wireless Communication Technology	Thomson Delmar, 1st edition	2000
R4	W.C.Y.Lee	Mobile Communications Engineering: Theory and applications	Second Edition, McGraw-Hill International	1998
R5	W.C.Y.Lee	Mobile Communication Design Fundamentals	Second edition, John Wiley & sons	1993

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		L	T	P	C
21GES30	ELECTRONICS AND MICROPROCESSORS	3	0	0	3

OBJECTIVES :

1 To understand various semiconductor devices and rectifiers.
2 To study the various types of Transistors and Amplifiers.
3 To Provide Information on digital electronics and their need.
4 To Understand the architecture of 8085 and their interfacing and its applications.

COURSE OUTCOMES :

After the completion of the course, Students shall be able to,

CO1	Describe the semiconductor devices and rectifiers.	**K2**
CO2	Explain types of transistors and amplifiers.	**K2**
CO3	Discuss the digital electronics.	**K2**
CO4	Summarize the architecture of 8085 and its features.	**K2**
CO5	Discuss the interfacing Techniques and applications of 8085.	**K2**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	1	1	2			2	1		1	2	1	
CO2	2	2	3	2	2	2			1	2			2	1	
CO3	3	2	3	2	2	2			1	1			2	1	
CO4	3	3	3	2	2	2			2	2			2	1	
CO5	2	1	2	2	2	1			1	1		1	2	1	

COURSE CONTENTS :

UNIT I **SEMICONDUCTORS AND RECTIFIERS** **9 Hrs**

Classification of solids based on energy band theory-Intrinsic semiconductors-Extrinsic semiconductors - P type and N type - PN junction - Zenor effect - Zenor diode characteristics - Half wave and full wave rectifiers.

UNIT II **TRANSISTORS AND AMPLIFIERS** **9 Hrs**

Bipolar junction transistor- CB, CE, CC configuration and characteristics-Biasing circuits- Class A, B and C amplifiers- Field effect transistor-Configuration and characteristic of FET amplifier.

UNIT III **DIGITAL ELECTRONICS** **9 Hrs**

Binary number system - AND, OR, NOT, NAND, NOR circuits-Boolean algebra- Exclusive OR gate - Flip flops-Half and full adders-Registers-Counters-A/D and D/A conversion.

UNIT IV **8085 MICROPROCESSOR** **9 Hrs**

Block diagram of microcomputer-Architecture of 8085-Pin configuration-Instruction set- Addressing modes-Simple programs using arithmetic and logical operations.

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UNIT V INTERFACING AND APPLICATIONS OF MICROPROCESSOR **9 Hrs**

Basic interfacing concepts - Interfacing of Input and Output devices-Applications of microprocessor Temperature control, Stepper motor control, traffic light control.

Total Hours: 45

TEXT BOOKS

S.No.	AUTHOR (S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR
T1	Milman and Halkias	Integrated Electronics	Tata McGraw-Hill publishers,	1995
T2	Ramesh Goankar	Microprocessor Architecture", Programming and Applications with 8085	Wiley Eastern	1998

REFERENCE BOOKS :

S.No.	AUTHOR (S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR
R1	Malvino and Leach	Digital Principles and Applications	Tata McGraw-Hill	1996
R2	Mehta V.K	Principles of Electronics	S. Chand and Company Ltd	1994
R3	Dougles V.Hall	Microprocessor and Interfacing", Programming and Hardware	Tata McGraw-Hill	1999
R4	Salivahanan S, Suresh Kumar N, Vallavaraj A	Electronic Devices and Circuits	Tata McGraw-Hill	1999

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11	Apply an 8085 Assembly Language Program to arrange ascending and descending orders from a given 8-bit series numbers.	S2
12	Analyze an Interfacing of Stepper Motor with Microprocessor 8085.	S2

REFERENCE BOOKS

S.No.	AUTHOR (S) NAME	TITLE OF THE BOOK	PUBLISHER	YEAR
R1	Milman and Halkias	Integrated Electronics	Tata McGraw-Hill publishers,	1995
R2	Ramesh Goankar	Microprocessor Architecture", Programming and Applications with 8085	Wiley Eastern	1998

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21GES33	ELECTRONIC DEVICES AND CIRCUITS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- Understand the theory of semiconductor diodes and their application.
- Gain a thorough understanding of operation and characteristics of TRIAC & DIAC, GTO.
- Know the basics of BJT operation, configuration and their application.
- Understand the concept of amplifiers and different types of feedback.
- Gain knowledge about the operation of oscillators and power supplies.

COURSE OUTCOMES:

At the end of this course, students will demonstrate the ability to

- Able to explain the structure and operation of the basic electronic devices
- Able to understand the different types of transistor structure and their operation.
- Able to learn the different types of amplifiers and its small signal analysis.
- Able to design the multistage and differential amplifier.
- Able to know about the feedback amplifiers and oscillators.

UNIT I APPLICATIONS OF SEMICONDUCTOR DEVICES 9

Introduction to semiconductor diode, PN junction diode structure, operation and VI characteristics - Zener diode -. Display devices- LED, LCD, Rectifiers: Half Wave and Full Wave Rectifiers

UNIT II TRANSISTORS 9

UJT, BJT, JFET, MOSFET, IGBT Construction, operation and V-I characteristics – Thyristor construction, operation and V-I characteristics, Two transistor analogy.

UNIT III AMPLIFIERS 9

BJT small signal model – Analysis of CE, CB, CC amplifiers- Gain and frequency response – MOSFET small signal model– Analysis of CS and Source follower – Gain and frequency response.

UNIT IV MULTISTAGE AMPLIFIERS AND DIFFERENTIAL AMPLIFIER 9

BICMOS cascade amplifier, Differential amplifier – Common mode and Difference mode analysis – Single tuned amplifiers – Gain and frequency response – Neutralization methods, power amplifiers –Types (Qualitative analysis).

UNIT V FEEDBACK AMPLIFIERS AND OSCILLATORS 9

Advantages of negative feedback – voltage / current, series, Shunt feedback –positive feedback – Condition for oscillations, RC phase shift, Wien bridge, Hartley, Colpitts and Crystal oscillators.

Total = 45 Periods

TEXT BOOKS				
Sl.No	**Author(s)**	**Title of the Book**	**Publisher**	**Year of Publication**
1.	Jacob. Millman, Christos C.Halkias	Electronic Devices and Circuits	Tata McGraw Hill	2012
2.	Sedha.R.S	A Text Book of Applied Electronics	Sultan Chand Publishers	2010
REFERENCE BOOKS:				
Sl.No	**Author(s)**	**Title of the Book**	**Publisher**	**Year of Publication**
1.	David A.Bell	Electronic Devices and Circuits	Prentice Hall of India Private Limited	2013
2.	Gupta.J.B	Electron Devices and Circuits	S.K.Kataria & Sons	2012
3.	Mathur.S.P, Kulshreshtha.D.C and Chanda.P.R	Electronic Devices – Applications and Integrated circuits	Umesh Publications	2010
4.	Malvino	Electronic Principles	Tata McGraw Hill	2010
5.	Boylestad & Nashelsky	Electronic Devices & Circuit Theory	Prentice Hall Of India (P) Ltd	2009

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21GES34	ELECTRONIC SIMULATION LABORATORY	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

- Able to explain the structure and operation of the basic electronic devices
- Able to understand the different types of transistor structure and their operation.
- Able to learn the different types of amplifiers and its small signal analysis.
- Able to know about the feedback amplifiers and oscillators.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	x	x	x	x	x				x	x	x		x	x	x
CO2	x	x	x	x	x				x	x	x		x	x	x
CO3	x	x	x	x	x				x	x	x	x	x	x	x

LIST OF EXPERIMENTS:

1. Characteristics of PN Junction diode under forward and reverse biased condition.
2. Characteristics of Zener diode
3. Characteristics of Half and Full wave rectifier.
4. Characteristics of a NPN Transistor under common emitter configuration.
5. Characteristics of a NPN Transistor under common base configuration.
6. Characteristics of a NPN Transistor under common collector configuration.
7. Characteristics of Junction Field Effect Transistor.
8. Characteristics of Uni Junction Transistor.
9. Design and frequency response characteristics of a common emitter amplifier.
10. Characteristics of photo diode & photo transistor.
11. Frequency response of RC phase shift and LC oscillators
12. Frequency response of LC oscillators
13. Differential amplifiers using FET
14. Study of CRO for frequency and phase measurements.

Total = 30 Periods

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Course Name	:	21CYC14 -DIGITAL FORENSICS	L	T	P	C
			3	0	0	3

	Course Objectives
1	To learn the fundamentals and importance of digital forensics.
2	To learn digital investigation in an organized and systematic way.
3	To learn data acquisition methods.
4	To understand knowledge on Digital Forensics.
5	To develop computer forensic tools.

	Course Outcomes
1	Explain the concepts of digital forensics.
2	Analyze investigation process.
3	Remember the inner workings of file systems.
4	Design data acquisition methods
5	Apply various forensic tools

Unit-I : Introduction	
Computer forensics fundamentals- Benefits of forensics-computer crimes-computer forensics evidence and courts- legal concerns and private issues.	9
Unit-II : Computing Investigations	
Understanding Computing Investigations – Procedure for corporate High-Tech investigations-understanding data recovery work station and software- conducting and investigations.	9
Unit-III : Data Acquisition	
Data acquisition- understanding storage formats and digital evidence- determining the best acquisition method, acquisition tools- validating data acquisitions-performing RAID data acquisitions- remote network acquisition tools- other forensics acquisitions tools	9
Unit-IV : Processing Crimes	
Processing crimes and incident scenes-securing a computer incident or crime-seizing digital evidence at scene-storing digital evidence-obtaining digital hash-reviewing case.	9
Unit-V : Current Computer Forensic Tools	
Current computer forensics tools- software, hardware tools, validating and testing forensic software, addressing data-hiding techniques, performing remote acquisitions, E-Mail investigations- investigating email crime and violations, understanding E-Mail servers, specialized E-Mail forensics tool.	9
:	45

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	**Karlstad**, Joakim	Fundamentals of Digital Forensics	Springer	2018
2.	Anders Flaglien, Inger Marie Sunde,AusraDilijonaite	Digital Forensics	John Wiley & Sons,	2017

REFERENCE BOOK

SI.NO	Author(s)	Title of the Book	Publisher	Year of Publications
1.	**Michael Hale Ligh, Andrew Case**	The Art of Memory Forensics	Wiley	2014
2.	Jack Wiles Anthony Reyes	The best damn cybercrime and digital forensics	Syngress	2007
3	Sharma, S.R	Dimensions Of Cyber Crime	Annual Publications Pvt. Ltd., 1st Edition	2004

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Course Name	:	21CYC15 -INTRODUCTION TO CYBER LAWS	L	T	P	C
			3	0	0	3

Course Objectives

1	To learn the basics concepts of Cyber evolution and computer technology
2	To learn Information Technology.
3	To Understand of concepts of Cyber Law
4	To develop the security in business
5	To learn cybercrime concepts

Course Outcomes

1	Explain the concepts of Cyberspace.
2	Analyze the various Information Technology Act
3	To Understand basics of Cyber Law related with legislation
4	Design Security in cyber space
5	Apply Various Case Studies on Real Time Crimes.

Unit-I : Introduction To Cyber Law Evolution Of Computer Technology	
Emergence of Cyber space. Cyber Jurisprudence, Jurisprudence and law, Doctrinal approach, Consensual approach, Real Approach, Cyber Ethics, Cyber Jurisdiction, Hierarchy of courts, Civil and criminal jurisdictions, Cyberspace-Web space, Web hosting and web Development agreement, Legal and Technological Significance of domain Names, Internet as a tool for global access.	9
Unit-II :Information Technology Act	
Overview of IT Act, 2000, Amendments and Limitations of IT Act, Digital Signatures, Cryptographic Algorithm, Public Cryptography, Private Cryptography, Electronic Governance, Legal Recognition of Electronic Records, Legal Recognition of Digital Signature Certifying Authorities, Cyber Crime and Offences, Network Service Providers Liability, Cyber Regulations Appellate Tribunal, Penalties and Adjudication	9
Unit-III :Cyber Law And Related Legislation	
Patent Law, Trademark Law, Copyright, Software – Copyright or Patented, Domain Names and Copyright disputes, Electronic Data Base and its Protection, IT Act and Civil Procedure Code, IT Act and Criminal Procedural Code, Relevant Sections of Indian Evidence Act, Relevant Sections of Bankers Book Evidence Act, Relevant Sections of Indian Penal Code, Relevant Sections of Reserve Bank of India Act, Law Relating To Employees And Internet, Alternative Dispute Resolution , Online Dispute Resolution (ODR).	9
Unit-IV :Electronic Business And Legal Issues	
Evolution and development in Ecommerce, paper vs paper less contracts E-Commerce models- B2B, B2C,E security. Application area: Business, taxation, electronic payments, supply chain, EDI, E-markets, Emerging Trends.	9
Unit-V :Case Study On Cyber Crimes	
Harassment Via E-Mails, Email Spoofing (Online A Method Of Sending E-Mail Using A False Name Or E-Mail Address To Make It Appear That The E-Mail Comes From Somebody Other Than The True Sender, Cyber Pornography (Exm.MMS),Cyber-Stalking	9
	45

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	K.Kumar	Cyber Laws: Intellectual property & E Commerce, Security"	, Dominant Publisher,	2011
2.	Rodney D. Ryder	Guide To Cyber Laws	Second Edition, Wadhwa And Company,	2007

REFERENCE BOOKS:

SI.NO	Author(s)	Title of the Book	Publisher	Year of Publications
1.	Vakul Sharma,	Handbook Of Cyber Laws	Macmillan India Ltd, 2 ndEdition,PHI,	2003
2.	Justice Yatindra Singh,	Cyber Laws	Universal Law Publishing, 1 stEdition,New Delhi	2003
3	Sharma, S.R	Dimensions Of Cyber Crime	Annual Publications Pvt. Ltd., 1st Edition	2004

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Course Name	:	21CYC16 -CYBER CRIME INVESTIGATIONS AND DIGITAL FORENSICS	L	T	P	C
			3	0	0	3

	Course Objectives
1	To understand the forensic concepts
2	To learn computer basics
3	To Identify methodology of Computer Forensics
4	To learn Forensics tools concepts
5	To understand working principle of Electronic evidence

	Course Outcomes
1	Analyze difference between computer crime and cyber crime
2	Explain basics concepts in computer
3	Develop the security
4	Apply various forensics tools
5	Explain electronic evidence process

Unit-I : Cyber Crime and computer crime	
Introduction to Digital Forensics- Definition and types of cybercrimes- electronic evidence and handling-electronic media-collection-searching and storage of electronic media- introduction to internet crimes-hacking and cracking-credit card and ATM frauds-web technology- cryptography-emerging digital crimes and modules	9
Unit-II : Basics of Computer	
Computer organization, components of computer- input and output devices, CPU, Memory hierarchy, types of memory, storage devices, system soft wares, application soft wares, basics of computer languages.	9
Unit-III : Computer Forensics	
Definition and Cardinal Rules, Data Acquisition and Authentication Process, Windows Systems-FAT12, FAT16, FAT32 and NTFS, UNIX file Systems, mac file systems, computer artifacts, Internet Artifacts, OS Artifacts and their forensic applications	9
Unit-IV : Forensic Tools	
Introduction to Forensic Tools, Usage of Slack space, tools for Disk Imaging, Data Recovery, Vulnerability Assessment Tools, Encase and FTK tools, Anti Forensics and probable counters, retrieving information.	9
Unit-V : Processing of Electronic Evidence	
Process of computer forensics and digital investigations, processing of digital evidence, digital images, damaged SIM and data recovery, multimedia evidence, retrieving deleted data: desktops, laptops and mobiles, retrieving data from slack space, renamed file, ghosting, compressed files.	9
:	45

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	C. Altheide& H. Carvey	Digital Forensics with Open Source Tools	Syngress	2011
2.	Aaron Philipp,David Cowen	Hacking Exposed Computer Forensics**Computer Forensics**	Pearson	2012

REFERENCE BOOKS:

SI.NO	Author(s)	Title of the Book	Publisher	Year of Publications
1.	Jack Wiles Anthony Reyes	The best damn cybercrime and digital forensics	Syngress	2007
2.	Sharma, S.R	Dimensions Of Cyber Crime	Annual Publications Pvt. Ltd., 1st Edition	2004
3	Anders Flaglien, Inger Marie Sunde,AusraDilijonaite	Digital Forensics	John Wiley & Sons,	2017

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Course Code & Course Name	:	21CYC17 -CLOUD COMPUTING	L	T	P	C
			3	0	0	3

Course Objectives

1.	Describe three cloud deployment models, and Overview of AWS Global infrastructure.
2.	Understand the different AWS core services.
3.	Formulate virtual firewalls with security groups.
4.	Review the availability differences of alternative database solutions.
5.	Summarize the AWS Shared Responsibility Model, Examine IAM users, groups, and roles.

Course Outcomes

1.	Construct three cloud deployment models, and Overview of AWS Global infrastructure.
2.	Implement the different AWS compute services.
3.	Create virtual firewalls with security groups.
4.	Construct the availability of different alternative database solutions.
5.	Implement AWS Shared Responsibility Model, Examine IAM users, groups, and roles.

Unit-I : Cloud Concepts	**9**
Cloud Concepts Overview - Introduction to Cloud Computing, Advantages of Cloud Computing, CC Reference Model, Introduction to Amazon Web Services (AWS), AWS Cloud Adoption Framework (CAF). Cloud Economics - Fundamentals of Pricing, Total Cost of Ownership, AWS Global Infrastructure Overview - AWS Global Infrastructure, AWS Service and Service Category Overview.	
Unit-II :Aws Core Services	**9**
Compute - Compute Services Overview, Introduction to Amazon Elastic Compute Cloud (EC2), Amazon EC2 Cost Optimization, Introduction to AWS Lambda, Introduction to AWS Elastic Beanstalk. Storage - Amazon Elastic Block Store (EBS), Amazon Simple Storage Service (S3), Amazon Elastic File System (EFS), Amazon Glacier. VPC - Amazon Virtual Private Cloud (VPC), Amazon VPC Security Groups, Amazon CloudFront,.Database - Amazon Relational Database Service (RDS), Amazon DynamoDB, Amazon Redshift, Amazon Aurora. Balancing, Scaling, Monitoring - Elastic Load Balancing (ELB), Amazon CloudWatch, Auto Scaling.	
Unit-III :Cloud Security	**9**
AWS Shared Responsibility Model, AWS Identity and Access Management (IAM), AWS Trusted Advisor, AWS CloudTrail, AWS Config, AWS Day One Best Practice Review, AWS Security and Compliance Programs, AWS Security Resources.	
Unit-IV :Cloud Architecting	**9**
Introduction to the Well-Architected Framework, Well-Architected Design Principles, Understanding Reliability and High Availability.	
Unit-V :Cloud Support	**9**
Introduction to AWS Organizations, AWS Cost Explorer, Overview of AWS Technical Support Plans and Costs, Microsoft azure, Google app Engine.	
Total :	**45**

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	KaiHwang, GeoffreyCFox, JackGDongarra	DistributedandCloud ComputingFrom ParallelProcessingtotheInternetofThings	MorganKaufmann Publishers	2012
2.	RajkumarBuyya, Christian Vecchiola,S ThamaraiSelvi	MasteringCloud Computing	TataMcGrawHill	2010

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	JohnW.RittinghouseAndJames F.Ransome	CloudComputing: Implementation, Management,andSecurity	CRCPress	2010
2.	Bernard Golden	Amazon Web Service For Dummies	John Wiley & Sons, Inc	2013
3.	Mitch Tulloch with the Windows Azure Team	Introducing Windows Azure	Microsoft Press	2013
4.	BarrieSosinsky	CloudComputingBible	WileyIndia	2015
5.	GautamShroff	EnterpriseCloud Computing	Cambridge	2010

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Course Code & Course Name	:	21CYC18 -CLOUD COMPUTING LABORATORY	L	T	P	C
			0	0	2	1

Course Objectives

1.	To understand and study Amazon EC2
2.	To work with EBS.
3.	To build VPC, web server and DB server
4.	To build the DB Server.
5.	To construct scale and load balance of cloud architecture.

Course Outcomes

1.	Construct Amazon EC2
2.	Working with EBS
3.	Develop VPC, web server and DB server
4.	Build the DB Server.
5.	Implement scale and load balance of cloud architecture.

List of Experiments

1.	Introduction to Amazon EC2
2.	Working with EBS
3.	Build VPC and Launch a Web Server
4.	Build DB Server and Interact with DB Using an App
5.	Scale and Load Balance Architecture
6.	Introduction to AWS IAM
7.	Use GAE launcher to launch the web applications.
8.	Simulate a Cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim.
9.	Install Hadoop single node cluster and run simple applications like wordcount.
10.	Install Virtual box/VMware Workstation with different flavors of Linux or windows OS on top of windows7 or 8.

Total	:	**45**

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Course Code & Course Name	:	21CYC19 - MOBILE APPLICATION DEVELOPMENT	L	T	P	C
			3	0	0	3

Course Objectives

1.	To learn the characteristics of mobile applications
2.	Understand the intricacies of UI required by mobile applications
3.	To study about the design aspects of mobile application
4.	To learn development and programming of mobile applications.
5.	Describe app development tools

Course Outcomes

1.	Implement the user interfaces of mobile applications.
2.	Designthemobileapplicationsthatisawareoftheresourceconstraintsofthemobiledevices.
3.	Applyadvancedmobileapplicationsthataccessesthedatabasesandtheweb.
4.	Explain programming basics for Application
5.	Develop useful mobile applications in the current scenario using Google Android and Eclipse simulator

Unit-I : Introduction	**9**
Mobile Applications–Characteristics and Benefits–Application Model – Infrastructure and Managing Resources – Mobile Software Engineering–Frame works and Tools–Mobile devices Profiles	
Unit-II : User Interface	**9**
Generic UI Development–VUI and Mobile Applications – Text to Speech techniques – Designing the right UI – Multi modal land Multichannel UI – Gesture based UIs – Screen Elements and Layouts – VoiceXML –JavaAPI.	
Unit-III :Application Design	**9**
Memory Management – Design patterns for limited memory – Work flow for Application Development – Techniques for composing Applications – Dynamic Linking – Plug ins and rules of thumb for using DLLs –Concurrency and Resource Management–Look and feel.	
Unit-IV :Application Development	**9**
IntentsandServices–StoringandRetrievingdata–CommunicationviatheWeb–NotificationandAlarmsGraphics and Multimedia – Telephony – Location based services – Packaging and Deployment–Security and Hacking.	
Unit-V :Tools	**9**
Google Android Platform – Eclipse Simulator – Android Application Architecture – Event based programming – Apple iPhone Platform – UI tool kit interfaces– Event handling and Graphics services– Layer Animation	
Total : 45	

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	ZigurdMednieks, LairdDornin,	ProgrammingAndroid	O'Reilly,	2011
2.	RetoMeier	ProfessionalAndroid2ApplicationDevelopment	WroxWiley	2010

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	AlasdairAllan	iPhoneProgramming	O'Reilly	2010
2.	Wei-Meng Lee	BeginningiPhone SDK Programming with Objective-C	Wrox Wiley	2010
3.	Poslad	UbiquitousComputing:SmartDevices,EnvironmentsandInteractions	Wiley	2009

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Course Code & Course Name	:	21CYC20 -MOBILE APPLICATION DEVELOPMENT LABORATORY	L	T	P	C
			0	0	2	1

Course Objectives

1.	To know about various platforms and tools available for developing mobile applications
2.	Torealizethedifferencesbetweendevelopingconventionalapplicationsand mobile applications.
3.	To learn programming skills inJ2MEandAndroidSDK
4.	TostudyaboutmicrobrowserbasedapplicationstoaccesstheInternetusingSunJavaToolkit.
5.	To learn creating database application using various tools

Course Outcomes

1.	Install and configure Android application development tools.
2.	Develop user Interfaces for the Android platform
3.	Save state information across important operating system events.
4.	Apply Java programming concepts to Android application development.
5.	Design Application for Data base

List of Experiments

1.	To study Android Studio and android studio installation. Create "Hello World" application.
2.	To understand Activity, Intent, Create sample application with login module. (Check username and password).
3.	Design simple GUI application with activity and intents e.g. calculator.
4.	Develop an application that makes use of RSS Feed.
5.	Write an application that draws basic graphical primitives on the screen
6.	Create an android app for database creation using SQLite Database.
7.	Develop a native application that uses GPS location information
8.	Implement an application that writes data to the SD card
9.	Design a gaming application
10.	Create an application to handle images and videos according to size
	Total : 30

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Course Code & Course Name	:	21CYC21 -WIRELESSCOMMUNICATIONS AND NETWORKS	L	T	P	C
			3	0	0	3

Course Objectives

1.	To study the Channel planning for Wireless Systems
2.	To study the Mobile Radio Propagation
3.	To learn the Equalization and Diversity
4.	To understand the Equalization and Diversity
5.	To learn the Wireless Networks

Course Outcomes

1.	Understand Cellular communication concepts
2.	Analyze the mobile radio propagation
3.	Apply various multiple schemes used in wireless communication
4.	Explain wireless wide area network and their performance analysis
5.	Demonstrate Wireless local area networks and their specifications

Unit-I : The Cellular Concept-System Design Fundamentals	**9**
Introduction, Frequency Reuse, Channel Assignment Strategies, Handoff Strategies- Prioritizing Handoffs, Practical Handoff Considerations, Interference and system capacity – Co channel Interference and system capacity, Channel planning for WirelessSystems,AdjacentChannelinterference,PowerControlforReducinginterference,Trunking and Grade of Service, Improving Coverage & Capacity in Cellular Systems- Cell Splitting, Sectoring.	
Unit-II :Mobile Radio Propagation: Large-Scale Path Loss	**9**
Introduction to Radio Wave Propagation, FreeSpacePropagationModel,RelatingPowertoElectricField,TheThreeBasicPropagationMechanisms,Reflection-ReflectionfromDielectrics,BrewsterAngle,Reflectionfromprefectconductors,GroundReflection(Two-Ray)Model,Diffraction-FresnelZoneGeometry, Knife-edge Diffraction Model, Multiple knife-edge Diffraction, Scattering, Outdoor Propagation Models- Longley-Ryce Model,Okumura Model, Hata Model, PCS Extension to Hata Model, Walfisch and BertoniModel, Wideband PCS Microcell Model, Indoor Propagation Models-Partition losses (Same Floor),Partition losses between Floors, Log-distance path loss model, Ericsson Multiple Breakpoint Model,AttenuationFactorModel,Signalpenetrationintobuildings,RayTracingandSiteSpecificModeling.	
Unit-III :Mobile Radio Propagation: Small–Scale Fading and Multipath	**9**
Small Scale Multi path propagation-Factors influencing small scale fading, Doppler shift, Impulse Response Modelofamulti path channel-Relationship between Band width and Received power, Small-Scale Multipath Measurements-Direct RF Pulse System, Spread Spectrum Sliding Correlator Channel Sounding, Frequency Domain Channels Sounding, Parameters of Mobile Multipath Channels-Time Dispersion Parameters, Coherence Bandwidth, Doppler Spread and Coherence Time, Types of Small-Scale Fading-Fading effects Due to Multipath Time Delay Spread, Flat fading, Frequency selective fading, Fading effects Due to Doppler Spread-Fast fading, slow fading, Statistical Models for multipath Fading Channels-Clarke's model for flat fading, spectral shape due to Doppler spread in Clarke's model, Simulation of Clarke and Gans Fading Model, Level crossing and fading statistics, Two-ray Rayleigh Fading Model.	
Unit-IV :Equalization and Diversity	**9**

Introduction, Fundamentals of Equalization, Training A Generic Adaptive Equalizer, Equalizers incommunicationReceiver,LinearEqualizers,NonlinearEqualization-Decision Feedback Equalization (DFE), Maximum Likelihood Sequence Estimation (MLSE) Equalizer,Algorithmsforadaptiveequalization-ZeroForcingAlgorithm,LeastMeanSquareAlgorithm,Recursiveleastsquaresalgorithm.DiversityTechniques-DerivationofselectionDiversityimprovement,DerivationofMaximalRatioCombiningimprovement,PracticalSpaceDiversityConsideration-Selection Diversity, Feedback or Scanning Diversity, Maximal Ratio Combining, Equal Gain Combining, Polarization Diversity, Frequency Diversity, Time Diversity, RAKE Receiver.

Unit-V :Wireless Networks	**9**
Introduction to wireless Networks, Advantages and disadvantages of Wireless Local Area Networks, WLAN Topologies, WLAN Standard IEEE 802.11, IEEE 802.11 Medium Access Control, Comparison of IEEE 802.11 a,b,g and n standards, IEEE 802.16 and its enhancements ,Wireless PANs,Hiper Lan, WLL.	
Total :	**45**

Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Theodore, S.Rappaport	WirelessCommunications Principles and Practice	2nd Ed.,PHI.	2002
2.	GottapuSasibhushanaRao	MobileCellularCommunication	PearsonEducation	2012

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	KamiloFeher	WirelessDigitalCommunications	PHI.	1999
2.	WilliamStallings	WirelessCommunicationandNetworking	PHI	2003
3.	AndreaGoldsmith	WirelessCommunications	CambridgeUniversityPress	2005

Course Code & Course Name	:	21CYC22 -WIRELESSCOMMUNICATIONS AND NETWORKS LABORATORY	L	T	P	C
			0	0	2	1

Course Objectives

1.	To study digital modulation concepts
2.	To learn various Encoder and Decoder techniques
3.	To study the MAT Lab software
4.	To learn the concept of transmitter, receiver and frequency in mobile handset
5.	To study the Net sim software

Course Outcomes

1.	Implement the advanced digital modulation techniques
2.	DesignConvolutionalencoderanddecoderforerrorcontrolcodingtechniques.
3.	Calculate path loss for Free space, Okumura and Hata models for outdoor propagation.
4.	Comprehend Cellular concepts of GSM and CDMA networks.
5.	Simulate RAKE receiver for CDMA with MATLAB.

List of Experiments

1.	FSK Modulation and Demodulation technique
2.	QPSK Modulation and Demodulation technique
3.	DQPSK Modulation and Demodulation technique
4.	8-QAMModulationandDemodulationtechnique.
5.	Implementation of Convolution Encoder and Decoder
6.	Simulation of Adaptive Linear Equalizer using MATLAB software
7.	MeasurementofcallblockingprobabilityforGSM&CDMAnetworksusingNetsimsoftware.
8.	Study of GSM handset for various signaling and fault insertion techniques (MajorGSMhandsetsections: clock, SIMcard,charging,LCDmodule,Keyboard,User interface).
9.	Study of transmitter and receiver section in mobile handset and measure frequency
10.	Simulation of RAKE Receiver for CDMA communication using MATLAB software

Total	:	**30**

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Course Code & Course Name	:	21CYC23 - COMPUTER FORENSIC	L	T	P	C
			3	0	0	3

Course Objectives

1.	To understand the concepts of cyber crime
2.	To study the basic concepts of computer
3.	To learn computer forensics
4.	To become familiar with forensics tools
5.	To learn to analyze and validate forensics data

Course Outcomes

1.	Implement real-world hacking techniques to test system security
2.	Understand the basics of computer software
3.	Apply a number of different computer forensic tools to a given scenario
4.	Identify the vulnerabilities in a given network infrastructure
5.	Analyze and validate forensics data

Unit-I: Cyber Crime and computer crime	**9**
Introduction to Digital Forensics, Definition and types of cybercrimes, electronic evidence and handling, electronic media, collection, searching and storage of electronic media, introduction to internet crimes, hacking and cracking, credit card and ATM frauds, web technology, cryptography, emerging digital crimes and modules.	
Unit-II: Basics of Computer	**9**
Computer organization, components of computer- input and output devices, CPU, Memory hierarchy, types of memory, storage devices, system software's, application software, basics of computer languages.	
Unit-III: Computer Forensics	**9**
Definition and Cardinal Rules, Data Acquisition and Authentication Process, Windows Systems-FAT12,FAT16, FAT32 and NTFS, UNIX file Systems, mac file systems ,computer arte facts, Internet Arte facts, OS Arti facts and their forensic applications	
Unit-IV: Forensic Tools and Processing of Electronic Evidence	**9**
Introduction to Forensic Tools, Usage of Slack space, tools for Disk Imaging, Data Recovery, Vulnerability Assessment Tools, Encase and FTK tools, Anti Forensics and probable counters, retrieving information ,process of computer forensics and digital investigations, processing of digital evidence, digital images,damagedSIManddatarecovery,multimediaevidence,retrievingdeleteddata:desktops,laptopsandmobiles,retrieving data from slack space ,renamed file, ghosting, compress edibles.	
Unit-V: Analysis and Validation	**9**
Validating Forensics Data – Data Hiding Techniques – Performing Remote Acquisition – Network Forensics – Email Investigations – Cell Phone and Mobile Devices Forensics	
Total :	**45**

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Bill Nelson, Amelia Phillips, Frank Enfinger, Christopher Steuart,	Computer Forensics and Investigations	Cengage Learning, India Edition	2016
2.	Pradeepk,Sinhapritisinh	Computer Fundamentals	BPB	2015.

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	John R.Vacca,	Computer Forensics	Cengage Learning	2005
2.	MarjieT.Britz	Computer Forensics and Cyber Crime: An Introduction	3rd Edition, Prentice Hall,	2013.
3.	Kenneth C.Brancik	Insider Computer Fraud	Auerbach Publications Taylor & Francis Group	2008

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Course Code & Course Name	:	21CYC24 - COMPUTER FORENSICLABORATORY	L	T	P	C
			0	0	2	1

	Course Objectives
1.	To learn Image retrieval techniques
2.	To study the computer forensic tools
3.	To learn how to secure our data
4.	To study Auto spy software to investigation process
5.	To understand the data recovering concepts

	Course Outcomes
1.	Implement image retrieval techniques
2.	Apply various computer forensic tools in real time`
3.	Analyze the techniques of data security
4.	Develop secure Application using Auto spy
5.	Explain data recovering techniques

	List of Experiments
1.	Study of Computer Forensics and different tools used for forensic investigation
2.	How to Recover Deleted Files using Forensics Tools
3.	Study the steps for hiding and extract any text file behind an image file/Audio file using Command Prompt.
4.	How to Extract Exchange a image file format(EXIF)Data from Image Files using Exit reader Software
5.	How to make the forensic image of the hard drive using EnCase Forensics.
6.	How to Restoring the Evidence Image using EnCase Forensics
7.	How to Collect Email Evidence in Victim PC
8.	How to Extracting Browser Artifacts
9.	Comparison of two Files for forensics investigation by Compare IT software
10.	Live Forensics Case Investigation using Autopsy
	Total : 45

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Course Code & Course Name	:	21CYC25 -WEB SERVICES	L	T	P	C
			3	0	0	3

Course Objectives

1.	To Learn the basics of XML technology.
2.	To Understand the background of distributed information system
3.	To Learn the security features of web services and service composition.
4.	To learn concepts of semantic web services
5.	To understand techniques of web services

Course Outcomes

1.	Create, validate, parse, and transform XML documents.
2.	Design middle ware solution based application.
3.	Develop web services using different technologies
4.	Compose set of complex web services
5.	Apply web services techniques for security

Unit-I : Distributed Information System	**9**
Distributed information system– Design of IB–Architecture of IB –Communication in an IS – Middleware RPC – TP monitors – Object brokers – Message oriented middleware – EAI –EAI Middleware – Workflow –Management – benefits and limitations – Web technologies for Application Integration.	
Unit-II : Web Services Building Block	**9**
Web Services – Definition – Web Services and EAI – Web Services Technologies – XML basics - web services Architecture – SOAP – WSDL – UDDI –WS – Addressing – WS – Routing –Webserviceimplementation–Javabasedwebservices-.NETbasedwebservices.	
Unit-III : Web Service Security	**9**
XML signature – XML Encryption – SAML -XKMS–WS-Security–WS Policy–Web service security framework. NET and passport – UDDI and security - web service security in java – mobile web service security.	
Unit-IV : Semantic Web Services	**9**
Semantic web service – architecture – RDF Data model–RDF schema–OWL–ontology–role of on to logy in web services-semantic Web service implementation issues	
Unit-V : Service Composition	**9**
Service Coordination and Composition coordination protocols–WS–Coordination –WS–transaction –WSCI–Service Composition – Service Composition Models – Dependencies between coordination and composition–BPEL–Current trends	
Total :	**45**

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Uttam K. Roy	Web Technologies	**Oxford University Press**	2010
2.	**G. Radhamani**	Web Services Security and E-business	IGI Global	2007

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Martin kalin	Java Web Services	O'Reilly Media, Inc	2013
2.	Shreeraj Shah	Hacking Web Services	Charles River Media	2006
3.	**James Snell, Doug Tidwell, PavelKulchenko**	Programming Web Services with SOAP	**O'Reilly Media**	2001

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Course Code & Course Name	:	21CYC26 -WEB SERVICES LAB	L	T	P	C
			0	0	2	1

	Course Objectives
1.	To Understand the application number theory in security.
2.	To Study the symmetric key and public key algorithms
3.	To Understand the compression techniques for security
4.	To learn security concepts in web service
5.	To understand registry methods in web services

	Course Outcomes
1.	Able to implement program using modules arithmetic for security
2.	To implement symmetric key and public key algorithm
3.	Ability to implement algorithms for digital signature and hashing
4.	Develop the security in web services
5.	Design the udi registry by using web services

	List of Experiments
1.	Create an XML file for any domain with multiple sub level complexity. (Example: Students data, Employee information, Product details etc...)
2.	Create a DTD and XML schema for the XML file.
3.	Tabulate the xml content using XSL.
4.	Validate a XML file using java script with XML DOM
5.	Write a java program to parse an XML file using DOM.
6.	WriteajavaprogramtoparseanXML fileusingSAX.
7.	WriteaprogramtoimplementXML–RPC.
8.	Writeaprogramtoimplementawebserviceusingjavaand.NET.
9.	Write a program to implement WSDL Service (HelloService.WSDL File)
10.	Write a program to implement business UDDI Registry entry

Total	**:**	**30**

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Course Code & Course Name	:	21CYC27 – CYBER PHYSICAL SYSTEMS	L	T	P	C
			3	0	0	3

Course Objectives

1.	To understand the basic concepts of Cypher physical system
2.	To understand the principles of automated control design
3.	To understand the CPS implementation
4.	To explain different formal methods for safety assurance of CPS
5.	To understand the secure deployment of CPS

Course Outcomes

1.	Understand the concepts of Cypher physical system in real world application
2.	Design his own model for cyber physical system
3.	Understand various modeling formalisms for CPS, such as hybrid automata, state-space methods, etc
4.	Understand the basics of CPS implementation
5.	Understand CPS security and safety aspects

Unit-I : INTRODUCTION TO CYBER PHYSICAL SYSTEMS (CPS)	**9**
Cyber-Physical Systems (CPS) in the real world - Basic principles of design and validation of CPS - Industry 4.0, AutoSAR, IIOT implications - Building Automation, Medical CPS -- CPS - Platform components - CPS HW platforms - Processors, Sensors, Actuators - CPS Network – Wireless Hart, CAN, Automotive Ethernet - CPS Sw stack - RTOS - Scheduling Real Time control tasks	
Unit-II : PRINCIPLES OF AUTOMATED CONTROL DESIGN	**9**
Principles of Automated Control Design - Dynamical Systems and Stability - Controller Design Techniques - Stability Analysis: CLFs, MLFs, stability under slow switching - Performance under Packet drop and Noise.	
Unit-III : CPS IMPLEMENTATION	**9**
CPS implementation - From features to software components, Mapping software components to ECUs - CPS Performance Analysis - effect of scheduling, bus latency, sense and actuation faults on control performance, network congestion.	
Unit-IV :FORMAL METHODS FOR SAFETY ASSURANCE OF CPS	**9**
Formal Methods for Safety Assurance of Cyber-Physical Systems - Advanced Automata based modeling and analysis - Basic introduction and examples - Timed and Hybrid Automata - Definition of trajectories, zen ness - Formal Analysis: Flow pipe construction, reach ability analysis - Analysis of CPS Software: - Weakest Pre-conditions - Bounded Model checking.	
Unit-V : SECURE DEPLOYMENT OF CPS	**9**
Secure Deployment of CPS - Attack models - Secure Task mapping and Partitioning - State estimation for attack detection - Automotive Case study : Vehicle ABS hacking - Power Distribution Case study : Attacks on Smart Grids.	
Total :	**45**

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Text Books :

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Rajeev Alur	Principles of Cyber-Physical Systems	MIT Press	2018
2.	E. A. Lee, Sanjit Seshia	Introduction to Embedded Systems – A Cyber–Physical Systems Approach	MIT Press	2017
3.	Platzer, Andre	Logical Foundations of Cyber-Physical Systems	Springer	2018

Referrence Books :

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Möller, Dietmar P.F	Computing Fundamentals in Cyber-Physical Systems Concepts, Design Methods, and Applications	Springer	2016

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Course Code & Course Name	:	21CYC28 - RISK MANAGEMENT	L	T	P	C
			3	0	0	3

Course Objectives

1.	To understand the ways in which risks are quantified and managed by financial institutions
2.	To study how to model the risk of portfolios emanating from fluctuations in market prices, or market risk
3.	To learn an introduction to commonly used models of credit risk.
4.	To understand balance between a practical approach to the most popular credit risk models and their theoretical underpinnings
5.	To learn credit risk, in particular credit derivatives are discussed.

Course Outcomes

1.	Explain the choice of parameters for VaR, and the impact of autocorrelation on VaR estimates.
2.	Analyze percentage changes in all market variables over the next day are a random sample from the last N days.
3.	Apply various measure volatility using trading days rather than calendar days.
4.	Develop the model-building approach, which is the main alternative to historical simulation
5.	Design the model building approach can be used for the situation

Unit-I : RISK AND ITS MANAGEMENT	9

This study unit introduces risk, its fundamental importance to a company and the sorts of risk that investors expect companies to take. A risk management framework is introduced against a backdrop of corporate finance principles, providing an umbrella methodology for the management of risk and highlighting where different treatment is needed according to the nature of a particular risk.

Unit-II : FINANCIAL MARKET RISK: INTEREST RATES	9

No company can escape interest rate risk and this study unit focuses on how interest rate sensitivity and its impact varies according to the type of company and business environment. The study unit provides appropriate responses to each different set of circumstances, introducing the science of the yield curve and the many instruments available for managing interest rate risk, explaining when each might be used.

Unit-III : FINANCIAL MARKET RISK: FOREIGN EXCHANGE	9

This study unit explains the different types of foreign exchange risk that can affect a company and how each might be evaluated and responded to. It recognizes that foreign exchange risk may be fundamental to the company and that an appropriate response needs to be drawn up for each type of risk in the context of a company's broader business and shareholder objectives. It introduces instruments available for managing risk, together with techniques for their use, giving extensive choice to business managers on how to respond to foreign exchange risk.

Unit-IV : FINANCIAL RISK: LIQUIDITY	9

All companies have liquidity risk (the risk of the inability to make required payments company wide as they fall due) and this risk arises from many different sources. The principles for managing liquidity risk are perhaps the most difficult to generalize (as companies' funding arrangements are very individual) but this unit takes an approach similar to that for other risks and provides a structured approach to the management of this particularly difficult but crucial risk

Unit-V : OTHER FINANCIAL RISKS AND ISSUES	9

This study unit considers some other risk-related areas commonly managed by finance professionals. In the first section we consider the risk in the counterparties with whom companies deal, ranging from customers and suppliers to banks; the risks arising from changes in commodity prices (which have similarities and links to foreign exchange risk); and risks arising from obligations to meet pension payments in defined benefit pension schemes. The study unit concludes by looking at two final issues; the control of operational risk within treasury departments and external risk reporting requirements.

Total	:	45

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
2.	**Thomas S. Coleman**	Quantitative Risk Management	**Harrison Bauer**	2012
3.	**Alexander Solla**	Financial Risk Management	**Harrison Bauer**	2015

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Dan Galai, Michel Crouhy, and Robert Mark	The Essentials of Risk Management	Financial Crisis	2002
2.	Andrew J.Dubrin	Essential of Management	Thomson Southwestern	2012
3.	Margaret Woods and Kevin Dowd	Financial RiskManagementforManagement Accountants	Society of Management Accountants of Canada	2008

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Course Code & Course Name	:	21CYC29 -INTRUSION DETECTION AND PREVENTION SYSTEM	L	T	P	C
			3	0	0	3

Course Objectives

1.	To learn the fundamentals and history of Intrusion Detection in order to avoid common pitfalls in the creation and evaluation of new Intrusion Detection Systems
2.	Analyze intrusion detection alerts and logs to distinguish attack types from false alarms
3.	To study the installation process of snort
4.	To understand the working principles of snort
5.	To learn how to intrusion detection by using ACID

Course Outcomes

1.	Explain the fundamental concepts of Network Protocol Analysis
2.	Use various protocol analyzers and Network Intrusion Detection Systems as security tools to detect network attacks
3.	Implement the Snort in Real time world
4.	Analyze the Snort working principles
5.	Develop Agent for intrusion detection by using ACID

Unit-I : History of Intrusion detection	**9**
History of Intrusion detection, Audit, Concept and definition , Internal and external threats to data, attacks, Need and types of IDS, Information sources Host based information sources, Network based information sources.	
Unit-II :Intrusion Prevention Systems	**9**
Intrusion Prevention Systems, Network IDs protocol based IDs, Hybrid IDs, Analysis schemes, thinking about intrusion. A model for intrusion analysis , techniques Responses requirement of responses, types of responses mapping responses to policy Vulnerability analysis, credential analysis non credential analysis	
Unit-III :Introduction to Snort	**9**
Introduction to Snort, Snort Installation Scenarios, Installing Snort, Running Snort on Multiple Network Interfaces, Snort Command Line Options. Step-By-Step Procedure to Compile and Install Snort Location of Snort Files, Snort Modes Snort Alert Modes	
Unit-IV :Working with Snort Rules	**9**
Working with Snort Rules, Rule Headers, Rule Options, And The Snort Configuration File etc. Plugins, Preprocessors and Output Modules, Using Snort with MySQL	
Unit-V :Using ACID	**9**
Using ACID and Snort Snarf with Snort, Agent development for intrusion detection, Architecture models of IDs andIPs.	
Total :	**45**

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	RafeeqRehman	Intrusion Detection with SNORT	1st Edition, Prentice Hall	2003
2.	Philippe Bune	An Introduction to intrusion detectionSystem	SANS Institute	2005

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Christopher Kruegel	Intrusion Detection and Correlation Challenges and Solutions	1st Edition Springer	2005
2.	Carl Endorf	Eugene Schultz and Jim Mellander	1st Edition, Tata McGraw-Hill	2004
3.	Rebecca Bace, Peter Mell	Intrusion detection System	NIST	2008

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Course Code & Course Name	:	21CYC30 -CYBER LAWS AND ETHICS	L	T	P	C
			3	0	0	3

Course Objectives

1.	**To study evaluation of cyber law**
2.	To learn concepts of Information Technology Act
3.	To understand the cyber law and how to find threats, attacks and how to prevent from attacks
4.	To study the electornic business and concepts of ethics
5.	To learn cyber ethics concepts

Course Outcomes

1.	understand the importance of professional practice
2.	Analyse the rights and responsibilities as an employee
3.	Implement the cyber law in related fields
4.	Explain the legal issues in e commerse
5.	Apply the cyber ethics in real time world

Unit-I: Introduction to Cyber Law	**9**

Evolution of computer technology, emergence of cyber space. Cyber Jurisprudence, Jurisprudence and law, Doctrinal approach, Consensual approach, Real Approach, Cyber Ethics, Cyber Jurisdiction, Hierarchy of courts, Civil and criminal jurisdictions, Cyberspace-Web space, Web hosting and web Development agreement, Legal and Technological Significance of domain Names, Internet as a tool for global access.

Unit-II: Information Technology Act	**9**

Overview of IT Act, 2000, Amendments and Limitations of IT Act, Digital Signatures, Cryptographic Algorithm, Public Cryptography, Private Cryptography, Electronic Governance, Legal Recognition of Electronic Records, Legal Recognition of Digital Signature, Certifying Authorities, Cyber Crime and Offences, Network Service Providers Liability, Cyber Regulations Appellate Tribunal, Penalties and Adjudication.

Unit-III: Cyber Law and Related Legislation	**9**

Patent Law, Trademark Law, Copyright, Software – Copyright or Patented, Domain Names and Copyright disputes, Electronic Data Base and its Protection, IT Act and Civil Procedure Code, IT Act and Criminal Procedural Code, Relevant Sections of Indian Evidence Act, Relevant Sections of Bankers Book Evidence Act, Relevant Sections of Indian Penal Code, Relevant Sections of Reserve Bank of India Act, Law Relating To Employees And Internet, Alternative Dispute Resolution , Online Dispute Resolution (ODR).

Unit-IV: Electronic Business and Legal Issues	**9**

Evolution and development in E-commerce, paper vs paper less contracts E-Commerce models- B2B, B2C, E security. Business, taxation, electronic payments, supply chain, EDI, E-markets, Emerging Trends.

Unit-V: Cyber Ethics	**9**

The Importance of Cyber Law, Significance of cyber Ethics, Need for Cyber regulations and Ethics. Ethics in Information society, Introduction to Artificial Intelligence Ethics: Ethical Issues in AI and core Principles, Introduction to Block chain Ethics.

Total	:	45

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	HarrishChander	Cyber Laws and IT Protection	PHI learning	2019
2.	Markus Christen, Michele Loi	**The Ethics of Cybersecurit y**	PHI learning	2020

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Debby Russell	Computer Security Basics	2nd Edition, O Reilly Media	2006
2.	Thomas R. Peltier	Information Security policies and procedures	A Practitioners Reference, 2nd Edition Prentice Hall	2004
3.	Kenneth J. Knapp	Security and Global Information Assurance	Threat Analysis and Response Solutions, IGI Global	2009

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Course Code & Course Name	:	21CYC31 -SOFTWARE ENGINEERING	L	T	P	C
			3	0	0	3

	Course Objectives
1.	Understand the phases in a software project
2.	Understand fundamental concepts of requirements engineering and Analysis Modeling.
3.	Understand the major considerations for enterprise integration and deployment.
4.	Learn various testing and maintenance measures
5.	Apply different techniques to measure software performance

	Course Outcomes
1.	Identify the key activities in managing a software project.
2.	Compare different process models.
3.	Concepts of requirements engineering and Analysis Modeling.
4.	Apply systematic procedure for software design and deployment.
5.	Compare and contrast the various testing and maintenance

Unit-I : Software Process And Project Management	9
Introduction to Software Engineering, Software Process, Perspective and Specialized Process Models – Software Project Management: Estimation – LOC and FP Based Estimation, COCOMO Model – Project Scheduling – Scheduling, Earned Value Analysis – Risk Management.	
Unit-II :Requirements Analysis And Specification	**9**
Software Requirements: Functional and Non-Functional, User requirements, System requirements, Software Requirements Document – Requirement Engineering Process: Feasibility Studies, Requirements elicitation and analysis, requirements validation, requirements management-Classical analysis: Structured system Analysis, Petri Nets- Data Dictionary.	
Unit-III :Software Design	**9**
Design process – Design Concepts-Design Model– Design Heuristic – Architectural Design – Architectural styles, Architectural Design, Architectural Mapping using Data Flow- User Interface Design: Interface analysis, Interface Design –Component level Design: Designing Class based components, traditional Components.	
Unit-IV :Testing And Implementation	**9**
Software testing fundamentals-Internal and external views of Testing-white box testing - basis path testing-control structure testing-black box testing- Regression Testing – Unit Testing – Integration Testing – Validation Testing – System Testing And Debugging – Software Implementation Techniques: Coding practices-Refactoring.	
Unit-V :Project Management	**9**
Estimation – FP Based, LOC Based, Make/Buy Decision, COCOMO II - Planning – Project Plan, Planning Process, RFP Risk Management – Identification, Projection, RMMM - Scheduling and Tracking –Relationship between people and effort, Task Set & Network, Scheduling, EVA - Process and Project Metrics.	
Total	**: 45**

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Roger S. Pressman	Software Engineering – A Practitioner"s Approach	McGraw-Hill International Edition	2010
2.	Stephen R. Schach	Object-Oriented andClassical Software Engineering – Irwin Computer Science	McGraw-Hill Education	2010

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Ian Sommerville	Software Engineering	Pearson Education Asia	2011
2.	Rajib Mall	Fundamentals of Software Engineering	PHI Learning Private Limited,	2009
3.	PankajJalote	Software Engineering- A Precise Approach	Wiley India	2010

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Course Code & Course Name	:	21CYC32 -OBJECT ORIENTED PROGRAMMING	L	T	P	C
			3	0	0	3

Course Objectives

1.	Understand the basic Object Oriented Programming concepts.
2.	Develop solutions to problems by using of Data Abstraction, Encapsulation and Inheritance.
3.	Ability to implement one or more patterns involving realization of an abstract interface.
4.	Utilization of polymorphism in the solution of problems which can take advantage of dynamic dispatching.
5.	To comprehend the art of programming, the structure and the meaning of basic Java programs.

Course Outcomes

1.	Classify basic concepts and structure of object-oriented programming.
2.	Implement real time applications by using constructor, operator overloading and function over loading in C++ Programming language.
3.	Demonstrate of Inheritance and polymorphism techniques in C++Programming language.
4.	Able to write simple programs in JAVA Programming language.
5.	Implement real time application by using exception handling and multithreaded techniques in JAVA programming language

Unit-I : Basic Concepts Of Oop	**9**
Introduction OOP: Principles of OOP, Benefits and applications of OOP - Overview of C++: Program Structure-Namespace- Identifiers-Declaration of variables-Constants-Operators- Reference Variables - Functions in C++: Inline Functions-Friend Functions - Objects and classes: Basics of object and class in C++-Private and Public Members-Static Data and Function Members-Class Scope and Accessing Class Members	
Unit-II :Constructors And Overloading	**9**
Constructors: Types of Constructors-Destructors - Overloading: Operator Overloading: Overloading Unary and Binary Operators-Rules for Overloading Operators - Function Overloading	
Unit-III :Inheritance And Polymorphism	**9**
Base Class and Derived Class-Types of Inheritance: Single-Multiple-Multilevel-Hierarchical-Protected Members. DerivedClassConstructors–Overriding, MemberFunctions-VirtualBaseClass-AbstractClass-Polymorphism:this pointer - Virtual Functions.	
Unit-IV :Introduction To Java	**9**
Basic Java Concepts: Objects – Classes – Methods and Messages –Abstraction and Encapsulation – Inheritance – Abstract Classes – Polymorphism - Access specifies – Static Members –Constructors – Finalize Method	
Unit-V :Java Programming	**9**
Arrays – Strings - Packages and Interfaces - Exception Handling – Multithreaded Programming- Dynamic Binding – Final Keyword – Abstract classes.	
Total :	**45**

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	E Balagurusamy	Object Oriented Programming with C++	Tata McGraw Hill	2012
2.	Herbert Schlitz	JAVA -The Compete Reference	Tata McGraw-Hill	2014

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	BjarneStroustrup	The C++ Programming Language	Pearson Education	2012
2.	Deitel and Deitel	C++ : How to Program	PHI	2014
3.	Herbert Schlitz	The Compete Reference C++	Tata McGraw Hill Wesley	2014
4.	Cay S. Horstmann and Gary Cornell	Core Java: Volume I – Fundamentals	Sun Microsystems Press	2008
5.	C. Thomas Wu	An introduction to Object- oriented programming with Java	Tata McGraw-Hill Publishing company Ltd	2006

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Course Code & Course Name	:	21CYC33 – OBJECT ORIENTED PROGRAMMING LABORATORY	L	T	P	C
			0	0	2	1

Course Objectives

1.	Understand the basic Object Oriented Programming concepts.
2.	Develop solutions to problems by using of Data Abstraction, Encapsulation and Inheritance.
3.	Ability to implement one or more patterns involving realization of an abstract interface.
4.	Utilization of polymorphism to solve problems which can take advantage of dynamic dispatching.
5.	To comprehend the art of programming, the structure and the meaning of basic Java programs.

Course Outcomes

1.	Classify basic concepts and structure of object-oriented programming.
2.	Implement real time applications by using constructor, operator overloading and function overloading
3.	Demonstrate Inheritance and polymorphism techniques in C++Programming language.
4.	Able to write simple programs in JAVA Programming language.
5.	Implement real time application by using exception handling and multithreaded techniques in JAVA programming language.

List of Experiments

1.	Pass by value, Pass by reference and Pass by address.
2.	Constructors & Destructors, Copy Constructor.
3.	Friend Function & Friend Class.
4.	Inheritance.
5.	Polymorphism & Function Overloading.
6.	Virtual Functions.
7.	Overload Unary & Binary Operators Both as Member Function & Non Member Function.
8.	Class Templates & Function Templates.
9.	Exception Handling Mechanism.
10.	Standard Template Library concept.
	Total : 45

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Course Code & Course Name	:	21CYC34 -DESIGN AND ANALYSIS OF ALGORITHMS	L	T	P	C
			3	0	0	3

Course Objectives

6.	To learn how to develop efficient algorithms for simple computational tasks.
7.	To learn reasoning and correctness of algorithms.
8.	To learn the complexity measures, different range of behavior algorithms intractable problems will be understood.
9.	To design the algorithms for real-time problems.
10.	To solve the problems by using different types of algorithms techniques.

Course Outcomes

6.	Design algorithms for various computing problems.
7.	Analyze the time and space complexity of algorithms.
8.	Critically analyze the different algorithm design techniques for a given problem.
9.	Modify existing algorithms to improve efficiency
10	Solve the real time problems by using back tracking and branch and bound techniques.

Unit-I : Introduction	**9**
Notion of an Algorithm – Fundamentals of Algorithmic Problem Solving – Important Problem Types – Fundamentals of the Analysis of Algorithm Efficiency – Analysis Framework – Asymptotic Notations and its properties – Mathematical analysis for Recursive and Non-recursive algorithms.	
Unit-II :Brute ForceAndDivide-And-Conquer	**9**
Brute Force - Closest-Pair and Convex-Hull Problems-Exhaustive Search - Traveling Salesman Problem - Knapsack Problem - Assignment problem. Divide and conquer methodology–Mergesort– Quick sort – Binary search – Multiplication of Large Integers – Strassen's Matrix Multiplication-Closest-Pair and Convex-Hull Problems.	
Unit-III :Dynamic ProgrammingandGreedyTechnique	**9**
Computing a Binomial Coefficient – Warshall's and Floyd' algorithm – Optimal Binary Search Trees –Knapsack Problem and Memory functions. Greedy Technique– Prim's algorithm- Kruskal's Algorithm-Dijkstra's Algorithm- Huffman Trees.	
Unit-IV :IterativeImprovementAndLimitationOfAlgorithm	**9**
The Simplex Method-The Maximum-Flow Problem – Maximm Matching in Bipartite Graphs- the Stable marriage Problem. Limitations of Algorithm Power-Lower-Bound Arguments-Decision Trees-P, NP and NP Complete Problems.	
Unit-V :Backtracking, Branch And Bound And Approximation Algorithm	**9**
Backtracking – n-Queens problem – Hamiltonian Circuit Problem – Subset Sum Problem-Branch and Bound – Assignment problem – Knapsack Problem – Traveling Salesman Problem- Approximation Algorithms for NP – Hard Problems – Traveling Salesman problem – Knapsack problem.	
Total :	**45**

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
3.	AnanyLevitin	Introduction to the Design and Analysis of Algorithms	Third Edition, PearsonEducation,.	2012
4.	BogdanCiu botaru& Gabriel-MiroMunte an	Advanced Network Programming Principles & Techniques, NetworkApplication Programming with Java	Springer Verlag	2013

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
6.	Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman	Data Structures And Algorithms	Pearson Education, Reprint	2006
7.	Donald E. Knuth,	The Art of Computer Programming	Volumes 1& 3 Pearson Education,	2009
8.	A I. Chandra Mohan	Design and Analysis of Algorithms	PHI Learning Pvt. Ltd, 2nd Edition	2012
9.	Steven S. Skiena	The Algorithm Design Manual	Second Edition , Springer	2008
10.	ManasRanjan Kabat	Design And Analysis Of Algorithms	PHI Learning Pvt. Ltd, 2nd Edition	2013

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Course Code & Course Name	:	21CYC35 - DESIGN AND ANALYSIS OF ALGORITHMS LABORATORY	L	T	P	C
			0	0	2	1

	Course Objectives
1.	To write programs in java to solve problems using divide and conquer strategy.
2.	To write programs in java to solve problems using backtracking strategy.
3.	To write programs in java to solve problems using greedy
4.	To write programs in java to solve problems using dynamic programming techniques strategy.
5.	To write programs in java to solve problems using approximation algorithm design.

	Course Outcomes
1.	Ability to write programs in java to solve problems using Divide and Conquer algorithm design techniques.. .
2.	Write program in java to solve problems using Greedy algorithm design technique
3.	Write program in java to solve problems using Dynamic programming algorithm design technique
4.	Write program in java to solve problems using Backtracking algorithm design technique
5.	Write program in java to solve problems using approximation algorithm design technique

	List of Experiments
1.	Write a java program to implement Quick sort algorithm for sorting a list of integers in ascending order
2.	Write a java program to implement Merge sort algorithm for sorting a list of integers in ascending order
3.	Write a java program to implement the backtracking algorithm for the sum of subsets problem.
4.	Write a java program to implement the backtracking algorithm for the Hamiltonian Circuits problem.
5.	Write a java program to implement greedy algorithm for job sequencing with deadlines.
6.	Write a java program to implement Dijkstra's algorithm for the Single source shortest path problem.
7.	Write a java program that implements Prim's algorithm to generate minimum cost spanning tree.
8.	Write a java program to implement Dynamic Programming algorithm for the 0/1 Knapsack problem.
9.	Write a java program to implement Dynamic Programming algorithm for the Optimal Binary Search Tree Problem.
	Total : 45

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Course Code & Course Name	:	21CYC36 -BLOCKCHAIN TECHNOLOGY	L	T	P	C
			3	0	0	3

Course Objectives

1.	To study Basic cryptographic primitives and Block chain Technology.
2.	To study about Distributed computing basics and the issues related to it.
3.	To know about Bitcoin and ethereum crypto- currencies.
4.	To learn about Hyperledger and other advancement in Block chain.
5.	To learn about privacy and security issues in Block chain.

Course Outcomes

1.	Explore Block chain Technology and cryptographic primitives.
2.	Tell about Distributed Computing and various Cryptographic Techniques.
3.	Solve Bitcoin and Ethereum puzzles to include blocks into Block chain.
4.	Tell about Hyper ledger and its uses.
5.	Address the privacy and security issues in Blockchain Technology.

Unit-I : Introduction	**9**
Introduction- Distributed systems- Architecture- Need for Distributed Record Keeping- Modeling faults and adversaries- Byzantine Generals problem-Consensus algorithms and their scalability problems- Cryptcurrency- Technologies Borrowed in Blockchain – hash pointers, consensus, byzantine fault-tolerant distributed computing and digital cash.	
Unit-II :Distributed Computing And Cryptography Basics	**9**
Introduction- Distributed Computing- issues in Distributed Computing- Atomic Broadcast, Consensus, Byzantine Models of fault tolerance- Hash functions, Puzzle friendly Hash, Collision resistant hash, digital signatures, public key crypto, verifiable random functions, Zero-knowledge system.	
Unit-III :Bitcoin And Ethereum	**9**
Bitcoin- blockchain, the challenges, and solutions, proof of work, Proof of stake, alternatives to Bitcoin consensus, Bitcoin scripting language and their use- Ethereum and Smart Contracts, The Turing Completeness of Smart Contract Languages and verification challenges.	
Unit-IV :Hyperledger	**9**
Using smart contracts to enforce legal contracts, comparing Bitcoin scripting vs. Ethereum Smart Contracts- Hyperledger fabric, the plug and play platform and mechanisms in permissioned blockchain	
Unit-V :Privacy And Security Issues In Blockchain	**9**
Pseudo-anonymity vs. anonymity, Zcash and Zk-SNARKS for anonymity preservation, attacks on Blockchains – such as Sybil attacks, selfish mining, 51% attacks - -advent of algorand, and Sharding based consensus algorithms to prevent these.	
Total :	**45**

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	S.Shukla, M. Dhawan, S.Sharma, S. Venkatesan	Blockchain Technology: Cryptocurrency and Applications	Oxford University Press	2019
2.	Josh Thompson	Blockchain: The Blockchain for Beginnings, Guild to Blockchain Technology and Blockchain Programming	Create Space Independent Publishing Platform	2017

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Tiana Laurence	Block chain For Dummies	Wiley	2019
2.	Don Tapscott	Blockchain Revolution: How the Technology BehindBitcoin and Other Cryptocurrencies is Changing the World	Penguin	2018
3.	Daniel Drescher	Blockchain Basics: A Non-Technical Introduction in 25 Steps	Apress	2017

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Course Code & Course Name	:	21CYC37 -MOBILE COMMUNICATION	L	T	P	C
			3	0	0	3

	Course Objectives
1.	Understand the fundamentals of mobile communication
2.	Apply the typical mobile networking infrastructure through a popular GSM protocol
3.	Summarize the basics of mobile telecommunication system.
4.	Identify the Mobile Network Layer Functionalities of Mobile communication.
5.	Define the functions of Transport and Application layers

	Course Outcomes
1.	State the basics of mobile telecommunication system
2.	Illustrate the generations of telecommunication systems in wireless network
3.	Understand the architectures, the challenges and the Solutions of Wireless Communication
4.	Identify solution for each functionality at each layer
5.	Analyze the functionality of Transport and Application layer

Unit-I : Wireless Communication Fundamentals	**9**
Introduction – Wireless transmission – Frequencies for radio transmission – Signals – Antennas – Signal Propagation – Multiplexing – Modulations – Spread spectrum – MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks.	
Unit-II :Telecommunication Networks	**9**
Telecommunication systems – GSM – GPRS – DECT – Satellite Networks - Basics – Parameters and Configurations – Capacity Allocation – FAMA and DAMA – Broadcast Systems – DAB - DVB.	
Unit-III : Wirless Lan	**9**
Wireless LAN – IEEE 802.11 - Architecture – services – MAC – Physical layer – IEEE 802.11a - HIPERLAN – Blue Tooth.	
Unit-IV :Mobile Network Layer	**9**
Mobile IP – Dynamic Host Configuration Protocol - Routing – DSDV DSR Alternative Metrics.	
Unit-V :Transport And Application Layers	**9**
Traditional TCP – Classical TCP improvements – WAP- Introduction to 4G mobile networks- Case study – Mobile multimedia networks.	
Total :	**45**

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Jochen Schiller	Mobile Communications	PHI/Pearson Education.Second Edition	2003
2.	William Stallings	Wireless Communications and Networks	PHI/Pearson Education	2002

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	KavehPahlavan, PrasanthKrishnamoorthy	Principles of Wireless Networks	PHI/Pearson Education	2003
2.	UweHansmann, LotharMerk, Martin S, Nicklons and Thomas Stober	Principles of Mobile Computing	Springer,New York	2003
3.	HazysztofWesolowshi	Mobile Communication Systems	John Wiley and Sons Ltd	2002

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Course Code & Course Name	:	21CYC38 -INTERNET OF THINGS	L	T	P	C
			3	0	0	3

Course Objectives

1.	To understand Smart Objects and IoT Architectures
2.	To learn about various IOT-related protocols
3.	To be exposed to web, cloud in the context of IoT
4.	To develop different models for network dynamics
5.	To analyze applications of IoT in realtime scenario

Course Outcomes

1.	Explain the underlying architectures and models in IoT.
2.	Analyze various protocols for IoT at the different layers for IoT
3.	Apply the web of things and cloud of things Models
4.	Develop different models for network dynamics
5.	Study the needs and suggest appropriate solutions for Industrial applications

Unit-I : Introduction	**9**
Definitions and Functional Requirements –Motivation – Architecture - Web 3.0 View of IoT– Ubiquitous IoT Applications – Four Pillars of IoT – DNA of IoT - The Toolkit Approach for End-user Participation in the Internet of Things. Middleware for IoT: Overview – Communication middleware for IoT –IoT Information Security.	
Unit-II :Iot PROTOCOLS	**9**
Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Issues with IoT Standardization – Unified Data Standards – Protocols – IEEE 802.15.4 – BACNet Protocol – Modbus – KNX – Zigbee Architecture – Network layer – APS layer – Security	
Unit-III :Web Of Things	**9**
Web of Things versus Internet of Things – Two Pillars of the Web – Architecture standardization for WoT– Platform Middleware for WoT – Unified Multitier WoT Architecture – WoT Portals and Business Intelligence. Cloud of Things: Grid/SOA and Cloud Computing–Cloud Middleware – Cloud Standards – Cloud Providers and Systems – Mobile Cloud Computing – The Cloud of Things Architecture	
Unit-IV : Iot Business Models	**9**
Integrated Billing Solutions in the Internet of Things Business Models for the Internet of Things - Network Dynamics: Population Models – Information Cascades - Network Effects – Network Dynamics: Structural Models - Cascading Behavior in Networks - The Small-World Phenomenon	
Unit-V : Applications	**9**
The Role of the Internet of Things for Increased Autonomy and Agility in Collaborative Production Environments - Resource Management in the Internet of Things: Clustering, Synchronisation and Software Agents. Applications - Smart Grid – Electrical Vehicle Charging.	
Total :	**45**

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	David Hanes,GonzaloSalgueiro,Patrick,Grossetete, Rob Barton and Jerome Henry	Fundamentals:Networking Technologies, Protocols and Use Cases for Internet of Things	Cisco Press	2017
2.	ArshdeepBahga,VijayMadisetti	Internet of Things	A hands-on approach, Universities press	2015

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	David Easley and Jon Kleinberg	Networks, Crowds, and Markets: Reasoning About a Highly Connected World	Cambridge University Press	2010
2.	Olivier Hersent, David Boswarthick, Omar Elloumi	The Internet of Things	A John Wiley & Sons, Ltd	2012
3.	Honbo Zhou	The Internet of Things in the Cloud: A Middleware Perspective	CRC Press	2012
4.	Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds)	Architecting the Internet of Things	Springer	2011
5.	Olivier Hersent, Omar Elloumi and David Boswarthick	The Internet of Things: Applications to the Smart Grid and Building Automation	Wiley	2012

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Course Code & Course Name	:	21CYC39 -INTERNET OF THINGS LABORATORY	L	T	P	C
			0	0	2	1

Course Objectives

1.	To study the assembly language using simulator and kit.
2.	To perform ALU operations.
3.	To generate waveforms and test timers.
4.	To develop applications using Embedded C.
5.	To develop IoT applications using Aurdino, Raspberry Pi, and Bluemix.

Course Outcomes

1.	Execute Assembly Language experiments using simulator.
2.	Implement ALU operations.
3.	Design waveforms and test timers
4.	Develop real time applications and explore ARM/PIC using Embedded C.
5.	Demonstrate real time applications using Aurdino, Raspberry Pi, and Bluemix.

List of Experiments

1.	Write 8051 Assembly Language experiments using simulator.
2.	Test data transfer between registers and memory.
3.	Perform ALU operations.
4.	Using interrupts generate waveforms and test Timers.
5.	Write assembly language experiments using Kit to test interfaces and interrupts using Traffic Generator, DAC, ADC,
6.	Stepper Motor (2).
7.	Write Basic and arithmetic Programs Using Embedded C.
8.	Write Embedded C program to test interrupt and timers.
9.	Develop Real time applications – clock generation, wave form generation, counter using embedded C.
10.	Explore ARM/PIC based controllers using Embedded C.
11.	Explore different communication methods with IoT devices
12.	Develop simple application – testing infrared sensor – IoT Applications – using Aurdino.
13.	Develop simple application – testing temperature, light sensor – IOT Application using open platform/Raspberry Pi.
14.	Deploy IOT applications using platforms such as Bluemix.
15.	Develop Real time applications – clock generation, wave form generation, counter using embedded C.
16.	Explore ARM/PIC based controllers using Embedded C.

Total	:	45

Course Code & Course Name	:	21CYC40-ARTIFICIAL INTELLIGENCE	L	T	P	C
			3	0	0	3

Course Objectives

1.	To learn the concepts of computational intelligence for solving problems
2.	To Understand about knowledge representation and decisions making
3.	To introduce the concepts of machine learning and Neural Networks
4.	To Initiate the Perception of Genetic Algorithms.
5.	To understand the knowledge about Expert Systems

Course Outcomes

1.	Apply different searching strategies for problem solving
2.	Representplanningproblemsandfindthesequenceofactionstoachievegoalsbyusingknowledge representation.
3.	Comprehends the various machine learning techniques.
4.	Demonstrate different techniques to represent Genetic Algorithms
5.	Develop the expert system for the real time problems.

Unit-I : Introduction To Al And Production Systems	**9**
Introduction to AI-Problem formulation, Problem Definition -Production systems, Control strategies, Search strategies. Problem characteristics, Production system characteristics -Specialized production system- Problem solving methods - Problem graphs, Matching, Indexing and Heuristic functions -Hill Climbing-Depth first and Breath first, Constraints satisfaction - Related algorithms, Measure of performance and analysis of search algorithms	
Unit-II :Representation Of Knowledge	**9**
Game playing - Knowledge representation, Knowledge representation using Predicate logic, Introduction to predicate calculus, Resolution, Use of predicate calculus, Knowledge representation using other logic- Structured representation of knowledge.	
Unit-III :Machine Learning	**9**
Machine Learning-Supervised learning-un Supervised learning-Reinforcement Learning-Learning by Inductive Logic Programming-Computational Learning Theory-Neural Nets-Artificial Neural Nets-Topology of AI- Learning using Neural Nets-Back Propagation Training Algorithm- Multi-Layered ADALINE Models- Hopfield Neural Net-Associative Memory-Fuzzy Neural Nets- Self Organizing Neural Net-Adaptive Resonance Theory.	
Unit-IV :Genetic Algorithms	**9**
Genetic Algorithms-Hollands Observation-Fundamental Theorem of Genetic Algorithms-Markov Model for Convergence Analysis-Applications of Optimization problem,Intelligent Systems-Genetic Programming- Fuzzy Neural Nets-Cognitive Maps-Stability Analysis-Control Command by Cognitive Map-Visual perception- CaseStudy	
Unit-V :Expert Systems	**9**
Expert systems - Architecture of expert systems, Roles of expert systems - Knowledge Acquisition –Meta knowledge, Heuristics. Typical expert systems - MYCIN, DART, XOON, Expert systems shells.	
Total :	**45**

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Elaine Rich, Kevin Knight, Shivashankar.B.Nair	Artificial Intelligence	Tata McGraw Hill	2011
2.	AmitKonar	Artificial Intelligence	CRC,Press	2009

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Russell, Peter Norvig	ArtificialIntelligence–A ModernApproach	Prentice Hall of India	2009
2.	Dan W. Patterson	Introduction to AI and ES	Pearson Education	2007
3.	AndriesP.Engelbrecht,	Computational Intelligence: An Introduction	John Wiley & Sons	2007
4.	Eugene Charniak, Drew McDermott	Introduction to Artificial Intelligence	Pearson Education	2006.
5.	Nils.J.Nilsson	Artificial Intelligence: A new synthesis	Elsevier	2003

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Course Code & Course Name	:	21CYC41 - PRINCIPLES OF COMPILER DESIGN	L	T	P	C
			3	0	0	3

Course Objectives

1.	To learn the basic concepts of Automata theory.
2.	To know the basic concepts of compilers.
3.	To learn the functions of Lexical Analyzer and Syntax Analyzer.
4.	To understand the process of Intermediate Code Generation.
5.	To understand the concepts of Code Generation and Code Optimization

Course Outcomes

1.	Design a lexical analyzer for compiler.
2.	Implement a parser such as a bottom– up SLR parser without using YACC.
3.	Implement semantic rules into a parser.
4.	Implement intermediate code generator for compiler design.
5.	Implement code generator and code optimizer.

Unit-I : Introduction To Automata And Compiler	
Basic Machines Finite Automata (FA) - Deterministic Finite Automata (DFA) – Nondeterministic Finite Automata (NFA) – Finite Automata with Epsilon transitions-Finite State Automata and Regular Expressions. Compilers – Phases of a compiler – Cousins of the Compiler– Compiler construction tools – Lexical Analysis – Role of LexiAnalyzer– Input Buffering – Tokens Specification.	
Unit-II :Lexical Analysis	
Recognition machine - A typical lexical analyzer generator - Parsing - Top Down parsing – Recursive Descent Parsing – Predictive Parsing. Syntax	
Unit-III :Analysis	
Analysis: Role of the parser – Context-Free Grammars — Bottom-up parsing – Shift Reduce Parsing – Operator Precedent Parsing – LR Parsers – SLR Parser – Canonical LR Parser – LALR Parser.	
Unit-IV :Intermediate code Generation	
Intermediate languages – Declarations – Assignment Statements – Boolean Expressions – Case Statements – Back patching – Procedure calls. Code Optimization and Code generation:	
Unit-V :Code Optimization	**9**
Introduction to code optimization - Principal Sources of Optimization – Optimization of basic Blocks – DAG representation of Basic Blocks – Peephole Optimization - code generation- Issues in design of code generator – The target machine - A simple Code generator.	
Total :	**45**

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Alfred Aho Jeffrey D Ullman	Compilers Principles Techniques and Tools	Pearson Education	2014
2.	J.E.Hopcroft, R.Motwani and J.D Ullman	Introduction to Automata Theory, Languages and Computations	Pearson Education	2003

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Fischer C N LeBlanc R J	Crafting a compiler with C	Benjamin Cummings	2003
2.	Bennet J P	Introduction to Compiler Techniques	Tata McGraw Hill	2003
3.	Kenneth C Louden	Compiler Construction Principles and Practice	Thompson Learning	2003
4.	Henk Alblas and Albert Nymeyer	Practice and Principles of Compiler Building wit h C	PH.	2001
5.	Alfred V. Ahoet. Al	Compilers Principles, Techniques and Tools	Pearson Education	2007

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Course Code & Course Name	:	21CYC42 - COMPILER DESIGN LABORATORY	L	T	P	C
			0	0	2	1

	Course Objectives
1.	To learn the basic concepts of Automata theory.
2.	To know the basic concepts of compilers.
3.	To learn the functions of Lexical Analyzer and Syntax Analyzer.
4.	To understand the process of Intermediate Code Generation.
5.	To understand the concept of Code Generation and Code Optimization

	Course Outcomes
1.	Ability to design and implement lexical analyzer using C and LEX tool.
2.	Ability to design and implement parsers using C, YACC and LEX tools.
3.	Ability to design and implement compilers.
4.	Implement intermediate code generator for compiler design.
5.	Implement code generator and code optimizer.

	List of Experiments
1.	Implementation of lexical analyzer in C.
2.	Implementation of lexical analyzer using LEX tool.
3.	Implementation of the recursive descent parser for an expression grammar that generates arithmetic expressions with digits, + and*.
4.	Implementation of a parser for the same grammar as given in problem using YACC and LEX.
5.	WritesemanticrulestotheYACCprograminproblemandimplementacalculatorthattakesanexpression with digits, + and * and computes and prints its value.
6.	Implementation of the front end of a compiler that generates the three address code for a simple language with: one data type integer, arithmetic operators, relational operators, variable declaration statement, one conditional construct, one iterative construct and assignment statement.
7.	Implementation of back end of a compiler using C.
8.	Stack implementation of LR parser using C.
9.	Implementation of lexical analyzer in C.
	Total : 45

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Course Code & Course Name	:	21CYC43 - DATA WAREHOUSING AND DATA MINING	L	T	P	C
			3	0	0	3

Course Objectives

1.	To study the concepts of data warehousing architecture
2.	To understand data mining principles and techniques
3.	To learn to use association rule mining for handling large data
4.	Tostudyclassificationandclusteringforbetterorganizationandretrievalofdata
5.	To expose business applications and recent trends of Data mining

Course Outcomes

1.	Identify the components of data warehousing architecture
2.	Implement data preprocessing for mining applications
3.	Apply the association rules for mining the data
4.	Deploy appropriate classification techniques
5.	Analyze clustering techniques

Unit-I : Data Warehousing	**9**
Introduction to Data warehousing - Data warehousing Components - Building a Data Warehouse - Mapping the Data Warehouse to Multiprocessor Architecture - DBMS Schemas for Decision Support - Data Extraction, Cleanup, and Transformation Tools - Multidimensional Data Model-On Line Analytical Processing and tools - Need for OLAP- OLAP Operations – Types of OLAP servers.	
Unit-II : Data Mining	**9**
Data Mining-Motivation and Importance of Data mining – Evolution of Database systems – Data mining functionalities – Steps in KDD process- Architecture of a typical data mining system - Classification of data mining systems – Data mining task primitives - Major issues in data mining	
Unit-III :Association Rule Mining	**9**
Introduction - Association rule mining - Mining frequent item sets with and without candidate generation – Pattern evaluation methods - Mining various kinds of association rules: Pattern mining - Mining multilevel association - Mining multidimensional association - Constraint based mining.	
Unit-IV :Classification	**9**
Basic concepts - Decision tree induction - Bayesian classification - Rule based classification - Classification by back propagation - Model Evaluation and Selection - Techniques to improve classification – Case study	
Unit-V :Cluster	**9**
Cluster analysis - Clustering techniques: Partitioning methods - Hierarchical methods - Evaluation of clustering Outlier detection: Outliers and Outlier analysis - Outlier detection methods- Case study	
Total :	**45**

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Jiawei Han and Micheline Kamber,	Data Mining: Concepts and Techniques	Morgan Kaufmann Publishers	2011.
2.	Alex Berson and Stephen J. Smith	Data Warehousing, Data Mining & OLAP	Tata McGraw Hill Edition	2011

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	G. K. Gupta	Introduction to Data Mining with Case Studies	Prentice Hall of India	2014
2.	Ian Witten, Eibe Frank	Data Mining: Practical Machine Learning Tools and Techniques	Morgan Kaufmann	2011
3.	Alex Berson and Stephen J. Smith	Data Warehousing, Data Mining & OLAP	Tata McGraw – Hill Edition	2007
4.	K.P. Soman, ShyamDiwakarand V. Ajay	Insight into Data mining Theory and Practice	Prentice Hall of India	2006
5.	George M Marakas	ModernData Warehousing, Miningand Visualization	Prentice Hall	2003

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Course Code & Course Name	:	21CYC44 - MACHINE LEARNING	L	T	P	C
			3	0	0	3

Course Objectives	
1	To understand the basics of Machine Learning (ML)
2	To understand the methods of Machine Learning
3	To know about the implementation aspects of machine learning
4	To understand the concepts of Data Analytics and Machine Learning
5	To understand and implement usecases of ML

Course Outcomes	
1	Understand the basics of ML
2	Explain various Machine Learning methods
3	Demonstrate various ML techniques using standard packages.
4	Explore knowledge on Machine learning and Data Analytics
5	Apply ML to various real time examples

Unit- I : MACHINE LEARNING BASICS	9
Introduction to Machine Learning (ML) - Essential concepts of ML – Types of learning – Machine learning methods based on Time – Dimensionality – Linearity and Non linearity – Early trends in Machine learning – Data Understanding Representation and visualization.	

Unit-II : MACHINE LEARNING METHODS	9
Linear methods – Regression -Classification –Perceptron and Neural networks – Decision trees –Support vector machines – Probabilistic models —Unsupervised learning – Featurization	

Unit-III : MACHINE LEARNING IN PRACTICE	9
Ranking – Recommendation System - Designing and Tuning model pipelines- Performance measurement – Azure Machine Learning – Open-source Machine Learning libraries – Amazon's Machine Learning Tool Kit: Sagemaker	

Unit-IV : MACHINE LEARNING AND DATA ANALYTICS	9
Machine Learning for Predictive Data Analytics – Data to Insights to Decisions – Data Exploration –Information based Learning – Similarity based learning – Probability based learning – Error based learning – Evaluation – The art of Machine learning to Predictive Data Analytics.	

Unit-V : APPLICATIONS OF MACHINE LEARNING	9
Image Recognition – Speech Recognition – Email spam and Malware Filtering – Online fraud detection – Medical Diagnosis.	

Total	:	45

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Text Books:				
S.No.	**Author(s)**	**Title of the Book**	**Publisher**	**Year of Publication**
1	Ameet V Joshi	Machine Learning and Artificial Intelligence	Springer Publications	2020
2	John D. Kelleher, Brain Mac Namee, Aoife D' Arcy	Fundamentals of Machine learning forPredictive Data Analytics, Algorithms, Worked Examples and case studies	MIT press	2015

Reference Books:				
S.No.	**Author(s)**	**Title of the Book**	**Publisher**	**Year of Publication**
1	Christopher M. Bishop	Pattern Recognition and Machine Learning	Springer Publications	2011
2	Stuart Jonathan Russell, Peter Norvig, John Canny	Artificial Intelligence: A Modern Approach	Prentice Hall	2020
3	John Paul Muller, Luca Massaron	Machine Learning Dummies	Wiley Publications	2021

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PROGRAMME ELECTIVE COURSES
(PEC)

Course Code &Course Name	:	21CYE01 & C# AND .NET FRAMEWORK	L	T	P	C
			3	0	0	3

Course Objectives	
1.	To discuss the concepts of NET Framework and C# language
2.	To Design and develop real-time applications using object oriented concepts in C#
3.	To Design anddeveloprеal-timeapplicationsusing.NET
4.	To Design and develop windows and web based applications using C#
5.	To Develop C# programs for Multithreading and database applications

Course Outcomes	
1.	Discuss the concepts of NET Framework and C# language
2.	Design and develop real-time applications using object oriented concepts in C#
3.	Design and develop real-time applications using.NET
4.	Develop the web based applications using ADO.NET in C#
5.	Implement the network application by using .Net framework.

Unit-I : INTRODUCTION TO C#	9
Introducing C#, Understanding .NET, Overview of C#, Literals, Variables, Data Types, Operators, Expressions, Branching, Looping, Methods, Arrays, Strings, Structures, and Enumerations.	
Unit-II :OBJECT ORIENTED ASPECTS OF C#	**9**
Classes, Objects, Inheritance, Polymorphism, Interfaces, Operator Overloading, Delegates, Events, Errors and Exceptions.	
Unit-III :APPLICATION DEVELOPMENT ON .NET	**9**
Windows Applications: Basic windows controls. Advanced controls, multi window applications, Accessing Data with ADO.NET: Connections, Data Adapters, Datasets, Data Application, Working with relational databases, multiple tables in a single dataset, Data views, Data Binding, Complex Binding, Navigating through datasets using bound controls.	
Unit-IV :WEB BASED APPLICATION DEVELOPMENT ON .NET	**9**
Programming Web Applications with Web Forms, web server controls, Programming Web Services.	
Unit-V :THE CLR AND THE .NET FRAMEWORK	**9**
Assemblies, Versioning, Attributes, Reflection, Viewing Metadata, Type Discovery, Reflecting on a Type, Marshaling, Remoting, Understanding Server Object Types, Specifying a Server with an Interface, Building a Server, Building the Client, Using Single Call, Threads.	
Total :	**45**

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	E. Balagurusamy	Programming in C#	Tata McGraw-Hill	2004
2.	J. Liberty	Programming C#	O'Reilly	2002

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Herbert Schildt	The Complete Reference: C#	Tata McGraw-Hill	2004
2.	Robinson et al	Professional C#	Wrox Press	2002
3.	Andrew Troelsen	C# and the .NET Platform	A1 Press	2003
4.	Thamarai Selvi, R. Murugesan	A Textbook on C#	Pearson Education	2003
5.	Karli Watson, Christian Nagel,Jacob Hammer Pedersen,Jon Reid, Morgan Skinner	Beginning Viual C# 2010	Wiley India Pvt.Ltd	2010

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Course Code &Course Name	:	21CYE02 & SOFTWARE PROJECTMANAGEMENT	L	T	P	C
			3	0	0	3

Course Objectives

1.	To highlight different techniques for software cost estimation
2.	To plan and monitor projects for the risk management
3.	To explore the process of monitoring and controlling
4.	To manage people and organization of teams
5.	To estimate the cost associated with project

Course Outcomes

1.	Able to practice the process of project management and its application in delivering successful projects
2.	Evaluate the risks and hazards in the project management
3.	Apply cost monitoring and control strategies for software projects
4.	Identify desirable characteristics of effective project managers and manage the organizational behavior of people working in teams
5.	Evaluate a project to develop the scope of work ,provide accurate cost estimates and to plan the various activities

Unit-I : INTRODUCTION AND PROJECT EVALUATION	9
Project Definition – Importance of Software Project Management – Contract Management – Activities covered by Software Project Management – Setting objectives – Stakeholders - Management Control – Overview of Project Planning – Stepwise Project Planning – Project evaluation - Strategic Assessment – Technical Assessment – Cost Benefit Analysis – Cash Flow Forecasting – Cost Benefit Evaluation Techniques.	
Unit-II :ACTIVITY PLANNING AND RISK MANAGEMENT	**9**
Objectives – Project Schedule – Sequencing and Scheduling Activities – Network Planning Models – Forward Pass – Backward Pass – Critical path (CRM) method – Activity Float – Shortening the Project Duration– Activity on Arrow Networks – Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Hazard Identification – Hazard Analysis.	
Unit-III :PROJECT MANAGEMENT AND CONTROL	**9**
Introduction – Creating the Framework – Collecting the Data – Visualizing Progress – Cost Monitoring – Earned Value – Prioritizing Monitoring – Getting Project Back To Target – Change Control – Managing Contracts – Introduction – Types of Contract – Stages in Contract Placement – Typical Terms of a Contract –Contract Management – Acceptance.	
Unit-IV :MANAGING PEOPLE AND ORGANIZING TEAMS	**9**
Introduction – Understanding Behavior – Organizational Behavior – Selecting the Right Person for the Job–Instruction in the Best Methods – Motivation – The Oldham Hackman Job Characteristics Model – Working In Groups – Becoming A Team – Decision Making – Leadership – Organizational Structures – Stress – Health And Safety.	
Unit-V :SOFTWARE EFFORT ESTIMATION	**9**
Introduction – The basics for software estimation – Software effort estimation techniques – Expert judgment–Estimating by analogy – Albrecht function point analysis –Function points Mark II – COSMIC Full function points - COCOMO: A Parametric Productivity Model.	
Total :	45

Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Bob Hughes, Mike Cotterell	Software Project Management	Tata McGraw Hill, Fifth Edition	2011
2.	Robert K. Wysocki	Effective Software Project Management	Wiley Publication	2011

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Adolfo Villafiorita	Introduction to Software Project Management	CRC Press	2014
2.	Jalote	Software Project Management in Practice	Pearson Education	2010
3.	Murali k. chemuturi, Thomas m cagly	Mastering software project management- best practices tools and Techniques	j ross Publication	2010

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Course Name	:	21CYE03 & SALESFORCE CRM AND PLATFORM	L	T	P	C
			0	0	2	1

Course Objectives

1.	To learn the basics of Salesforce as a CRM and a Platform
2.	To learn the administrative and configurable capabilities of Salesforce
3.	To write business logic customizations using Apex triggers and classes customized using SOQL and DML
4.	To describe how trigger code works within the basics of the Save Order of Execution and transactions
5.	To write Visual force markup code to customize the user interface

Course Outcomes

1.	Leverage configurable aspects of Salesforce for business process automation
2.	Understand Apex Programming and Visualforce
3.	Develop Apex program with SOQL &DML
4.	Testing and Execution of triggers in Apex

Unit-I : INTRODUCTION TO SALESFORCE	**9**
Salesforce Overview - Architecture – Environment - Sales Cloud - Service Cloud - Navigating Setup Salesforce Objects - Standard Objects - Custom Objects & Fields - Field Types - Master Detail - Lookup Relationship - Schema Builder - Global Search.Standard UI Configuration - Page Layouts - Record Types - Record Type Based Picklist Values. Process Automation - Validation Rules, Workflow Rules and Actions - Process Builder - Approval Process. Salesforce Security Model - Role Hierarchy - Profiles and Permission Sets - Access Controls - Object and Field Level Security - Record Level Security - Org Wide Defaults - Record Ownership - Sharing Rules.	
Unit-II :SALESFORCECRMFUNCTIONALITY	**9**
CRM Basics : Introduction to CRM - Sales Objects - Service Objects. Sales Process: Lead - Web-to-Lead - Lead Conversion - Opportunities - Accounts & Contacts – Products. Service Process: Case, Email-to-Case, Web-to-Case. Automation Rules: Lead/Case Assignment Rules - Escalation Rules - Merge Records - DuplicationRules.	
Unit-III :APEXPROGRAMMING BASICS	**9**
Programming with Apex: Introduction to Apex - Statements & Collections - Introduction to Apex Classes. SOQL: Syntax, SOQL in Apex, Dynamic SOQL. Query using relationships: Relationship name, child-to-parent relationship – parent-to-child relationship.DML essentials: DML operations with Apex - Transaction Controls - DML errors.	
Unit-IV :APEX PROGRAMMINGDEVELOPMENT	**9**
Apex Trigger Essentials: Introduction - Trigger Events - Syntax - Trigger context variables. Apex Class Implementation: Implement Business Logic in Apex class - Trigger Handlers and Controllers - Best Practices (Bulkification, No DML & queries inside loops) - Apex Test Classes. Advanced Apex: Asynchronous Apex - Apex Scheduler - Batch Apex - Future methods - Queueable Apex API Callouts - Apex Web Services - Standard APIs. Transactions: Lifecycle of a transaction – Memory life cycle for static variable - Salesforce order of Execution - Execution Governor Limits. Development Tools: Developer Console - Debug Logs - Eclipse & Force.com IDE - Visual Studio – Workbench	
Unit-V :VISUALFORCE DEVELOPMENT	**9**
Visualforce: Introduction – Creating Visualforce pages – Important Visualforce Tags - Exploring the View and Controller layers of Visualforce – Standard Controller – Display data from a record in a Visualforce page – Display related data – Invoke standard controller actions– Using standard list controller in a Visualforce page – Using custom controllers and extensions – Security concerns.	
Total	: 45

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Paul Goodey, - Fourth Edition,	Salesforce CRM - The Definitive Admin Handbook	4th Revised edition Edition, PACKT enterprises, Kindle edition	2016
2.	Matt Kaufmann and Michael Wicherski	Learning Apex Programming	PACKT enterprises, Kindle edition	2015

REFERENCE BOOK

SI.NO	Author(s)	Title of the Book	Publisher	Year of Publications
1.	David Taber	Salesforce.com Secrets of Success: Best Practices for Growth and Profitability	2nd Edition, Prentice Hall	2013
2.	Keir Bowden	Visualforce Development Cookbook	PACKT enterprises, Kindle edition	2016

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Course Code & Course Name	:	21CYE04&Salesforce CRM and Platform Laboratory	L	T	P	C
			0	0	2	1

Course Objectives

1.	To learn the basics of Salesforce as a CRM and a Platform
2.	To learn the administrative and configurable capabilities of Salesforce
3.	To write business logic customizations using Apex triggers and classes customized using SOQL and DML
4.	To describe how trigger code works within the basics of the Save Order of Execution and transactions
5.	To write Visual force markup code to customize the user interface

Course Outcomes

1.	Leverage configurable aspects of Salesforce for business process automation
2.	Understand Apex Programming and Visualforce
3.	Develop Apex program with SOQL &DML
4.	Testing and Execution of triggers in Apex

List of Experiments

1.	Salesforce Basics
2.	Salesforce Platform Basics
3.	Platform Development Basics
4.	Developer Console Basics
5.	Apex Basics for Admin
6.	Object Oriented Programming for Admin
7.	Apex Triggers
8.	SOQL Database .Net Basics
9.	Visual force Basics
10.	Build a Conference Management Application
11.	Development an Account Relocation Application
12.	Transform SQL Queries to SOQL Queries

Total	:	45

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Course Name	:	21CYE05&Biometric Systems & Biometric Image Process	L	T	P	C
			3	0	0	3

Course Objectives

1.	Understand the basics of biometrics compared to traditional securing mechanisms.
2.	Design and develop a biometric security system
3.	Gain knowledge in building blocks of research fields like Pattern Recognition, Image Processing etc.
4.	evaluate the fingerprint biometrics of several modalities from measures
5.	Analyze finger biometric technology

Course Outcomes

1.	Understand the technological uplifts with biometrics
2.	Evaluate security systems with biometrics.
3.	Acquire the fundamental concepts of a digital ***image processing*** system
4.	Demonstrate the features of **fingerprint biometrics**
5.	Apply iris biometric for identification

Unit-I : Introduction	9

Biometric fundamentals – Biometric technologies – Biometrics Vs traditional techniques –Characteristics of a good biometric system – Benefits of biometrics – Key biometric processes: verification, identification and biometric matching – Performance measures in biometric systems, FAR,FRR, FTE rate, EER and ATV rate, Applications of Biometric Systems, Security and Privacy Issues. Physiological Biometrics : Leading technologies : Finger-scan – Facial-scan – Iris-scan – Voice-scan–components, working principles, competing technologies, strengths and weaknesses – Other physiological biometrics : Hand-scan, Retina-scan – components, working principles, competing technologies, strengths and weaknesses – Automated fingerprint identification systems.

Unit-II : Behavioral Biometrics	9

Leading technologies: Signature-scan – Keystroke scan – components, working principles, strengths and weaknesses. **Privacy and Standards in Biometrics**: Assessing the Privacy Risks of Biometrics – Designing Privacy- Sympathetic Biometric Systems – Need for standards – different biometric standards.

Unit-III : Fundamentals of Image Processing	9

Digital Image representation - Fundamental steps in Image Processing Image Enhancement: The Spatial Domain Methods, The Frequency Domain Methods – Image Segmentation: Pixel Classification by Thresholding, Histogram Techniques, Smoothing and Thresholding- Gradient Based Segmentation: Gradient Image, Boundary Tracking, Laplacian Edge Detection.

Unit-IV : Fingerprint Biometrics	9

Fingerprint Patterns, Fingerprint Features, Fingerprint Image, width between two ridges -Fingerprint Image Processing - Minutiae Determination - Fingerprint Matching: Fingerprint
Classification, Matching policies.

Unit-V : Iris Biometrics	9

Iris System Architecture, Definitions and Notations - Iris Recognition: Iris location, Doubly Dimensionless Projection, Iris code, Comparison - Coordinate System: Head Tilting Problem, Basic Eye Model, Searching Algorithm, Texture Energy Feature

Total	45

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Paul Reid	Biometrics for Network Security	Pearson Education	2004
2.	Rafael C.Gonzalez, Richard E.Woods, Steven L.Eddins	Digital Image Processing	Pearson Education	2009
3.				

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	David D. Zhang	Automated Biometrics: Technologies and Systems	Kluwer Academic Publishers	2000
2.	Anil K Jain, Arun A Ross, Karthik Nandakumar	Introduction to Biometrics	Springer	2011
3.	Samir Nanavati, Michael Thieme, Raj Nanavati	Biometrics – Identity Verification in a Networked World	Wiley-dreamtech India Pvt Ltd	2003

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Course Name	:	21CYE06& AWS Academy Cloud Developing	L	T	P	C
			3	0	0	3

Course Objectives

1.	Recall cloud computing services and models.
2.	Configure AWS Identity and Access Management for programmatic access.
3.	To Develop containers with AWS Lambda
4.	Access solutions with Amazon API Gateway.
5.	Identify best practice for building secure applications and deploying applications.

Course Outcomes

1.	Create on AWS.
2.	Develop AWSI density and Access Management for programmatic access.
3.	Implement Container with AWS Lambda.
4.	Organize solutions with Amazon API Gateway.
5.	Build secure applications and deploying applications.

Unit-I : Introduction to Developing on AWS	**9**
Course Prerequisites, objectives and overview, AWS Training Portal, Lab Environment, AWS Free Tier, AWS Educate, Systems Development Lifecycle, Steps to Get Started Developing on AWS, Working with AWS SDKs, Errors and Exceptions, Introduction to AWS X-Ray, Introduction to Amazon CloudWatch and AWS CloudTrail, IAM - Shared Responsibility Model, Overview of IAM, Authentication with IAM, Authorization with IAM.	
Unit-II : : Developing Storage Solutions with Amazon S3	**9**
Introduction to Amazon S3, Creating Amazon S3 Buckets, Working with Amazon S3 Objects, Protecting Data and Managing Access to Amazon S3 Resources. Developing NoSQL Solutions with Amazon DynamoDB - Introduction to Amazon DynamoDB, Amazon DynamoDB Key Concepts, Partitions and Data Distribution, Secondary Indexes, Read/Write Throughput, Streams and Global Tables, Backup and Restore, Basic Operations for Amazon DynamoDB Tables. Caching Information for Scalability - Caching Overview, Caching with Amazon CloudFront, Caching with Amazon ElastiCache, Caching Strategies.	
Unit-III : Introduction to Containers with AWS Lambda	**9**
Introduction to Containers, Containers vs. Hardware Virtualization, Microservices – Use Case for Containers, Amazon Container Services. Developing Solutions with Amazon SQS and Amazon SNS - Introduction to Message Queues, Introduction to Amazon SQS, Amazon SQS Developer Concepts, Introduction to Amazon SNS, Amazon SNS Developer Concepts, Introduction to Amazon MQ. Developing Event – Driven solutions with AWS Lambda - Introduction to Serverless Computing with AWS Lambda, Overview of AWS Lambda, Execution Models for Invoking Lambda Functions, AWS Lambda Permissions, Overview of Authoring and Configuring Lambda Functions, Overview of Deploying Lambda Functions.	
Unit-IV : Developing Solutions with Amazon API Gateway	**9**
Application Programming Interfaces, Amazon API Gateway, Creating a RESTful API, Controlling Access to a RESTful API, Testing a RESTful API, Deploying a RESTful API, Invoking a RESTful API, Monitoring a RESTful API. Developing solutions with AWS step functions - Workflow Coordination in Distributed Applications, Introduction to AWS Step Functions, State Types, AWS Step Functions Use Case, AWS Step Functions API. Developing secure application on AWS - Secure Network Connections, Manage Application Secrets, Authenticate with AWS Security Token Service, Authenticate with Amazon Cognito.	
Unit-V : Deploying Applications on AWS	**9**
Introducing DevOps Using AWScodeservicesforCI/CD, Introducing Deployment and Testing Strategies, Developing Applications with AWSElasticBeanstalk, Deploy applications AWSCloudFormation, Deploying Serverless applications AWSSAM.	
Total	45

Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Maverick Koston	AWS: Amazon Web Services, the Ultimate Guide for Beginners to Advanced	-	2020
2.	Mark Wilkins	Learning Amazon Web Services (AWS): A Hands-On Guide to the Fundamentals of AWS Cloud	-	2019
3.	Marcus Young	Implementing Cloud Design Patterns for AWS	-	2015

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Nathaniel Felsen	Effective DevOps with AWS	-	2018
2.	A.W.S. Smith	AWS: Amazon Web Services	-	2018
3.	Andreas Wittig and Michael Wittig	Amazon Web Services in Action	-	2015

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Course Code & Course Name	:	21CYE07&AWS Academy Cloud Developing Laboratory	L	T	P	C
			0	0	2	1

Course Objectives

1.	To Understand and study AWS Documentation and AWS Cloud9
2.	To create an IAM User and IAM Group
3.	To develop Amazon S3 and AWS Lambda and Amazon API Gateway
4.	To perform an activity RCUs and WCUs
5.	To demonstrate AWS Lambda with API Gateway.

Course Outcomes

1.	Generate AWS Cloud9
2.	Implement IAM user and Group
3.	Developing Amazon S3 and AWS Lambda and Amazon API Gateway
4.	Able to implement Docker Container.
5.	Demonstrate AWS Lambda with API Gateway.

List of Experiments

1.	Activity - AWS Documentation Scavenger Hunt
2.	Introduction to AWS Cloud9
3.	Educator Demo - AWS Cloud9
4.	Educator Demo - Create an IAM User and IAM Group
5.	Developing with Amazon S3 using the AWS SDK
6.	Activity - Calculate Read Capacity Units (RCUs)
7.	Activity - Calculate Write Capacity Units (WCUs)
8.	Working with Docker Containers
9.	Developing with AWS Lambda and Amazon API Gateway using the AWS SDK
	Total : 45

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Course Name	:	21CYE08&AWS Academy Cloud Architecting	L	T	P	C
			3	0	0	3

Course Objectives

1.	Illustrate how cloud adoption transforms the way IT systems work.
2.	Identify the benefits of Infrastructure as Code.
3.	Summarizedatabaseservicesforstoringanddeployingweb-accessibleapplications.
4.	DescribehowtheAWSWell-ArchitectedFrameworkimprovescloud-basedarchitectures.
5.	Evaluate the most important performance metrics for applications

Course Outcomes

1.	Implement IT related work and access Amazon Web Services
2.	Develop code
3.	Construct real time database application using current techniques
4.	Populate Cloud based architectures
5.	Design real time application with performance metrics.

Unit-I : Welcome to AWS Academy Cloud Architecting	**9**
Course Prerequisites, Objectives, Overview, Creating AWS Training Portal Account, Accessing Course Materials. Designing Environment - Choosing a Region, Selecting Availability Zones, Virtual Private Cloud (VPC), Dividing VPCs and Subnets, Default VPCs and Default Subnets, Controlling VPC Traffic, Connecting Multiple VPCs, Integrating On-premises Components, VPC Best Practices. Designing for High Availabilty I - Load Balancing and Fault Tolerance, High Availability Across Regions, Connections Outside of Amazon VPC.	
Unit-II : Designing for High Availability II and Infrastructure	**9**
Designing for High Availabilty II - Best Practice – Scalability, Determining if Scaling is Needed, Automatic Scaling, Scaling Data Stores, AWS Lambda and Event Driven Scaling. Automating Infrastructure - Manual Environment Configuration, Infrastructure as code on AWS, Grouping resources in a template, Resources not supported by AWS CloudFormation. Decoupling Infrastructure - Loose Coupling, Loose Coupling Strategies, Communicating Easily and Reliably Among Components, Communicating with Loose Coupling and Amazon DynamoDB, Amazon API Gateway, Serverless Architectures, Decoupling Examples	
Unit-III : Designing Web-Scale Media and Architected Framework	**9**
Storing Web-Accessible Content with Amazon S3, Caching with Amazon Cloud Front, Managing NoSQL Databases, Storing Relational Data in Amazon RDS. Architected Framework - Introduction to the Well-Architected Framework, Pillars of the Well-Architected Framework, Well-Architected Design Principles. Operational Excellence - Principles of the Operational Excellence Pillar, Drive Operational Excellence, Operational Excellence Pillar Questions.	
Unit-IV : Well-Architected Pillars : Security, Reliability, PerformanceEfficiency	**9**
Security - Principles of the Security Pillar, Preventing Common Security Exploits, Securing Data in Cloud Front, Encrypting Data, Authentication. Reliability - Principles of the Reliability Pillar, Making Infrastructure More Reliable, Reliability Pillar Questions. Performance Efficiency - Principles of the Performance Efficiency Pillar, Infrastructure Efficiency Improvements, Performance Efficiency Pillar Questions and Best Practice.	

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Unit-V : Well-Architected Pillars : Cost Optimization, Troubleshooting, Design Patterns and Sample Architectures		9
Cost Optimization - Principles of the Cost Optimization Pillar, Optimizing the Cost of Infrastructure, Dedicated Instances and Dedicated Hosts, Trusted Advisor, Optimizing Costs with Caching, AWS Cost Calculation Tools, Cost Optimization Questions. Troubleshooting - Troubleshooting Steps, AWS Support Options. Design Patterns - High-Availability Design Patterns, Stream Processing Example, Sensor Network Data Ingestion and Processing Example, Application Backend Example, Transcoding and Serving Video Files Example.		
Total	**:**	**45**

Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Joe Baron, Biff Gaut, Hisham Baz, Tim Bixler, Sean Senior, Kevin E. Kelly, John Stamper	AWS Certified Solutions Architect Official Study Guide: Associate Exam	-	2016

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Ben Piper, David Clinton	AWS Certified Solutions Architect Study Guide: Associate SAA-C01 Exam	-	2019
2.	Julian Gramm	The Complete Guide From Beginners To Advanced For Amazon Web Services	-	2019
3.	Ben Piper, and David Clinton	AWS Certified Solutions Architect Study Guide: Associate SAA-C01 Exam 2nd Edition	-	2018

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Course Name	:	21CYE09&AWS Academy Cloud Architecting Laboratory	L	T	P	C
			0	0	2	1

Course Objectives	
1.	Formulate Auto scaling with AWS Lambda.
2.	To Summarize AWS Cloud formation.
3.	To decouple the infrastructure.
4.	To implement Serverless Architecture and Amazon CloudFront
5.	To Develop Amazon Route 53 and sandbox

Course Outcomes	
1.	Develop Auto scaling with AWS Lambda.
2.	Deploy AWS Cloud formation.
3.	Decoupling the infrastructure.
4.	To implement Serverless Architecture and Amazon CloudFront
5.	Construct Amazon Route 53 and sandbox

List of Experiments			
1.	Making Environment Highly Available		
2.	Using Auto Scaling with AWS Lambda		
3.	Automating Infrastructure Deployment with AWS Cloud Formation		
4.	Decoupling Infrastructure		
5.	Implementing a Serverless Architecture with AWS Managed Services		
6.	Introduction to Amazon CloudFront		
7.	Multi-Region Failover With Amazon Route 53		
8.	Sandbox		
9.	Making Environment Highly Available		
		Total	: 45

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Course Name	:	21CYE10&AWS Academy Cloud Foundation	L	T	P	C
			2	0	0	1

Course Objectives

1.	Describe three cloud deployment models, and Overview of AWS Global infrastructure.
2.	Understand the different AWS core services.
3.	Formulate virtual firewalls with security groups.
4.	Review the availability differences of alternative database solutions.
5.	Summarize the AWS Shared Responsibility Model, Examine IAM users, groups, and roles.

Course Outcomes

1.	Construct three cloud deployment models, and Overview of AWS Global infrastructure.
2.	Implement the different AWS compute services.
3.	Create virtual firewalls with security groups.
4.	Construct the availability of different alternative database solutions.
5.	Implement AWS Shared Responsibility Model, Examine IAM users, groups, and roles.

Unit-I : Cloud Concepts	9
Cloud Concepts Overview - Introduction to Cloud Computing, Advantages of Cloud Computing, Introduction to Amazon Web Services (AWS), AWS Cloud Adoption Framework (CAF). Cloud Economics - Fundamentals of Pricing, Total Cost of Ownership, AWS Global Infrastructure Overview - AWS Global Infrastructure, AWS Service and Service Category Overview.	
Unit-II : AWS Core Services	9
Compute - Compute Services Overview, Introduction to Amazon Elastic Compute Cloud (EC2), Amazon EC2 Cost Optimization, Introduction to AWS Lambda, Introduction to AWS Elastic Beanstalk. Storage - Amazon Elastic Block Store (EBS), Amazon Simple Storage Service (S3), Amazon Elastic File System (EFS), Amazon Glacier. VPC - Amazon Virtual Private Cloud (VPC), Amazon VPC Security Groups, Amazon CloudFront,. Database - Amazon Relational Database Service (RDS), Amazon DynamoDB, Amazon Redshift, Amazon Aurora. Balancing, Scaling, Monitoring - Elastic Load Balancing (ELB), Amazon CloudWatch, Auto Scaling.	
Unit-III : Cloud Security	9
AWS Shared Responsibility Model, AWS Identity and Access Management (IAM), AWS Trusted Advisor, AWS CloudTrail, AWS Config, AWS Day One Best Practice Review, AWS Security and Compliance Programs, AWS Security Resources.	
Unit-IV : Cloud Architecting	9
Introduction to the Well-Architected Framework, Well-Architected Design Principles, Understanding Reliability and High Availability.	
Unit-V : Cloud Support	9
Introduction to AWS Organizations, AWS Cost Explorer, Overview of AWS Technical Support Plans and Costs.	
Total :	45

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Cloud Experts	The AWS Handbook	-	2018
2.	Dan Sullivan	Official Google Cloud Certified Associate Cloud Engineer Study Guide	-	2019

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Ben Piper, David Clinton	AWS Certified Cloud Practitioner Study Guide: CLF-C01 Exam	Addison-Wesley Professional	June 2019
2.	Mark Wilkins	Learning Amazon Web Services (AWS): A Hands-On Guide to the Fundamentals of AWS Cloud	Addison-Wesley Professional	July 2019
3.	Ben Piper, David Clinton	AWS Certified Cloud Practitioner Study Guide	Sybex	July 2019

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Course Name	:	21CYE11&AWS ACADEMY CLOUD FOUNDATION LABORATORY	L	T	P	C
			0	0	2	1

Course Objectives	
1.	To understand and study Amazon EC2
2.	To work with EBS.
3.	To build VPC, web server and DB server
4.	To build the DB Server.
5.	To construct scale and load balance of cloud architecture.

Course Outcomes	
1.	Construct Amazon EC2
2.	Working with EBS
3.	Develop VPC, web server and DB server
4.	Build the DB Server.
5.	Implement scale and load balance of cloud architecture.

List of Experiments			
1.	Introduction to Amazon EC2		
2.	Working with EBS		
3.	Build VPC and Launch a Web Server		
4.	Build DB Server and Interact with DB Using an App		
5.	Scale and Load Balance Architecture		
6.	Introduction to AWS IAM		
7.	Sandbox		
		Total	: 30

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Course Name	:	21CYE12&ETHICAL HACKING AND CYBER FORENSICS	L	T	P	C
			3	0	0	3

Course Objectives	
1.	To render all the techniques used for penetration testing for performing security auditing
2.	To transform the internet security industry by infusing professionalism and efficiency
3.	To discover Remote Control Insecurities
4.	To Understand the Digital Investigation and its technology.
5.	To Learn Methods of storing data and forensic artifacts

Course Outcomes	
1.	Perform system vulnerability exploit attacks
2.	Learn various hacking methods
3.	Examine Advanced HijackingTechniques and cryptography method
4.	Apply the process in taking digital investigation
5.	Explain different methods of storing data and file formats

Unit-I : Casing the Establishment	
What is footprinting- Internet Footprinting - Scanning-Enumeration - basic banner grabbing, Enumerating Common Network services. Securing permission - Securing file and folder permission. Using the encrypting file system. Securing registry permissions. Securing service- Managing service permission. Default services in windows 2000 and windows XP. Unix - The Quest for Root. Remote Access vs Local access. Remote access. Local access. After hacking root.	
Unit-II :Network Hacking	
Dial-up ,PBX, Voicemail, and VPN hacking - Preparing to dial up. War- Dialing. Brude-Force Scripting PBX hacking. Voice mail hacking, VPN hacking. Network Devices – Discovery, Autonomous System Lookup. Public Newsgroups, Service Detection. Network Vulnerability, Detecting Layer 2 Media.	
Unit-III :Remote Control Insecurities	
Connection. Weakness.VNC . Microsoft Terminal Server and Citrix ICA .Advanced Techniques Session Hijacking. Back Doors. Trojans. Cryptography . Subverting the systems Environment. Social Engineering. Web Hacking. Web server hacking web application hacking. Hacking the internet User - Malicious Mobile code, SSL fraud, E-mail Hacking, IRC hacking, Global Counter measures to Internet User Hacking.	
Unit-IV :Digital Investigation	
Digital Investigation - Digital Evidence and Computer Crime - History and Terminology of Computer Crime Investigation - Technology and Law - The Investigative Process -Investigative Reconstruction - Modus Operandi, Motive and Technology - Digital Evidence in the Courtroom.	
Unit-V :Understanding information	**9**
Methods of storing data: number systems, character codes, record structures, file formats and file signatures - Word processing and graphic file formats - Structure and Analysis of Optical Media Disk Formats - Recognition of file formats and internal buffers - Extraction of forensic artifacts– understanding the dimensions of other latest storage devices – SSD Devices.	
Total	**: 45**

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Stuart McClure, Joel Scambray and Goerge Kurtz,	"Hacking Exposed Network Security Secrets & Solutions"	Tata Mcgrawhill Publishers	2010
2.	Bensmith, and Brian Komer	"Microsoft Windows Security Resource Kit"	Prentice Hall of India	2010

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
3.	Hein, Hilary Morrison	Ethical Hacking	Create Space Independent Publishing Platform	2018
4.	Patrick Engebretson ·	The Basics of Hacking and Penetration Testing	Elsevier Science	2013
5.	Rafay Baloch	Ethical Hacking and Penetration Testing Guide	CRC Press	2017

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Course Code & Course Name	:	21CYE13&Ethical hacking Laboratory	L	T	P	C
			0	0	2	1

Course Objectives	
1.	Install, configure, use and manage hacking software on a closed network environment
2.	Evaluate best practices in security concepts to maintain confidentiality, integrity and availability of computer systems
3.	Execute a penetration test using standard hacking tools in an ethical manner.
4.	Plan a vulnerability assessment and penetration test for a network.
5.	Determine the type of attack used and pinpoint exploit code in network traffic

Course Outcomes	
1.	Analyze and resolve Cyber security through the application of systematic approaches
2.	Explore wireless network hacking
3.	Demonstrate the ability to attack and defend a network.
4.	Investigate trojans and other attacks
5.	Explore hacking through the network: Sniffers and evasion

List of Experiments	
1.	Scanning Options
2.	Analyze Browser-Based Heap Spray Attack
3.	Analyze SQL Injection Attack
4.	Analyze Various Data Sources to Confirm Suspected Infection
5.	Automated Vulnerability Assessments
6.	Core Impact Vulnerability Scan
7.	Core Impact Web Application Penetration Testing
	Total : 45

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Course Name	:	21CYE14&Computer Forensics Analysis& Investigation	L	T	P	C
			3	0	0	3

Course Objectives	
1.	To correctly define and cite appropriate instances for the application of computer forensics Correctly collect and analyze computer forensic evidence
2.	Identify the essential and up-to-date concepts, algorithms, protocols, tools, and methodology of Computer Forensics
3.	Explain how to conduct a digital forensics investigation, including the concept of the chain of evidence.
4.	Report findings from digital forensic investigations.
5.	Perform recovery of digital evidence from various digital devices using a variety of software utilities.

Course Outcomes	
1.	Students discuss the use of different computer forensic tools.
2.	Identify the process in taking digital evidence.
3.	Describe how to conduct an investigation using methods of memory, operating system, network and email forensics.
4.	Assess the different forensics tools.
5.	Differentiate among different types of security attacks.

Unit-I : Computer forensics analysis	9
Determining what data to collect and analyze. Addressing data hiding techniques, Hiding partitions, Marking bad cluster, Bit –shifting, using steganography to hide data, Examining encrypted files, Recovering Passwords, Performing Remote Acquisitions, Remote Acquisitions with Runtime Software.	
Unit-II : Recovering graphics files	**9**
Understanding vector Graphics, Understanding graphics file formats .Lossless and lossy compression. Identifying graphics file fragments, Repairing Damaged Headers, Searching for and carving data from unallocated space. Understanding steganography in graphics files. Using steganalusis tools. Understanding copyright issues with graphics.	
Unit-III : Virtual Machines, Network forensics, and Live Acquit ions	**9**
Performing live acquit ions, Performing a live acquit ion in windows, Developing standard procedures for network forensics, Reviewing network logs. Using network tools, using Unix/Linux tools. Using packet sniffers, examining the honey net projects.	
Unit-IV : E-Mail Investigation	**9**
Exploring the role of email investigation, Exploring the role of client and server in email, Investigating E-mail crimes and violations, Examining E-mail Messages, Viewing E-mail headers, Examing E-mail headers, Examining additional E-mail files. Tracing an e-mail message, Using network E-mail logs, Understanding E-mail servers, Examining Unix e-mail server logs, Examining Microsoft email server logs.	
Unit-V : Cell phone and mobile device forensics	**9**
Understanding mobile device forensics, Mobile phone basics, inside mobile devices, inside PDAs, Understanding acquisition procedures for cell phones and mobile devices, Mobile forensics equipment.	
Total	

Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Bill Nelson,Amelia Phillips,Christopher Steuart	Guide to Computer Forensics and Investigations	Fourth Edition,Course Technology	
2.	Angus M.Marshall	Digital forensics: Digital evidence in criminal investigation	John – Wiley and Sons	2008

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Eoghan Casey	Handbook of Digital Forensics and Investigation	Elsevier	2009
2.	John Sammons	The Basics of Digital Forensics: The Primer for Getting Started in Digital Forensics	Elsevier	2011
3.	Amelia Phillips, Bill Nelson, and Christopher Steuart	Guide to Computer Forensics and Investigations	Booktopia	2003

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Course Code & Course Name	:	21CYE15&Computer Forensics Laboratory	L	T	P	C
			0	0	2	1

Course Objectives

1.	Conduct digital investigations that conform to accepted professional standards
2.	Identify and document potential security breaches of computer data
3.	Apply a solid foundational grounding in computer networks, operating systems, file systems
4.	Explain and perform forensic analysis in various operating system environments.
5.	Select and apply current computer forensics tools.

Course Outcomes

1.	Demonstrate the recovery of image files.
2.	Perform e-mail investigations.
3.	Act as expert witness and report results of investigations.
4.	Identify and apply current practices for data discovery recovery and acquisition.
5.	Conduct basic network forensic analysis.

List of Experiments

1.	Recovering Graphics Files
2.	Digital Forensics Analysis and Validation
3.	Virtual Machine Forensics
4.	Live Acquisitions, and Network Forensics
5.	Email/Social Media Investigations
6.	Mobile Device Forensics
7.	Disk Forensics and Data Recovery
8.	Steganography
9.	Key loggers
10.	Network monitors
	Total : 45

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Course Name	:	21CYE16&SEMANTIC WEB	L	T	P	C
			3	0	0	3

Course Objectives

1.	To learn Web Intelligence
2.	To learn Knowledge Representation for the Semantic Web
3.	To learn Ontology Engineering
4.	To learn Semantic Web Applications, Services and Technology
5.	To learn Social Network Analysis and semantic web

Course Outcomes

1.	Understand the concept structure of the semantic web technology and how this technology revolutionizes the World Wide Web.
2.	Understand the concepts of Web Science, semantics of knowledge and resource, ontology.
3.	Describe logic semantics and inference with OWL.
4.	Use ontology engineering approaches in semantic applications
5.	To perform social network k analysis for different applications

Unit-I : Web Intelligence	9
Thinking and Intelligent Web Applications, The Information Age ,The World Wide Web, Limitations of Today's Web, The Next Generation Web, Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.	
Unit-II : Knowledge Representation for the Semantic Web	9
Ontologies and their role in the semantic web,Ontologies Languages for the Semantic Web – Resource Description Framework(RDF) / RDF Schema, Ontology Web Language(OWL), UML, XML/XML Schema.	
Unit-III : Ontology Engineering	9
Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping, Logic, Rule and Inference Engines.	
Unit-IV : Semantic Web Applications, Services and Technology	9
Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base ,XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods.	
Unit-V : semantic Patterns and Tools, Challenges and Opportunities	9
Patterns in Software Design, Pattern Frame, Semantic Patterns, Semantic Tools, Semantic Web Services Tools, Semantic Doubts, Semantic Opportunities and Challenges.	
Total :	45

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Berners Lee, Godel and Turing	Thinking on the Web	Wiley inter science	2008

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	J. Davies, R. Studer, P. Warren, John Wiley & Sons	Semantic Web Technologies, Trends and Research in Ontology Based Systems	Wiley inter science	2006
2	Liyang Lu Chapman	Information sharing on the semantic Web	CRC Publishers, (Taylor & Francis Group)	2006

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Course Name	:	21CYE17&NETWORK PROGRAMMING AND MANAGEMENT	L	T	P	C
			3	0	0	3

Course Objectives	
1.	To Explain socket programming to design client server environment
2.	To understand the basics of socket programming using TCP and UDP Sockets
3.	To analyze the socket options and Internet protocol interoperability
4.	To develop macros for including objects in MIB structure.
5.	T o Understand SNMPv1, v2 and v3 protocols & practical issues

Course Outcomes	
1.	Apply socket structure and functions to client server applications
2.	Design applications using TCP and UDP sockets
3.	Implement socket options and advanced sockets to applications
4.	Compare number of variations of the network management architecture
5.	Configure and manage network services and network architecture

Unit-I : SOCKET STRUCTUREANDFUNCTIONS	9
Introduction to Socket Programming - OSI Layer and Services - Overview of TCP/IP Protocols - Socket Introduction - Socket address Structures - Value - Result Arguments - Byte Ordering Functions Byte Manipulation Functions - Elementary TCP sockets - Socket, connect, bind, listen, accept, fork and exec functions, concurrent servers - Close function	
Unit-II :TCP ANDUDPSOCKETS	**9**
TCP Echo Server - TCP Echo Client - Posix Signal handling - TCP Echo server functions Normal startup-terminate and signal handling server process termination - Crashing and Rebooting of server host - shutdown of server host - I/O multiplexing - I/O Models - select function - shutdown function - pselect function - poll function- Multiplexing TCP Sockets - TCP socket options - Elementary UDP sockets - UDP echo Server - UDP echo Client - Multiplexing UDP sockets	
Unit-III :SOCKET OPTIONS ANDADVANCEDSOCKETS	**9**
Socket options - getsocket and setsocket functions - generic socket options - IP socket options - ICMP socket options - Domain name system - gethostbyname function - gethostbyadr function - getservbyname and getservbyport functions Ipv4 and Ipv6 interoperability - threaded servers - thread creation and termination- Mutex - condition variables - raw sockets - raw socket creation - raw socket output - raw socket input - ping program - trace route program	
Unit-IV :SIMPLENETWORKMANAGEMENT	**9**
SNMP network management concepts - SNMPv1 - Management information - MIB Structure - Object syntax - Standard MIBs - MIB-II Groups - SNMPv1 protocol and Practical issues	
Unit-V :SNMP ENHANCEDFEATURESANDRMON	**9**
Introduction to SNMPv2 - SMI for SNMPV2 - Protocol - SNMPv3 - Architecture and Applications - Security and access control model - Overview of RMON	
Total: 45	

Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	W. Richard Stevens, Bill Fenner Andrew M. Rudoff	Unix Network Programming Vol-I	Pearson Education	2015
2.	Mani Subramaniam	Network Management: Principles and Practice	PHI	2012

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Iresh A. Dhotre, V.S.Bagad	Network Programming & Management	Technical Publications	2009
2.	William Stallings	SNMP, SNMPV2, SNMPV3 and RMON 1 and 2	Addison Wesley	1999
3.	D. E. Comer	Internetworking with TCP/IP Vol - IIII, (BSD Sockets Version), 2nd Edition	Prentice Hall of India	2003

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Course Name	:	21CYE18&Business Intelligence	L	T	P	C
			3	0	0	3

Course Objectives	
1.	To understand the business intelligence architectures.
2.	T o develop a foundation in Business Intelligence (BI) for Business Analysis through knowledge delivery.
3.	T o understand the different aspects of the BI environment, and data envelopment analysis.
4.	To implementation methodology and project life cycle business intelligence
5.	To understand the management and future of business intelligence

Course Outcomes	
1.	Explain about business intelligence architectures.
2.	Summarize various knowledge delivery methods
3.	Summarize data envelopment analysis
4.	Implement the business intelligent system for real-time application.
5.	Explain the management and future of business intelligent system.

Unit-I : BUSINESSINTELLIGENCE	9
Effective and timely decisions – Data, information and knowledge – Role of mathematical models – Business Intelligence architectures: Cycle of a business intelligence analysis – Enabling factors in business intelligence projects – Development of a business intelligence system – Ethics and business intelligence.	

Unit-II : KNOWLEDGEDELIVERY	9
The business intelligence user types, Standard reports, Interactive Analysis and Ad Hoc Querying, Parameterized Reports and Self-Service Reporting, dimensional analysis, Alerts/Notifications, Visualization: Charts, Graphs, Widgets, Scorecards and Dashboards, Geographic Visualization, Integrated Analytics, Considerations: Optimizing the Presentation for the Right Message.	

Unit-III :DATAENVELOPMENTANALYSIS	9
Efficiency measures – The CCR model: Definition of target objectives- Peer groups – Identification of good operating practices; cross efficiency analysis – virtual inputs and outputs – Other models.	

Unit-IV :BUSINESS INTELLIGENCE IMPLEMENTATION: INTEGRATION AND EMERGING TRENDS	9
Implementing BI – Overview – BI and Integration Implementation – Connecting BI System to Database and other Enterprise Systems – On-Demand BI – Issues of Legality, Privacy, and Ethics –	

Emerging Topics in BI – The Rise of Collaborative Decision Making		
Unit-V :MANAGEMENTANDFUTUREOFBUSINESSINTELLIGENCE		**9**
Development of BI - Business Intelligence System - Reporting system - Data Warehouse - Data Mart- Knowledge Management Systems - Discussion and Case Study – The Future of Business Intelligence.		
	Total :	**45**

Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	David Loshin Morgan, Kaufman	Business Intelligence: TheSavy Managers Guide	Wiley Publications	2012
2.	Efraim Turban, Ramesh Sharda, Jay E.Aronson, David King	Business Intelligence: A Managerial Approach	Pearson Education	2011

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Efraim Turban, Ramesh Sharda, Dursun Delen,	Decision Support and Business Intelligence Systems	Pearson	2013
2.	Rajiv Sabherwal, Irma Becerra- Fernandez	Business Intelligence Practices, Technologies, and Management	Wiley	2011
3.	Carlo Vercellis	Business Intelligence: Data Mining and Optimization for Decision Making	Wiley Publications	2009

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Course Name	:	21CYE19&Wireless Sensor Networks	L	T	P	C
			3	0	0	3

	Course Objectives
1.	To understand basic sensor network concepts
2.	To know physical layer issues, medium Access control Protocols
3.	To comprehend network layer characteristics and protocols and transport layer issues and protocols
4.	To understand the network management in Wireless sensor network.
5.	To understand the Middleware services

	Course Outcomes
1.	To understand basic sensor network concepts
2.	To know physical layer issues, medium Access control Protocols
3.	To comprehend network layer characteristics and protocols and transport layer issues and protocols
4.	To understand the network management in Wireless sensor network.
5.	To understand the Middleware services

Unit-I : INTRODUCTION	9
Introduction to wireless sensor networks - Challenges and Constraints - Application of sensor networks ode architecture - Operating System - Fundamental aspects.	
Unit-II :PHYSICAL LAYER ANDMEDIUM ACCESSLAYER	**9**
Basic architectural framework – Physical layer – source encoding –channel encoding – modulation – medium access control- Wireless MAC protocols – Characteristics of MAC protocols in sensor networks – Contention free MAC protocols - traffic adaptive medium access - Low-Energy Adaptive Clustering Hierarchy –Contention based protocols - Power Aware Multi-Access with Signaling - Data-Gathering MAC - Receiver-Initiated MAC.	
Unit-III : - NETWORK LAYER ANDTRANSPORTLAYER	**9**
Routing metrics – Data centric Routing - Proactive routing – OLSR – Reactive Routing – AODV – Location Based Routing - Traditional Transport Control Protocols - TCP (RFC 793) - UDP (RFC 768) - Mobile IP - Feasibility of Using TCP or UDP for WSNs - Transport Protocol Design Issues – Examples of Existing Transport Control Protocols- CODA (Congestion Detection and Avoidance).	
Unit-IV :NETWORKMANAGEMENT	**9**
Power Management - Local Power Management Aspects - Processor Subsystem - Communication Subsystem - Active Memory - Power Subsystem- Dynamic Power Management - Dynamic Operation Modes - Time Synchronization – Clocks and the Synchronization Problem - Time Synchronization in Wireless Sensor Networks - Reasons for Time Synchronization - Challenges for Time Synchronization - Basics of Time Synchronization - Synchronization Messages Non determinism of Communication	

Latency -Time Synchronization Protocols Lightweight Tree-Based Synchronization - Timing-sync Protocol for Sensor Networks Localization -Ranging Techniques -Time of Arrival - Time Difference of Arrival - Angle of Arrival - Received Signal Strength - Range- Based Localization - Triangulation - Range-Free Localization - Ad Hoc Positioning System (APS) .		
Unit-V :MIDDLEWARE FORWIRELESSSENSORNETWORKS		**9**
Introduction -WSN Middleware Principles - Middleware Architecture – Data Related Functions, Architectures – Case study - MiLAN (Middleware Linking Applications and Networks) - IrisNet (Internet-Scale Resource- Intensive Sensor Networks Services).		
Total	**:**	**45**

Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Dr.Xerenium, Shen, Dr. Yi Pan	Fundamentals of Wireless Sensor Networks, Theory and Practice	Wiley Series	2010
2.	H. Karl and A. Willig	Protocols and Architectures for Wireless Sensor Networks	John Wiley & Sons	2005

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1	Kazem Sohraby, Daniel Manoli	Wireless Sensor networks-Technology, Protocols and Applications	Wiley Inter Science Publications	2007
2	Bhaskar Krishnamachari	Networking Wireless Sensors	Cambridge university press	2005.
3	C. S. Raghavendra,K. M. Sivalingam, andT.	Wireless Sensor Networks	John Wiley & Sons	2007
4	N.P. Mahalik	Sensor Networks and Configuration: Fundamentals, Standards, Platforms, and	Springer	2006

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Course Name	:	21CYE20&INFORMATION RETRIEVAL TECHNIQUES	L	T	P	C
			3	0	0	3

Course Objectives

1.	To know about Information retrieval system strategies.
2.	To learn Web Search Engine and Compare various types of retrieval utilities.
3.	To know about Information Retrieve a modeling techniques
4.	ToIdentifyvariouswebbasedinformationretrievaltechniquesusingmoderntools.
5.	To understand information retrieval techniques in XML retrieval and multimedia

Course Outcomes

1.	Explain the factors which optimize the information retrieval process
2.	Understand web based information retrieval techniques
3.	Identify the techniques of Information Retrieval modeling
4.	Applyparallelinformationretrievalmodelsanddistributedinformationretrievalmodelsinrealtime problem.
5.	SummarizevariousstepsinvolvedinXMLandmultimediainformationretrievaltechniques

Unit-I : INTRODUCTION	9

Introduction - History of IR- The IR problem – Software Architectures of the IR system – The retrieval and ranking processes – Open source Search engine Frameworks - The impact of the web on IR - The role of artificial intelligence (AI) in IR – IR Versus Web Search - Components of a Search engine- Characterizing the web.

Unit-II : WEB RETRIEVAL ANDWEBCRAWLING	9

Web retrieval – Introduction – The web – search engine architectures – search engine ranking – managing web data – search engine user interaction – browsing – Web crawling – Introduction – Applications of web crawler – Architecture and implementation

Unit-III : INFORMATIONRETRIEVALMODELING	9

IR Models-Modeling and Ranking - A Taxonomy of IR Models - Classic Information Retrieval -The Boolean Model – TF - IDF Weights - Document Length Normalization - The Vector Model- The Probabilistic Model - Alternative Set Theoretic Models - Set-Based Model - Extended Boolean Model-Fuzzy Set Model - Alternative Algebraic Models - Generalized Vector Space Model - Latent Semantic Indexing Model - Neural Network Model - Alternative Probabilistic Models - BM25 - Language Models - Divergence from Randomness – Bayesian NetworkModels

Unit-IV : PARALLEL AND DISTRIBUTED INFORMATION RETRIEVAL	9

Distributed Information Retrieval – Introduction – A taxonomy of Distributed IR systems – Theoretical Model – Data partitioning – Parallel IR – Introduction – Parallel Indexing – Clustering and Classification – Parallel Systems – Parallel IR on MIMD architectures – parallel IR on SIMD architectures – Cluster based IR – Retrieval in peer to peernetworks.

Unit-V : XMLRETRIEVALANDMULTIMEDIAINFORMATIONRETRIEVAL			9
XML Retrieval – Introduction – XML retrieval evaluation – Query Languages – Multimedia Information Retrieval –The challenges – Content based image retrieval – Audio and Music retrieval – Retrieving and browsingvideo.			
	Total	**:**	**45**

Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Ricardo Baeza - Yates and Berthier Ribeiro - Neto	Modern Information Retrieval: The Concepts and Technology behind search	2nd Edition, ACM Press Books	2011
2.	Stefan Buettcher, Charles L. A. Clarke, Gordon V. Cormack	Information Retrieval: Implementing and Evaluating Search Engines	The MIT Press	2010
3.	Ricardo Baeza - Yates and Berthier Ribeiro - Neto	Modern Information Retrieval: The Concepts and Technology behind search	2nd Edition, ACM Press Books	2011

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	G.G. Chowdhury	Introduction to Modern Information Retrieval	Neal- Schuman Publishers, Third Edition	2010
2.	Mark Levene	An Introduction to Search Engines and Web Navigation	2nd Edition Wiley	2010
3.	Bruce Croft, Donald Metzler and Trevor Strohman	Search Engines: Information Retrieval in Practice	1st Edition Addison Wesley	2009
4.	Christopher D. Manning, PrabhakarRaghavan, Hinrich Schütze	An Introduction to Information Retrieval	Cambridge University Press, Cambridge, England	2008
5.	David A. Grossman, Ophir Frieder	Information Retrieval: Algorithms, and Heuristics	Academic Press, Second Edition	2008

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Course Name	:	21CYE21&SERVICEORIENTEDARCHITECTURE	L	T	P	C
			3	0	0	3

Course Objectives

1.	To study the importance of Service Oriented Architecture.
2.	To provide an overview of XMLTechnology and modeling data bases in XML
3.	To introduce Security solutions in XML and Web Services and to introduce Security standards for Web Services
4.	To learn to implement SOA in theJ2EEand.Netenvironment
5.	T oImplement the various advanced web service susingJ2EE

Course Outcomes

1.	Explain the fundamental principles of SOA
2.	Develop a simple XML services using SOA principles
3.	Develop a simple web services using SOA principles
4.	Model and analyze the JAVA web services and architecture.
5.	Implement the various advanced web services usingJ2EE

Unit-I : INTRODUCTION	**9**
The Evolution of SOA –Characteristics of SOA – Introducing SOA- Service oriented analysis – Business- centric SOA – Deriving business services- service modeling - Service Oriented Design- SOAP basics – SOA composition guidelines – Entity-centric business service design – Application service design– Task centric business service design	
Unit-II : XMLSERVICES	**9**
XML document structure – Well formed and valid documents – Namespaces – DTD – XML Schema – X- Files- Parsing XML – using DOM, SAX – XML Transformation and XSL – XSL Formatting – Modeling Databases in XML	
Unit-III : WEB SERVICESAND SOA	**9**
Web services – Service descriptions – Messaging with SOAP –Message exchange Patterns – Coordination-Atomic Transactions – Business activities – Orchestration – Choreography- Service layer abstraction –Application Service Layer – Business Service Layer – Orchestration Service Layer.	
Unit-IV : JAVA WEBSERVICESARCHITECTURE	**9**
Java Web Service Developer pack– JAXP- Architecture-SAX-DOM-XSLT-JDOM-JAX RI – JAX- RPC- Service Model - JAX RPC and J2EE - JAXM – JAXM Architecture –JAXR - Registries and Repositories – JAXR Architecture – JAXR Information Model - JAXB – Architecture – Developing with JAXB - XML to Java mapping – JAXB API - Validation with JAXB – Customizing JAXB.	
Unit-V : EXTENDED WEBSERVICESSPECIFICATION	**9**
Metadata Management - Metadata Specification - Policy – Metadata exchange – Web Services Security–Core concepts – Challenges - Threads and Remedies – Message Level Security – Data Level Security – Advanced Messaging – Reliable Messaging - Notification – Transaction Management - Protocols and Specification – TransactionSpecification	

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Total	:	45

Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Eric Newcomer, Greg Lomow	Understanding SOA with Web Services	Pearson Education	2005
2.	James McGovern, Sameer Tyagi, Michael E Stevens, Sunil Mathew	Java Web Services Architecture	Elsevier	2003
3.	Eric Newcomer, Greg Lomow	Understanding SOA with Web Services	Pearson Education	2005

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Thomas Erl	Service Oriented Architecture	Pearson Education	2005.
2.	Frank Cohen	Fast SOA	Elsevier	2007
3.	Scott Campbell, Vamsi Mohun,	Mastering Enterprise SOA	Wiley	2007

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Course Name	:	21CYE22&Agile Technology	L	T	P	C
			3	0	0	3

Course Objectives

1.	T o Identify core agile principles
2.	T o Describe agile requirement over traditional methods of software development
3.	T o Understand Extreme Programming Concepts.
4.	To develop the agile products.
5.	T o Demonstrate the advanced techniques of Agile Methods

Course Outcomes

6.	Apply agile principles and practices in an actual project.
7.	Prepare the Document and assess an agile project.
8.	Apply Extreme Programming in agile technology.
9.	Explain the steps of releasing agile product.
10.	Demonstrate the advanced techniques of Agile Methods

Unit-I : INTRODUCTION TO AGILESOFTWAREDEVELOPMENT	**9**
Agile Software Development-Cayman design- Organizational Culture Considerations with Agile - eam Members'Viewpoint- Manager's Viewpoint- Executive's Viewpoint- Different Types of Agile- Extreme Programming (XP)- Scrum- Feature-Driven Development- Dynamic Systems Development Method- Kanban Method- Crystal Family-Certification - Different Roles- Deep Dive into Scrum Roles- Roles in Other Methodologies	

Unit-II : AGILEREQUIREMENTS	**9**
Agile Software Development-Cayman design- Organizational Culture Considerations with Agile - eam Members'Viewpoint- Manager's Viewpoint- Executive's Viewpoint- Different Types of Agile- Extreme Programming (XP)- Scrum- Feature-Driven Development- Dynamic Systems Development Method- Kanban Method- Crystal Family-Certification - Different Roles- Deep Dive into Scrum Roles- Roles in Other Methodologies	

Unit-III : EXTREMEPROGRAMMING	**9**
XP Life Cycle-XP Team-XP Concepts-Prerequisite of XP-Recommendation of XP-Pair Programming- Energized Work-Informative Workspace-Root-Cause Analysis-Retrospectives-Collaborating-Team Strategy- Organizational Strategy-Sit Together-Real Customer Involvement-Ubiquitous Language-Coding Standards- Iteration Demo-Reporting	

Unit-IV : RELEASINGAGILEPRODUCTS	**9**
Done Done-No Bugs-Version Control-Continuous Integration-Collective Code Ownership-documentation- Planning-Vision-Release Planning-Planning Game-Risk Management-Iteration Planning-Slack- Stories- Estimating-	

Unit-V : VMASTERINGAGILITY	**9**
Developing-Incremental Requirements-Customer Tests-Test Driven Development-Refactoring-Simple Design- Incremental Design and Architecture-Spike Solutions-Performance Optimization-Exploratory Testing Values and Principles-Improve the Process-Rely on People-Eliminate Waste-Deliver Value-Seek Technical Excellence- CaseStudy	

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Total	:	45

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Sondra Ashmore, Kristin Runyan	Introduction to Agile Methods	Addison-Wesley Professional	2014
2.	James Shore, Shane Warden	The Art of Agile Development	O'REILLY	2008

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Woodward,E.Surdeck	A Practical guide to Distributed Scrum	Addison-wesley	2010
2.	Dean Leffingwell	Agile Software Requirements	Agile software Development Series	2010
3.	Kent ,Beck	Extreme Programming Explained	Pearson Education	2008
4.	Larman	Agile and iterative development: A Managers Guide	Addison-wesley	2004
5.	Anderson, David	Agile Management for Software Engineering: Applying the Theory of Constraints for Business Results	Prentice Hall	2003

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Course Name	:	21CYE23&SOCIAL NETWORK ANALYSIS	L	T	P	C
			3	0	0	3

Course Objectives

1.	Understand the concept of semantic web and related applications.
2.	Learn knowledge representation using ontology.
3.	Understand human behaviour in social web and related communities
4.	Learn to handle privacy related issues
5.	Learn visualization of social networks

Course Outcomes

1.	Develop semantic web related applications.
2.	Represent knowledge using ontology.
3.	Predict human behaviour in social web and related communities.
4.	Handle privacy related issues
5.	Visualize social networks.

Unit-I : SOCIAL NETWORK ANALYSIS	9
Social Network Analysis: History, Concepts and Research - Structure and Dynamics of Social Networks - Analysis of Social Networks - Analyzing the Dynamics of Communication in Online Social Networks - Qualitative Analysis of Commercial Social Network Profiles - Analysis of Social Networks Extracted from Log Files - Perspectives on Social Network Analysis for Observational Scientific Data - Modeling Temporal Variation in Social Network: An Evolutionary web graph approach - Churn in Social Networks.	
Unit-II : SOCIAL MEDIA MINING AND SEARCH	**9**
Discovering Mobile Social Networks - Online Identities and Social Networking - Detecting Communities - Concept Discovery in Youtube.com - Mining Regional Representative Photos from Consumer- Generated Geo tagged Photos - Collaborative Filtering Based on Choosing a Different Number of Neighbors - Discovering Communities from Social Networks	
Unit-III : SOCIAL NETWORK INFRASTRUCTURES AND COMMUNITIES	**9**
Decentralized Online Social Networks - Multi-Relational Characterization of Dynamic Social Network Communities- Accessibility Testing of Social Websites - Understanding and Predicting Human Behavior for Social Communities- Associating Human-Centered Concepts with Social Networks Using Fuzzy Sets	
Unit-IV : PRIVACY IN ONLINE SOCIAL NETWORKS	**9**
Managing Trust in Online Social Networks - Security and Privacy in Online Social Networks - Investigation of Key-Player Problem in Terrorist Networks Using Bayes Conditional Probability - Optimizing Targeting of Intrusion Detection Systems in Social Networks - Security Requirements for Social Networks in Web 2.0	
Unit-V : VISUALISATION AND APPLICATIONS OF SOCIAL NETWORKS	**9**
Visualization of Social Networks - Novel Visualizations and Interactions for Social Networks Exploration- Applications of Social Network Analysis - Online Advertising in Social Networks - Social Bookmarking on a Company's Intranet: A Study of Technology Adoption and Diffusion.	
Total : 45	

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Furht, Borko	Handbook of Social NetworkTechnologies and Applications	Springer	2010
2.	Giles, Mark Smith, John Yen	Advances in Social Network Mining and Analysis	Springer	2010
3.	Furht, Borko	Handbook of Social NetworkTechnologies and Applications	Springer	2010

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Max Chevalier, Christine Julien and Chantal Soul- Dupuy	Collaborative and Social Information Retrieval and Access: Techniques for Improved User Modelling	IGI Global snippet	2010
2.	Charu C. Aggarwal	Social Network Data Analytics	Springer	2011
3.	Guandong Xu, Yanchun Zhang and Lin Li	Web Mining and SocialNetworking Techniques and applications	Springer	2011
4.	John Scott	Social Network Analysis	SAGE Publications Ltd	2013
5.	Toby Segaran	Programming Collective Intelligence	O□Reilly	2012

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Course Name	:	21CYE24&GAME PROGRAMMING	L	T	P	C
			3	0	0	3

Course Objectives

1.	Understand the concepts of Game design and development.
2.	Learn the processes, mechanics and issues in Game Design.
3.	Be exposed to the Core architectures of Game Programming.
4.	Know about Game programming platforms, frame works and engines.
5.	Learn to develop games

Course Outcomes

1.	Understand the concepts of Game design and development.
2.	Learn the processes, mechanics and issues in Game Design.
3.	Be exposed to the Core architectures of Game Programming.
4.	Know about Game programming platforms, frame works and engines.
5.	Learn to develop games.

Unit-I : 3D GRAPHICS FOR GAME PROGRAMMING	**9**
Coordinate Systems, Ray Tracing, Modeling in Game Production, Vertex Processing, Rasterization, Fragment Processing and Output Merging, Illumination and Shaders, Parametric Curves and Surfaces, Shader Models, Image Texturing, Bump Mapping, Advanced Texturing, Character Animation, Physics-based Simulation	
Unit-II : GAME DESIGN PRINCIPLES	**9**
Character development, Story Telling, Narration, Game Balancing, Core mechanics, Principles of level design, Genres of Games, Collision Detection, Game Logic, Game AI, Path Finding	
Unit-III : GAMING ENGINE DESIGN	**9**
Renderers, Software Rendering, Hardware Rendering, and Controller based animation, Spatial Sorting, Level of detail, collision detection, standard objects, and physics	
Unit-IV : GAMING PLATFORMS AND FRAMEWORKS	**9**
Flash, DirectX, OpenGL, Java, Python, XNA with Visual Studio, Mobile Gaming for the Android, iOS, Game engines - Adventure Game Studio, DXStudio, Unity	
Unit-V : GAME DEVELOPMENT	**9**
Developing 2D and 3D interactive games using OpenGL, DirectX – Isometric and Tile Based Games, Puzzle games, Single Player games, Multi Player games.	
Total : 45	

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	David H. Eberly	Game Engine Design, Second Edition: A Practical Approach to Real Time Computer Graphics	"3D" Morgan Kaufmann, 2 Edition	2006

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Ernest Adams and Andrew Rollings	Fundamentals of Game Design	Prentice Hall 1st edition	2006
2.	Roger E. Pedersen	Game Design Foundations	Edition 2, Jones & Bartlett Learning	2006

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Course Name	:	21CYE25&NATURAL LANGUAGE PROCESSING	L	T	P	C
			3	0	0	3

Course Objectives

1.	To tag a given text with basic language processing features,
2.	To Design An innovative application using NLP components,
3.	To implement a rule based system to tackle morphology/syntax of a language,
4.	To Design a tag set to be used for statistical processing keeping an application in mind,
5.	To Compare and contrast use of different statistical approaches for different types of applications.

Course Outcomes

1.	Understand the basic concepts of Natural Language Processing.
2.	Describe the tag a given text with basic language processing features,
3.	Implement a rule based system to tackle morphology/syntax of a language
4.	Design a tag set to be used for statistical processing keeping an application in mind
5.	To Compare and contrast use of different statistical approaches for different types of applications.

Unit-I : INTRODUCTION	**9**
Natural Language Processing tasks in syntax, semantics, and pragmatics – Issues - Applications - The role of machine learning - Probability Basics –Information theory – Collocations -N-gram Language Models - Estimating parameters and smoothing - Evaluating language models.	
Unit-II :MORPHOLOGY AND PART OFSPEECHTAGGING	**9**
Linguistic essentials - Lexical syntax- Morphology and Finite State Transducers - Part of speech Tagging - Rule-Based Part of Speech Tagging - Markov Models - Hidden Markov Models – Transformation based Models - Maximum Entropy Models. Conditional Random Fields.	
Unit-III :SYNTAXPARSING	**9**
Syntax Parsing - Grammar formalisms and tree banks - Parsing with Context Free Grammars - Features and Unification - Statistical parsing and probabilistic CFGs (PCFGs)-Lexicalized PCFGs	
Unit-IV :SEMANTIC ANALYSIS	**9**
Representing Meaning – Semantic Analysis - Lexical semantics –Word-sense disambiguation - Supervised – Dictionary based and Unsupervised Approaches - Compositional semantics Semantic Role Labeling and Semantic Parsing – Discourse Analysis.	
Unit-V :APPLICATIONS	**9**
Named entity recognition and relation extraction- IE using sequence labeling-Machine Translation (MT) – Basic issues in MT-Statistical translation-word alignment- phrase-based translation –Question Answering.	
Total : 45	

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Roland R. Hausser	Foundations of Computational Linguistics:	MIT Press	2011
2.	Daniel Jurafsky and James H. Martin	Martin Speech and Language Processing	McGraw Hill	2008

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Christopher D. Manning and Hinrich Schuetze	Foundations of Statistical Natural Language Processing	MIT Press	1999
2.	Steven Bird, Ewan Klein and Edward Loper	Natural Language Processing with Python	O'Reilly Media	2009
3.	Pierre M. Nugues	An Introduction to Language Processing with Perl and Prolog: An Outline of Theories, Implementation, and Application with Special	Soft cover reprint	2010
4.	James Allen,	Natural Language Understanding	Addison Wesley	1994
5.	Nitin Indurkhya, Fred J. Damerau	Handbook of Natural Language Processing	CRC Press	2010

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Course Name	:	21CYE26&BIG DATA ANALYTICS	L	T	P	C
			3	0	0	3

Course Objectives

1.	To Learn tips and tricks for Big Data.
2.	To Learn to build and maintain reliable, scalable, distributed systems with Apache Hadoop
3.	To Learn the Hadoop Architecture
4.	To apply Hadoop ecosystem components
5.	To Learn to build Hadoop Advanced Data base Systems

Course Outcomes

1.	Understand the basic concepts of BigData.
2.	Explain the basics of Hadoop.
3.	Describe the architecture of Hadoop.
4.	Design Hadoop Ecosystem and yarn.
5.	Explain the techniques of HIVE AND HIVEQL,HBASE

Unit-I : INTRODUCTION TOBIGDATA	**9**
Introduction – distributed file system – Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce, Matrix-Vector Multiplication by Map Reduce.	
Unit-II :INTRODUCTIONHADOOP	**9**
Big Data – Apache Hadoop & Hadoop Eco System – Moving Data in and out of Hadoop – Understanding inputs and outputs of Map Reduce - DataSerialization.	
Unit-III :HADOOPARCHITECTURE	**9**
Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands , Anatomy of File Write and Read., NameNode, Secondary NameNode, and DataNode, Hadoop MapReduce paradigm, Map and Reduce tasks, Job, Task trackers - Cluster Setup – SSH & Hadoop Configuration – HDFS Administering –Monitoring & Maintenance.	
Unit-IV :HADOOP ECOSYSTEMANDYARN	**9**
Hadoop ecosystem components - Schedulers - Fair and Capacity, Hadoop 2.0 New Features- NameNode High Availability, HDFS Federation, MRv2, YARN, Running MRv1 in YARN.	
Unit-V :HIVE ANDHIVEQL, HBASE	**9**
Hive Architecture and Installation, Comparison with Traditional Database, HiveQL - Querying Data - Sorting And Aggregating, Map Reduce Scripts, Joins & Subqueries, HBase concepts- Advanced Usage, Schema Design, Advance Indexing - PIG, Zookeeper - how it helps in monitoring a cluster, HBase uses Zookeeper and how to Build Applications withZookeeper	
Total :	**45**

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
3.	Boris lublinsky, Kevin t. Smith, Alexey Yakubovich	Professional Hadoop Solutions	Wiley	2015
4.	Chris Eaton, Dirk deroos	Understanding Big data	McGraw Hill	2012

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
8.	Tom White	HADOOP: The definitive Guide Everything	O Reilly	2012
9.	Vignesh Prajapati	Big Data Analytics with R and Haoop	Packet Publishing	2013
10.	Tom Plunkett, Brian Macdonald	Oracle Big Data Handbook	Oracle Press	2014
11.	Jy Liebowitz,	Jy Liebowitz,	CRC press	2013
12.	Seema Acharya and Subhashini C	Big Data and Analytics	Wiley India	2015

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Course Name	:	21CYE27&AD-HOC AND SENSOR NETWORKS	L	T	P	C
			3	0	0	3

Course Objectives

1.	To Understand the design issues in ad hoc and sensor networks
2.	To learn the different types of MAC protocols.
3.	Be familiar with different types of adhoc routing protocols.
4.	Be expose to the TCP issues in adhoc networks.
5.	To Learn the architecture and protocols of wireless sensor network

Course Outcomes

1.	Explain the concepts, network architectures and applications of ad hoc and wireless sensor networks.
2.	Analyze the protocol design issues of ad hoc and sensor networks
3.	Design routing protocols for ad hoc and wireless sensor networks with respect to some protocol design issues
4.	Evaluate the QoS related performance measurements of ad hoc and sensor networks.
5.	Explain the techniques of protocols networks

Unit-I : INTRODUCTION	**9**
Fundamentals of Wireless Communication Technology – The Electromagnetic Spectrum – Radio propagation Mechanisms – Characteristics of the Wireless Channel -mobile ad hoc networks (MANETs) and wireless sensor networks (WSNs): concepts and architectures. Applications of Ad Hoc and Sensor networks. Design Challenges in Ad hoc and Sensor Networks.	
Unit-II : MAC PROTOCOLS FOR AD HOC WIRELESS NETWORKS	**9**
Issues in designing a MAC Protocol- Classification of MAC Protocols- Contention based protocols-Contention based protocols with Reservation Mechanisms- Contention based protocols with Scheduling Mechanisms – Multi channel MAC-IEEE 802.1	
Unit-III : ROUTING PROTOCOLS AND TRANSPORT LAYER IN AD HOC WIRELESS NETWORKS	**9**
Issues in designing a routing and Transport Layer protocol for Ad hoc networks- proactive routing, reactive routing (on-demand), hybrid routing- Classification of Transport Layer solutions-TCP over Ad hoc wireless Networks.	
Unit-IV : WIRELESS SENSOR NETWORKS (WSNS) AND MAC PROTOCOLS	**9**
Single node architecture: hardware and software components of a sensor node – WSN Network architecture: typical network architectures-data relaying and aggregation strategies -MAC layer protocols: self-organizing, Hybrid TDMA/FDMA and CSMA based MAC- IEEE 802.15.4.	
Unit-V : WSN ROUTING, LOCALIZATION & QOS	**9**
Issues in WSN routing – OLSR- Localization – Indoor and Sensor Network Localization-absolute and relative localization, triangulation-QOS in WSN-Energy Efficient Design-Synchronization-Transport Layer issues.	
Total :	**45**

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	C. Siva Ram Murthy, and B. S. Manoj	Ad Hoc Wireless Networks: Architectures and Protocols	Prentice Hall Professional Technical Reference	2008

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Carlos De Morais Cordeiro, Dharma Prakash Agrawa	Ad Hoc & Sensor Networks: Theory and Applications	World Scientific Publishing Company	2006.
2.	Feng Zhao and Leonides Guibas	Wireless Sensor Networks	Elsevier Publication	2002.
3.	Holger Karl and Andreas Willig	Protocols and Architectures for Wireless Sensor Networks	Wiley	2005

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Course Name	:	21CYE28&MANAGEMENT INFORMATION SYSTEM	L	T	P	C
			3	0	0	3

Course Objectives

1.	To describe the role of information technology and decision support systems in business and record the current issues with those of the firm to solve business problems.
2.	To introduce the fundamental principles of computer-based information systems analysis and design and develop an understanding of the principles and techniques used.
3.	To enable students understand the various knowledge representation methods and different expert system structures as strategic weapons to counter the threats to business and make business more competitive.
4.	To enable the students to use information to assess the impact of the Internet and Internet technologyonelectroniccommerceandelectronicbusinessandunderstandthespecificthreats and vulnerabilities of computer systems.
5.	To provide the theoretical models used in database management systems to answer business questions.

Course Outcomes

1.	Relate the basic concepts and technologies used in the field of management information systems;
2.	Compare the processes of developing and implementing information systems.
3.	Outline the role of the ethical, social, and security issues of information systems.
4.	Translatetheroleofinformationsystemsinorganizations,thestrategicmanagementprocesses, with the implications for the management.
5.	Apply the understanding of how various information systems like DBMS work together to accomplish the information objectives of an organization.

Unit-I : Management information system in a digital firm	**9**
MIS concept - Definition –Role of the MIS - Impact of the MIS-MIS and the user - Management as a control system - MIS a support to management - Development process of theMIS	
Unit-II : System analysis and design	**9**
System - Need for system analysis - System analysis of the existing system - System analysis of a new requirements - System Development Model - Structured System Analysis and Design - Object Oriented Analysis	
Unit-III : Information system applications	**9**
MIS applications, DSS – GDSS - DSS applications in E enterprise - Knowledge Management System and Knowledge Based Expert System- Enterprise Model System and E-Business, E- Commerce, E-communication, Business Process Reengineering.	
Unit-IV : Technology of information system	**9**
Data process- Transaction and application process- Information system process; Unified communication and network; Security challengesin E-enterprises; Security threats and vulnerability-Controlling security threat and vulnerability.	
Unit-V : Data base management system	**9**
Objectives of data base approach- Characters of databaseManagementsystems-Dataprocessingsystem-ComponentsofDBMSpackages- Data base administration- Data models - Data warehouse.	

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Total	:	45

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Jawadekar, W.S	Management Information Systems	Tata McGrawHill Private Limited	2009
2.	Kenneth C. Laudon and Jane P. Laudon	Management Information Systems	Pearson Education	-
3.	Alex Leon and Mathew Leon	Data Base Management Systems	Vikas Publishing House	-
4.	Goyal, D.P	Management Information System	MACMILLAN India Limited	2008
5.	Panneerselvam R	Database Management System	PHI Private Limited	2008

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Course Name	:	21CYE29&SOFTWARE QUALITY ASSURANCE	L	T	P	C
			3	0	0	3

Course Objectives

1.	Understand the basic tenets of software quality and quality factors.
2.	Be exposed to the Software Quality Assurance (SQA) architecture and the details of SQA components.
3.	Understand of how the SQA components can be integrated into the project life cycle.
4.	Be familiar with the software quality infrastructure.
5.	Be exposed to the management components of software quality.

Course Outcomes

1.	Utilize the concepts in software development life cycle.
2.	Demonstrate their capability to adopt quality standards.
3.	Assess the quality of software product.
4.	Apply the concepts in preparing the quality plan & documents.
5.	Demonstrate testing a software and apply management principles on decision making

Unit-I : Software Quality	**9**
Introduction, Constraints of Software Product Quality Assessment, Customer is a King, Quality and Productivity Relationship, Requirements of a Product, Organisation Culture, Characteristics of Software, Software Development Process, Types of Products, Schemes of Criticality Definitions, Problematic Areas of Software Development Life Cycle, Software Quality Management, Why Software Has Defects? Processes Related to Software Quality, Quality Management System Structure, Pillars of Quality Management System, and Important Aspects of Quality Management.	
Unit-II : Fundamentals of testing	**9**
Introduction, Necessity of testing, what is testing? Fundamental test process, The psychology of testing, Historical Perspective of Testing, Definitions of Testing, Approaches to Testing, Testing During Development Life Cycle, Requirement Traceability Matrix, Essentials of Software Testing, Workbench, Important Features of Testing Process, Misconceptions About Testing, Principles of Software Testing, Salient Features of Good Testing, Test Policy, Test Strategy or Test Approach, Test Planning, Testing Process and Number of Defects Found in Testing, Test Team Efficiency, Mutation Testing, Challenges in Testing.	
Unit-III : Testing Strategies: Unit Testing- Boundary Value Testing	**9**
Normal Boundary Value Testing, Robust Boundary Value Testing, Worst-Case Boundary Value Testing, Special Value Testing, Examples, Random Testing, Guidelines for Boundary Value Testing-**Equivalence Class Testing:** Equivalence Classes, Traditional Equivalence Class Testing, Improved Equivalence Class Testing, Edge Testing, Guidelines and Observations- **Decision Table–Based Testing:** Decision Tables, Decision Table Techniques, Cause-and-Effect Graphing, Guidelines and Observations- **Path Testing:** Program Graphs, DD-Paths, Test Coverage Metrics, Basis Path Testing, Guidelines and Observations- **Data Flow Testing:** Define/Use Testing, Slice-Based Testing, Program Slicing Tools.	
Unit-IV : Software Verification and Validation	**9**
Introduction, Verification, Verification Workbench, Methods of Verification, Types of reviews on the basis od Stage Phase, Entities involved in verification, Reviews in testing lifecycle, Coverage in Verification, Concerns of Verification, Validation, Validation Workbench, Levels of Validation, Coverage in Validation, Acceptance Testing, Management of Verification and Validation, Software development verification and validation activities. V-test Model: Introduction, V-model for software, Testing during Proposal stage, Testing during requirement stage, Testing during test planning phase, Testing during design phase, Testing during coding, VV Model, Critical Roles and Responsibilities. **Levels of Testing:** Introduction, Proposal Testing, Requirement Testing, Design Testing, Code Review, Unit Testing, Module	

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Testing, Integration Testing, Big-Bang Testing, Sandwich Testing & Critical Path First.		
Unit-V : Special Tests		**9**
Introduction, GUI testing, Compatibility Testing, Security Testing, Performance Testing, Volume Testing, Stress Testing, Recovery Testing, Installation Testing, Requirement Testing, Regression Testing, Error Handling Testing, Manual Support Testing, Intersystem Testing, Control Testing, Smoke Testing, Adhoc Testing, Parallel Testing, Execution Testing, Operations Testing, Compliance Testing, Usability Testing, Decision Table Testing, Documentation Testing, Training testing, Rapid Testing, Control flow graph, Generating tests on the basis of Combinatorial Designs, State Graph, Risk Associated with New Technologies, Process maturity level of Technology, Testing Adequacy of Control in New technology usage, Object Oriented Application Testing, Testing of Internal Controls, COTS Testing, Client Server Testing, Web Application Testing, Mobile Application Testing, eBusiness eCommerce Testing, Agile Development Testing, Data Warehousing Testing.		
Total	**:**	**45**

REFRENCE BOOKS :

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	William E. Lewis	Software Testing and Continuous Quality Improvement	CRC Press	2016
2.	M. G. Limaye	Software Testing: Principles, Techniques and Tools	TCH	2017
3.	Dorothy Graham, Erik van Veenendaal, Isabel Evans, Rex Black	Foundations of Software Testing	Cengage Learning	-
4.	Paul C. Jorgenson	Software Testing: A Craftsman's Approach	CRC Press	2017

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Course Name	:	21CYE30&BIOINFORMATICS	L	T	P	C
			0	0	0	0

Course Objectives	
1.	To improve the programming skills of the student
2.	To let the students know the recent evolution in biological science.
3.	To learn about Phylogenetics and its applications
4.	To know about inference problems in biology and its applications
5.	To learn how to perform RNA modeling

Course Outcomes	
6.	Develop bioinformatics tools with programming skills.
7.	Apply computational based solutions for biological perspectives.
8.	To understand phylogenetics and its applications
9.	To apply engineering techniques in the field of molecular biology
10.	To create RNA models using various algorithms

Unit-I : INTRODUCTION	9
Introduction to Operating systems, Linux commands, File transfer protocols ftp and telnet, Introduction to Bioinformatics and Computational Biology, Biological sequences, Biological databases, Genome specific databases, Data file formats, Data life cycle, Database management system models, Basics of Structured Query Language (SQL).	

Unit-II :SEQUENCE ANALYSIS	9
Sequence Analysis, Pair-wise alignment, Dynamic programming algorithms for computing edit distance, string similarity, shotgun DNA sequencing, end space free alignment. Multiple sequence alignment, Algorithms for Multiple sequence alignment, Generating motifs and profiles, Local and Global alignment, Needleman and Wunsch algorithm, Smith Waterman algorithm, BLAST, PSIBLAST and PHIBLAST algorithms.	

Unit-III :PHYLOGENETICS	9
Introduction to phylogenetics, Distance based trees UPGMA trees, Molecular clock theory, Ultrametric trees, Parsimonious trees, Neighbour joining trees, trees based on morphological traits, Bootstrapping. Protein Secondary structure and tertiary structure prediction methods, Homology modeling, abinitio approaches, Threading, Critical Assessment of Structure Prediction, Structural genomics.	

Unit-IV :MOLECULAR BIOLOGY	9
Inference problems and techniques for molecular biology- Overview of key inference problems in biology: Homology identification, Genomic sequence annotation (Genes and ORFs identification), Protein structure prediction (Secondary and Tertiary structure prediction), Protein function prediction, Biological network identification, Next generation sequencing.	

Unit-V :RNA Modeling	9
Basics of RNA Structure prediction and its limitations, Features of RNA Secondary Structure,RNA structure predictionmethods: Based on self-complementary regions in RNA sequence, Minimum free energy methods, Suboptimal structure prediction by MFOLD, Prediction based on finding most probable structure and Sequence co-variance method. Application of RNA structure modeling.	

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Total	:	45

Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Lesk, A. K.	Introduction to Bioinformatics	Oxford University Press	2013
2.	Dan Gusfield	Algorithms on Strings, Trees and Sequences: Computer Science and Computational Biology	Cambridge University Press	1997

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
13.	Durbin, R., Eddy, S., Krogh, A., and Mitchison, G.	Biological Sequence Analysis Probabilistic Models of proteins and nucleic acids	Cold Spring Harbor Laboratory Press	2004
14.	Baldi, P. and Brunak, S	Bioinformatics: The Machine Learning Approach	Cambridge University Press	1998

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Course Name	:	21CYE31&DOCKER AND KUBERNETES	L	T	P	C
			3	0	0	3

Course Objectives

1.	To Understand Kubernetes Architecture
2.	To Know the Principles of cluster And Image Management
3.	To Define Network And data Management using containers
4.	To Develop a Docker Essentials
5.	To deploy stateful and stateless apps on the cluster

Course Outcomes

1.	Installing & creating an account with docker Hub
2.	Develop interactive Scaling control and Networking Services using docker
3.	Expose the Build Comprehensive Hands-on with Kubernetes Components
4.	Kubernetes Cluster installation on Virtualbox, AWS & Google Cloud Platforms
5.	Develop interactive app outside the cluster and to autoscale apps

Unit-I : INTRODUCTION	**9**
Introduction to Docker-requirements –Docker containers-listing-searching-pulling for an image-Starting containers-listing containers-stopping containers,deleting containers-setting and getting privileged access inside a container- run container images in Kubernetes-injecting new process to a running container-labelling filtering containers	
Unit-II : NETWORK AND DATA MANAGEMENT FOR CONTAINERS	**9**
Introduction-Accessing containers from outside-Managing data in containers-linking two or more containers-LAMP-application by linking containers-networking of multihost containers with Flannel-Assigning IPv6 addresses to containers.	
Unit-III : DOCKER PERFORMANCE AND ORCHESTRATION	**9**
Introduction-Benchmarking CPU performance,Benchmarking disk performance, Benchmarking network performance-Performance monitoring.Orchestration-Introduction-Applications with docker compose-cluster with docker Swarm-CoreOS for docker Orchestration-docker in project atomic.	
Unit-IV : INTRODUCTION TO KUBERNETES	**9**
Introduction- Kubernetes Architecture- Components of kubernetes cluster -cluster management - Deploy Kubernetes-deploy Kubernetes on AWS and Google cloud platforms- Pods and Deployments -Kubernetes Master- master nodes.	
Unit-V : KUBERNETES USING DOCKER	**9**
Kubernetes Management Design Patterns with Docker, CoreOS Linux- Kubernetes docker containers-Nodes-Cluster-Service-pod-Replication controller-label-selector-name-namespace-volume-Service proxy-listing service-listing nodes-Kubernetes Cluster-Scaling-Testing-wordpress with kubernetes cluster.	
Total :	**45**

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Deepak Vohra	Kubernetes Microservices with Docker	Apress	2016
2.	Neependra Khare	Docker Cookbook	Packt Publishing	2015

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Deepak Vohra	Kubernetes Management Design Patterns	Apress	2017
2.	Ed Robinson	Kubernetes on AWS	Packt Publishing	2018
3.	Karl Matthias, Sean P. Kane	Docker: Up and Running	O'Reilly Media	2015

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Course Name	:	21CYE32&OPEN STACK ESSENTIALS	L	T	P	C
			3	0	0	3

Course Objectives

1.	To Understand Open Stack Architecture
2.	To Know The Principles Of Identity And Image Management
3.	To Define Network And Instance Management
4.	To Develop A Block And Object Storage
5.	To Design And Build Simple Nodes

Course Outcomes

1.	Installing Pack stack and generating an answer file
2.	Develop Glance as a Registry of images
3.	Build Web Interface External Network Setup
4.	Develop Object file management in the web interface
5.	Develop interactive Scaling control and Networking Services

Unit-I : ARCHITECTURE AND COMPONENT OVERVIEW	**9**
Open Stack Architecture- Dashboard- Keystone- Glance- Neutron- Nova- Cinder-Shift- Ceilometer- Heat.RDO Installation: Installing RDO using Packstack -Installing Packstack and generating an answer file.	
Unit-II : IDENTITY AND IMAGE MANAGEMENT	**9**
Services and Endpoints: Hierarchy of users-roles-Creating an User-Creating an role-Interacting with Keystone in the dashboard-Endpoints in the Dashboard.Glance as a Registry of images -Using the Web Interface-Building an Image.	
Unit-III : NETWORK AND INSTANCE MANAGEMENT	**9**
Networking And Neutron-Network Fabric-Open VSwitch Configuration-VLAN –GRE tunnels-VXLAN tunnels- Creating a Network- Web interface Management-External Network access – Preparing a network – Creating an External network-Web Interface External Network Setup.Managing flavors –Managing key pairs – Launching an Instance-Managing floating IP addresses-Managing Security Groups.	
Unit-IV : BLOCK AND OBJECT STORAGE	**9**
Use case – Creating and using Block Storage – Attaching the block storage to an Instance - Backing Storage – Cinder types. Object Storage- Use case Architecture of Swift Cluster – Creating and using object storage – Object file management in the web interface – Ring Files.	
Unit-V : SCALING AND MONITORING	**9**
Scaling Compute nodes – Control and Networking – Scaling control and Networking Services – Load – Balancing Key stone – Additional Key stone tuning – Glance Load Balancing.Monitoring – Methods – Commands – Non open stack Service checks – Monitoring control services – Network Services – Compute services – Trouble Shooting.	
Total :	**45**

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Dan Radez	OpenStack Essentials Second Edition	Packt Publishing	2015
2.	Neependra Khare	Docker Cookbook	Packt Publishing	2013

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Omar Khedher	Learning Openstack Networking Third Edition	Packt Publishing	2014
2.	Cody Bumgardner	Open Stack in Action	Packt Publishing	2011
3.	Tom Fifield	Open stack Operations Guide	Packt Publishing	2000

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Course Name	:	21CYE33&USER CENTRIC DESIGN	L	T	P	C
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Course Objectives

1.	Given a problem setting, critically discuss the appropriateness of potential design methods such as contextual design, prototyping, ideation, etc.
2.	Describe the issues and challenges to achieving a human-centered design process.
3.	Gather useful information about users and activities through observation or systematic in quiry.
4.	Use, adapt and extend design standards, guidelines, and patterns.
5.	Create a prototype for a small system and plan and perform a usability evaluation.

Course Outcomes

1.	Develop an appreciation for the theory and sensibilities of user-centered design
2.	Develop skills in the use and application of a variety of design methods, specifically Applicable to user- centered design
3.	Improve individual and collaborative skills in design-based problem solving
4.	Develop UCD is an Iterative process
5.	Develop Multidisciplinary Design Teams for User Centered Design

Unit-I : USER CENTERED DESIGN OVERVIEW	9
User centered Design- UCD Principle - Iterative Process-Phase of the design process—Investigative Methods and Tools-Example: Brainstorming- Apply User Centered Design – Understand context of use – Specify user Requirements – Design Solutions – Evaluate against requirements – Hardware UCD - Working with Users.	
Unit-II : MULTIDISCIPLINARY DESIGN TEAMS	9
Multidisciplinary Design Teams for User Centered Design: Engineer-Designer-Researcher- Marketer – Stakeholder – Investment in UCD Pays off – Benefits of User centered Design – Approach of User centered Design – UX and Interactive Design. Design Principle : Hick's Law – Fitt's Law – Visibility – Visual Feedback – Gestalt Principle – Mobile UCD – UCD Terms.	
Unit-III : ESTABLISISHING A BASELINE ABOUT UCD	9
Introduction to UCD – UCD and User Experience – User Experience versus User Interface – UX is more than a Buzz word – User Research – Interviews – Surveys – Focus Groups – Observational Usability Research – Scenarios - UCD Process – Storyboards - Creating a personal Manifesto – Balance and Filter Design Features – MVP .	
Unit-IV : USER CENTRIC TOOLS AND TECHNIQUES	9
Introduction to UCD Tools and Techniques – Activity: Personas and Target Audience – UX One sheet – Journey Mapping – Wire framing – Ideation –Prototyping – Evaluation – Design specification - Sketching: Open ended vs Highly Constrained Sketching – Scribble Sketching – Stretch your imagination – Combining Sketching with images – Final Reflection – Pendo – Survey Monkey- Axure – POP - Silverback.	
Unit-V : TRENDS IN UCD	9
Personalization - Material design - Designing for content - Designing for content - Animation and micro-interactions - Accessible design - AI for testing design options and making decisions - Data and design collaboration - Minimalistic Simple Designs - Stellar 3D Animation & Graphic – RIDE (Report – Iterate Deploy – Evaluate).	
Total	45

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Travis Lowdermilk	User-Centered Design: A Developer's Guide to First Edition	O'Reilly Media	2013
2.	Brian Still and Kate Cran	Fundamentals of User-Centered Design: A Prac	CRC Press	2016

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Elizabeth F. Churchill,	Foundations for Designing User-Centered Systems: What System Designers Need to Know about People	Springer	2014
2.	Amir Shevat	Designing Bots: Creating Conversational Experiences	O'Reilly Media	2017
3.	Westley Knight	UX for Developers: How to Integrate User-Centered Design Principles Into Your Day-to-Day Development Work	Apress	2018

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Course Name	:	21CYE34&SOFTWARE TESTING	L	T	P	C
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Course Objectives	
1.	To understand the basic software testing principles.
2.	To understand the working principles of various testing methodologies.
3.	To Understand knowledge of techniques for system testing and functional testing
4.	To understand the ways and means of controlling and monitoring testing activity.
5.	To understand the concept of modern software testing tools.

Course Outcomes	
1.	Explain the basic software testing principles.
2.	Classify the types of testing
3.	Differentiate operation of system testing & functional testing
4.	Analyze the techniques in testing in planning, automation & execution management.
5.	Implement the testing using modern software testing tools.

Unit-I : INTRODUCTION	9
Basic Concepts and preliminaries –Objectives of Testing-Testing Activities-Testing Levels-Role of Testing-Verification and Validation-Test Case-Theory of Program Testing- Theory of Good enough and Gerhart- Weyuker and Ostrand- Gourlay- Adequacy of Testing- Limitations of Testing.	

Unit-II :TYPES OF TESTING	9
Unit Testing-Static and Dynamic Unit Testing-Defect Prevention-Mutation Testing and Debugging-Control Flow Testing-Control Flow Graph- Paths in a Control Flow Graph- Path Selection Criteria- Generating Test Input- Data Flow Testing-Data Flow Graph- Data Flow Terms- Data Flow Testing Criteria- Comparison of Data Flow Test Selection Criteria-Feasible Paths and Test Selection Criteria- Comparison of Testing Techniques-Domain Testing.	

Unit-III :SYSTEM TESTING & FUNCTIONAL TESTING	9
System Testing- Different Types of Interfaces and Interface Errors- System Integration Techniques- Software and Hardware Integration- Test Plan for System Integration- Test Categories- Basic Tests- Functionality Tests- Robustness Tests- Functional Testing- Functional Testing Concepts of Howden- Pairwise Testing- Equivalence Class Partitioning-Boundary Value Analysis- Decision Tables- Random Testing- Error Guessing- CategoryPartition	

Unit-IV :PLANNING, AUTOMATION & EXECUTION	9
Planning And Automation- Approach- Suite Structure- Environment- Execution Strategy- Effort Estimation- System Test Automation- Evaluation and Selection of Test Automation Tools- Characteristics of Automated Test Cases- Structure of an Automated Test Case- Test Execution- Modeling Defects- Metrics for Tracking System Test- Orthogonal Defect Classification- Defect Causal Analysis- Beta Testing- First Customer Shipment- System Test Report- Product Sustaining-Measuring TestEffectiveness	

Unit-V : MODERN SOFTWARE TESTING TOOLS	9
. Evolution of Automated Testing Tools-Variable Capture/Replay Tools-Extreme Programming-Software Testing Trends-Taxonomyof Testing Tools-Methodologyto Evaluate Automated Testing Tools-Case Study	

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Total	:	45

TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Kshirsagar Naik, Priyadarshi Tripathy	Software Testing & Quality Assurance	A JOHN WILEY & SONS	2011
2.	William E.Lewis, Gunasekaran Veerapillai	Software Testing & Continuous Quality Improvement	AUERBACH PUBLICATIONS	2011

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Alan C Gillies	Software Quality Theory and Management	Cengage Learning	2011
2.	Srinivasan Desikan, Gopalaswamy Ramesh	Software Testing – Principles and Practices	Pearson Education	2009.
3.	Ron Patton	Software testing	Pearson Education	2007
4.	William E. Perry	Effective Methods for Software Testing	Wiley India	2006.
5.	Renu Rajani and Pradeep Oak	Software Testing – Effective Methods, Tools and Techniques	TataMcGraw Hill PublishingCompany Limited	2005

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Course Name	:	21CYE35&SOFT COMPUTING	L	T	P	C
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Course Objectives

1.	To understand the basic concepts of soft computing
2.	To understand the fundament also artificial and neural networks
3.	To understand the fundamentals Unsupervised Learning Network
4.	To understand the fuzzy sets and fuzzy logic and genetic algorithms.
5.	To understand the fuzzy Fuzzy Arithmetic and Fuzzy Measures

Course Outcomes

6.	Build intelligent machines using soft computing techniques.
7.	Design a Neural Networks for the real time problems.
8.	Implement various learning techniques
9.	Apply fuzzy logic and Develop fuzzy sets for real time problems.
10.	Develop genetic algorithms for various real-time applications

Unit-I : AI PROBLEMSANDSEARCH

AI problems, Techniques, Problem Spaces and Search, Heuristic Search Techniques- Generate and Test, Hill Climbing, Best First Search Problem reduction, Constraint Satisfaction and Means End Analysis. Approaches to Knowledge Representation- Using Predicate Logic 2nd Rules.

Unit-II : ARTIFICIALNEURALNETWORKS

Introduction, Basic models of ANN, important terminologies, Supervised Learning Networks, Perception Networks, Adaptive Linear Neuron, Back propagation Network. Associative Memory Networks, Training Algorithms for pattern association, BAM and Hopfield Networks.

Unit-III :UNSUPERVISEDLEARNINGNETWORK

Introduction, Fixed Weight Competitive Nets, Maxnet, Hamming Network, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization, Counter Propagation Networks, Adaptive Resonance Theory Networks. Special Networks- Introduction to various i networks.

Unit-IV :FUZZYLOGIC

Introduction to Classical Sets (crisp Sets)and Fuzzy Sets- operations and Fuzzy sets. Classical Relations -and Fuzzy Relations- Cardinality, Operations, Properties and composition. Tolerance and equivalencerelations. Membership functions- Features, Fuzzification, membership value assignments, Defuzzification.

Unit-V :APPLICATIONS 9

Fuzzy Arithmetic and Fuzzy Measures, Fuzzy Rule Base and Approximate Reasoning Fuzzy Decision making Fuzzy Logic Control Systems. Genetic Algorithm- Introduction and basic operators andterminology. Applications: Optimization

of TSP, Internet Search technique.			
	Total	**:**	**45**

Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	S N Sivanandam, S N Deepa	Principles of Soft Computing	Wiley India	2007
2.	Fakhreddine 0 Karray, Clarence D Silva	Soft Computing and Intelligent System Design	Pearson Edition	2004

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Amit Konar	Artificial Intelligence and Soft Computing- Behavioral and Cognitive Modeling of the Human Brain	CRC press	2000
2.	Elaine Rich and Kevin Knight	Artificial Intelligence	TMH	2008
3.	Stuart J. Russell and Peter Norvig	Artificial Intelligence A Modern Approach	Prentice Hall	2010
4.	Hung T. Nguyen, Elbert A. Walker	A first course in Fuzzy Logic	CRC. Press	2005
5.	N. P. Padhy	Artificial Intelligence and Intelligent Systems	Oxford University Press	2005

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Course Name	:	21CYE36&REALTIMESYSTEMS	L	T	P	C
			3	0	0	3

Course Objectives

1.	To understand the basic concepts of real-time computing
2.	Tounderstandthemajorissuesreal-timeschedulingandreal-timekernels.To writeReal-timescheduling algorithms
3.	To understand timing analysis and resource control in real-time system
4.	To design the real time database and fault tolerant techniques
5.	To implementation the real-time operating systems.

Course Outcomes

1.	Applytheknowledgeofoperatingsystemconceptstounderstandrealtimesystem.
2.	Implement the tasks scheduling of Real-time systems
3.	Define various protocols for effective resource sharing
4.	Find out the fault in real-time system by using various techniques
5.	Design real time system for various real-time applications

Unit-I : INTRODUCTION TO REALTIMESYSTEM	**9**
Typical RT applications - Hard and soft Real Time constraints - Hard and soft RTS - Reference Modeling RTS- Issues in RTS - Structure of RTS	
Unit-II :REALTIMESCHEDULING	**9**
Task, processes, processors - Task allocation algorithm - Single processor and multi processor Scheduling - Clock driven and priority based scheduling algorithm	
Unit-III :TIMING ANALYSIS ANDRESOURCECONTROL	**9**
Prediction of Execution Time - Worst Case Execution Time (WCET) analysis – Assumptions on Resources and Their Usage – Resource Contention and Resource Access Control – Priority Ceiling Protocol – Priority Inheritance Protocol – Stack Based Priority Ceiling Protocol – Preemption Ceiling Protocol.	
Unit-IV :REALTIMEDATABASEANDFAULTTOLERANTTECHNIQUES	**9**
Transaction priority and concurrency control issues - Disk scheduling - Fault type and Detection Techniques - Redundancy management – Integration issues	
Unit-V :REAL TIME SYSTEMCASESTUDIES	**9**
Examples of Hard, Soft and Firm real time systems like automatic chocolate vending machine, Smart Card and Adaptive Cruise Control System in a car or flight	
Total : 45	

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Jane .W. S. Liu	Real Time Systems	Pearson Education	2012
2.	Krishna .C.M	Real Time Systems	Mc-Graw Hill	2010

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Prasad K.V.K.K	Embedded/Real-Time Systems: Concepts, Design and Programming Cognitive Modeling of the Human Brain	Dream Tech Press	2014
2.	Sriram V Iyer , Pankaj Gupta	Embedded Real Time Systems Programming	McGraw Hill	2010
3.	Phillip A. Laplante	Real-Time Systems Design & Analysis	John Wiley & Sons	2006

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Course Code & Course Name	:	21CYE37- COMMUNICATION SECURITY AND ENCRYPTION	L	T	P	C
			3	0	0	3

Course Objectives

1.	To understand the fundamentals of objectives of cryptography and network security
2.	To know about the cryptography techniques that provide information and network security
3.	To evaluate the security of communication systems, networks and protocols based on a multitude of security metrics
4.	To demonstrate the concepts of digital signatures and key agreement protocols
5.	To understand and implement the network security concepts

Course Outcomes

1.	Understand the fundamentals of objectives of cryptography and network security.
2.	Know about the cryptography techniques that provide information and network security.
3.	Evaluate the security of communication systems, networks and protocols based on a multitude of security metrics.
4.	Demonstrate the concepts of digital signatures and key agreement protocols.
5.	Understand and implement the network security concepts.

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
21CYE37.CO1	x	x	x	-	-	x	-	-	x	-	-	x	x	-	-
21CYE37.CO2	x	x	x	-	-	-	-	-	x	-	-	x	x	x	x
21CYE37.CO3	x	-	x	-	x	-	x	x	-	-	-	-	-	x	x
21CYE37.CO4	x	x	-	x	-	x	x	-	-	x	x	x	-	-	-
21CYE37.CO5	x	x	x	-	-	-	x	-	x	-	x	x	x	-	x

Unit-I : INTRODUCTION TO COMMUNICATION SECURITY	9

Information security objectives - Schematic of a secure communication system- Formal definition of a cryptosystem- The shift cipher, the substitution cipher, the affine cipher, the permutation cipher - Cryptanalysis – attack models, attacks on different ciphers . Shan non's Approach to Cryptography: Measures of security - Perfect secrecy - Definition of entropy - One-time pad.

Unit-II : SYMMETRIC KEY CRYPTOGRAPHY	9

The notion of a symmetric key cryptography - The Data Encryption Standard (DES) and differential cryptanalysis - The Advanced Encryption Standard (AES). Cryptographic Hash Functions: Definition of hash functions and properties - The birthday problem - Unkeyed hash functions - Keyed hash functions - Message Authentication Codes (MAC) - The Random Oracle Model (ROM).

Unit-III : AUTHENTICATION	9

Definition of authentication - A simple authentication protocol and possible attacks - Strong password protocols - BM Encrypted Key Exchange (EKE) - Key Distribution Centers (KDC) - Certification authorities and certificate revocation - KDC based authentication protocols. Public Key Cryptosystems: Fundamentals of Public -key Cryptography - Background on number theory - The RSA public key cryptosystem - The ElGamal public key cryptosystem and discrete logs.

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Unit-IV : DIGITAL SIGNATURES	9
An RSA based signature scheme - The ElGamal based signature scheme - The Schnorr signature scheme - The Digital Signature Algorithm (DSA). Key Distribution and Key Agreement Protocols : Key Predistribution - Diffie-Hellman key Exchange - The MTI key.	
Unit-V : NETWORK SECURITY	**9**
TCP/IP threats - The IPSEC protocol - The SSL and TLS protocols - Firewalls and Virtual Private Networks (VPNs) - Electronic mail security - Worms - DDoS attacks - BGB and security consideration.	
Total : 45	

Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1	Lidong Chen, Guang Gong	Communication System Security	CRC Press	2012
2	Lucas C. K. Hui, S. H. Qing, et al.	Information and Communications Security	Pearson Publications	2014

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1	Pradeep Kumar Singh, Arti Noor, et al.	Evolving Technologies for Computing, Communication and Smart World	Laxmi Publications Pvt Ltd.	2020
2	Charlie Kaufman, Radia Perlman, and Mike Speciner	Network Security	Pearson Publications Pvt Ltd.	2018
3	K.Haribaskar	Cryptography and Network Security	Laxmi Publications Pvt Ltd.	2011

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Course Name	:	21CYE38&HIGH SPEED NETWORKS	L	T	P	C
			3	0	0	3

Course Objectives

1.	To learn High speed networks and AT Architecture
2.	To understand resource allocation and s congestion management approaches
3.	To understand resource allocation and s congestion management approaches
4.	To understand the integrated and differentiated services
5.	To learn protocols for QOS support

Course Outcomes

1.	Summarize the mechanism to provide high speed networking through case studies of ATM and frame relay networks
2.	Construct queuing system with different arrival and service rates
3.	Analyze the performance of various congestion controls in ATM.
4.	Design the integrated and differentiated services
5.	Explain the protocols needed for QoS support.

Unit-I : HIGHPERFORMANCENETWORKS	**9**
FrameRelayNetworks–AsynchronousTransferMode(ATM)–ATMProtocolArchitecture-ATMlogical connection - ATM cell – ATM service categories – ATM Adaptation Layer (AAL) - High Speed LANs: Fast ethernet - Gigabit ethernet - Fiberchannel.	
Unit-II : QUEUINGMODELS ANDCONGESTIONMANAGEMENT	**9**
Queuing analysis- Queuing models – Single server queues – Effects of congestion – Congestion control – Traffic management – Congestion control in packet switching networks	
Unit-III : ATMCONGESTIONCONTROL	**9**
Performance of TCP over ATM - Traffic and congestion control in ATM – Requirements – Attributes – Traffic management frame work - Traffic control – Available Bit Rate (ABR) Traffic management – ABR rate control - Resource Management (RM) Cell formats – ABR capacity allocations.	
Unit-IV : INTEGRATED ANDDIFFERENTIATEDSERVICES	**9**
Integrated services architecture – Approach - Components - Services - Queuing discipline – Fair admission control - Traffic shaping - Resource reservation queuing (FQ) - Processor Sharing (PS) - Bit-Round Fair Queuing (BRFQ) - Generalized Processor Sharing (GPS) - Weighted Fair Queuing (WFQ) – Random early detection - Differentiated services DS code points – Per Hop Behavior	
Unit-V : PROTOCOLS FORQOSSUPPORT	**9**
Resource Reservation (RSVP) – Goals & characteristics - Data flow - RSVP operations - Protocol mechanisms – Multiprotocol label switching – Operations - Label stacking – Protocol details – Real Time Protocol (RTP) – Protocol architecture - Data transfer protocol - Real Time Control Protocol (RTCP)	
Total : 45	

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Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1	William Stallings	High Speed Networks and	Pearson Education	2002
2	Warland &PravinVaraiya	High Performance Communication Networks	Jean Harcourt Asia Pvt. Ltd	2001

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	IrvanPepelnjk, et al	MPLS and VPN architecture□	Cisco Press	2003
2.	Behrouz A. Forouzan, Sophia Chung Fegan	Data Communications and Networking	McGraw-Hill Higher Education	2003

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EMPLOYABILITY ENHANCEMENT COURSES (EEC)

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21CYP01	PROJECT WORKPHASEI	L T PC 0 010 5

COURSE OBJECTIVES

1. To practical implementation of theoretical knowledge gained during the study from First year to Third year
2. To implement the irideas/realtimeindustrialproblem/currentapplicationoftheirengineeringbranch which they have studied in curriculum
3. To build confidence in the student what he has learn theoretically.
4. T o identify the appropriate problem solving methodology
5. T o Analyze and process the experimental information

COURSE OUTCOMES

1. Preparealiteraturesurveyinaspecificdomainasateam/individualtomotivatelifelonglearning.
2. Identifytheproblemwhichneedstobeprovidedasustainablesolutionusingmoderntools
3. Analyzetheproblemdefinitionanddesignitsimpactonthesocietyandenvironment.
4. Document the literature and bindings.
5. ChosethedomainofInformationTechnologyandprogramminglanguagesandapplytovarietyofreal time problem scenarios.

Content:

- Project helped students to gather, organize, summarize and interpret technical literature with the purpose of formulating a project proposal.
- B.E. Projects can be two types: Projects based on implementation of any application oriented
- problem,whichwillbemoreorlessexperimentalinnature,andtheotherswillbebasedon some innovative/ theoretical work.
- InProjectPhase-Ithestudentwillundertakeprojectovertheacademicyear,whichwillinvolve the analysis, design of a system or sub system in the area identified earlier in the field of Information Technology.
- The topic must be formulated in consultation with the guide and project coordinator.

Review Committee:

- The Head of the department/Project coordinator shall constitute a review committee for project work for project group.
- Project guide would be one member of that committee by default.
- The students project group shall make presentation on the progress made by them before the committee.
- Therecordoftheremarks/suggestionsofthereviewcommitteeshouldbeproperlymaintained and should be made available at the time of examination.
- Each student/group is required to give presentation apart review for 10to15 minutes followed by a detailed discussion.

PROJECT WORK REVIEWS

- Project work phases will have a minimum of three internal reviews by an appointed committee of faculty.
- The final review will be done by an external faculty

Review 1: Finalization of scope – the objectives and scope of the project should be finalized in second week of their academic semester. Should finalize list of required hardware, software or other equipment for executing the project, test environment/tools.

Review 2: Finalization – High level design, planning. **Guidelines for Students and Faculty:**

Project Review Committee:

1. This committee will be responsible for evaluating the timely progress of the projects and communicating the progress report to the students.
2. As far as possible Students should finalize the same project title taken for Project.
3. Reviewcommitteeshouldconduct"FeasibilityReview"infirstweekaftercommencementoftheterm.Review committee should finalize the scope of the project.
4. If change in project topic is unavoidable then the students should complete the process of project approval by submitting synopsis along with their view of important papers. This new project topic should be approved by review committee.

Term Work:

1. The term work will consist of are port prepared by the student on the project allotted to them.
2. They should use appropriate tools for the preparation of report like project planning, UML diagram, testing tools, referencing tool set.

Report Structure

- Contents
- List of Abbreviations
- List of Figures
- List of Graphs
- List of Tables

1. Introduction and aims/motivation and objectives
2. Literature Survey
3. Problem Statement
4. Project Requirements
5. System Analysis Proposed Architecture/high level design of the project
6. Verification Validation
7. Project plan
8. Conclusion
9. References
10. Appendices

Evaluation Guidelines:

- A panel of examiner will evaluate the viability of project/project scope.
- The panel will also verify that all the suggestions/comments in the review document are taken care and accordingly allot the teamwork marks.
- Oral examination in the form of presentation will be based on the project work completed by the candidates. Preliminary report must also be presented during the oral examination.

TOTAL HOURS: 150

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21CYP02	PROJECT WORK -PHASEII	L T PC 0 0 20 10

COURSE OBJECTIVES

1. To Plan an experimental design to solve Engineering problems
2. To develop an attitude of team work and independent working on real time problems
3. To Analyze and process the experiment a information
4. To evaluate, interpret and justify the experimental results
5. To develop a dissertation report

COURSE OUTCOMES

1. Plan an experimental design to solve engineering/societal problems using modern tools
2. Develop lifelong learning to keep abreast to flattest technologies.
3. Analyze and implement the design to provide sustain able solutions.
4. Evaluateandinterprettheexperimentalresultsandanalyzetheimpactonsocietyand environment.
5. Implement and test the application for their all time problems.

PROJECT WORK REVIEWS

- Project work phases will have minimum of three internal reviews by an appointed committee of faculty.
- The final review will be done by an external faculty

Review 3: Implementation Status and testing document.

Review 4: Final Project Demonstration, Project Report and proper Result analysis

The group will submit at the end of semester II.

a. The Workable project.

b. Projectreport(WordDocument)intheformofboundjournalcompleteinallrespect– 1 copyfortheInstitute,1 copyforguideand1copyofeach student in the group for certification. The project report contains the details.

1. Problem definition
2. Requirement specification
3. System design details (UMLdiagrams)
4. System implementation – code documentation – dataflow diagrams/ algorithm, protocols used.
5. Test result and procedure
6. Conclusions.
7. Appendix a. Tools used b. References c. Base papers.

TOTAL HOURS: 3

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21CYP03	COMPREHENSION	L T PC 0 021

COURSE OBJECTIVES

1. To write effective and coherent paragraphs
2. To comprehend the overall land internal organization of an academic essay
3. To write an effective thesis statement
4. To use pre-writing strategies to plan writing
5. To Produce coherent and unified paragraphs with adequate support and detail of the topic

COURSE OUTCOMES

1. Write a paragraph with a topic sentence, support, and concluding sentence
2. Write an effective introduction thesis statement that addresses the writing prompt and conclusion
3. Produce a well-organized academic essay and use a variety of accurate sentence structures
4. Produce appropriate vocabulary and correctwordforms
5. Produce accurate grammatical structures for the paragraph writing

COMPREHENSION TOPICS:

1. Cloud Computing for Small Businesses
2. Role of Information Technology in Corporate Functions
3. Knowledge Management
4. The Impact of Cloud Computing
5. Cluster computing
6. Computer Forensics
7. The Internet of Things
8. Data Security
9. Green Computing
10. Issue on E-government Development and Applications
11. Big Data
12. Design of Reversible Computing Systems
13. Social Platforms

TOTAL HOURS: 30

21CYP04	TECHNICALSEMINAR	L T P C 0 4 0 2

COURSE OBJECTIVES

1. To expose students to the 'real 'working environment and get acquainted with the organization structure, Business operations and administrative functions
2. To promote and develop presentation skills and import a knowledgeable society
3. To set the stage for future recruitment by potential employers
4. To develop the presentation skill for employability
5. To Utilize available technical resources in efficient manner

COURSE OUTCOMES

1. Develop a skill for work in actual working environment.
2. Utilize available technical resources in efficient manner.
3. Write technical documents and give oral present actions related to the work completed.
4. Implement the presentation in latest trends in Information Technology

Seminar Topic:

Seminar topic should relate to the Information Technology, Some of the seminar topics are listed below:

1. Free Net
2. Linear Programming in Cloud
3. Blackberry Technology
4. Biometric Security Systems
5. Credit Card FraudDetection
6. Vehicle Management System
7. Smart shader Technology
8. Digital Piracy
9. Google Glass
10. Data Recovery
11. Cyber and Social Terrorism
12. Space Mouse
13. Pill Camera
14. Ambient Intelligence
15. Mind Reading Computer
16. Honey pots
17. Security through Obscurity
18. Electronic Banking
19. Gi-Fi

Scheme of Evaluation:

The Course is evaluated based on:

- Presentation
- Student's reports
- PPT presentation
- Presentation will take place in the weekly class.The presentation is evaluation by your class in charge.
- Reportmustbesubmitteddduringpresentation.Thereportevaluationisdonebyyourclassincharge.
- A Viva voce comprising comprehensive questions based on the presentation.

TOTAL HOURS: 60

21CYP05	ENTREPRENEURSHIPDEVELOPMENT	L T PC 30 03

COURSE OBJECTIVES

1. To promote strong entrepreneurship among Engineers ,Managers and Science students.
2. To promote entrepreneurship among relevant sectors in the state.
3. To collaborate with other organizations and institutions.
4. To organize entrepreneurship development and awareness programs.
5. To undertake research studies to identify high technology area shaving entrepreneurship opportunities.

COURSE OUTCOMES

1. Identifying real problems and a solutions people want pitching solutions, such as products and services.
2. Achievehighdegreeofproductivityinasmallteamviaagile,highqualitypracticesand team organization approaches
3. Create a production software development environment.
4. Preparelandscapeandapproachesforattractinginvestorsandsecuringfunding Communicating with customer
5. Achieve customer satisfaction in the development of ITproductsandservices

UNITI 9

CONCEPT OF ENTREPRENEURSHIP: Meaning and characteristics of entrepreneurship, entrepreneurial culture, socio-economic origin of entrepreneurship, factors affecting entrepreneurship, conceptual model of entrepreneurship, traits of a good entrepreneur, entrepreneur, intra-preneur and manager ENTREPRENEURIAL MOTIVATION: motivating, compelling and facilitating factors, entrepreneurial ambition, achievement motivation theory and Kakinada experiment

UNITII 9

ESTABLISHMENTOFENTREPRENEURIALSYSTEMS: search,processingandselectionofidea,Input requirements SMALL SCALE INDUSTRY: meaning, importance, characteristics, advantagesand problems of SSIs. Steps for starting a small industry, guidelines for project report, registration asSSI.

UNITIII 9

ASSISTANCE TO SSI: need for incentives & subsidies, need for institutional support, role of government and other institutions.

UNITIV 9

FUNCTIONALPLANS:Marketingplan-marketingresearchforthenewventure, stepsinpreparingmarketing plan, contingency planning; Organizational plan- Forms of ownership, designing organizational structure, job design, manpower planning; Financial plan- cash budget, working capital, proforma income statement, Proforma cash flow, proforma balance sheet, break evenanalysis.

UNITV 9

SOURCES OF FINANCE: Debt or Equity financing, commercial banks, venture capital; financial institutions supporting entrepreneurs; legal issues- intellectual property rights, patents, trademarks, copy rights, trade secrets, licensing, franchising.

TOTAL HOURS: 45

TEXT BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Gupta C. B. and Srinivasan N. P	Entrepreneurial Development	Sultan Chand & Sons	2014
2.	Vasant Desai	Management of a Small Scale Industry	Himalaya Publishing House	2011

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REFERENCE BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1	Sangeetha Sharma	Entrepreneurship Development	PHI Learning Pvt. Ltd	2016
2	K Ramachandran	Entrepreneurship Development	Tata McGraw-Hill	2009
3	Abhishek Nirjar	Entrepreneurship Development	CBS Publishers	2014
4	S. Anil Kumar	Entrepreneurship Development	New Age International	2008
5	Fang Zhao	Information Technology Entrepreneurship and Innovation	O'Reilly	2008

WEB URLs

1. https://www.tutorialspoint.com/entrepreneurship_development/index.htm
2. https://www.entrepreneur.com/article/244279
3. https://ocw.mit.edu/courses/entrepreneurship/
4. http://freevideolectures.com/Course/3645/Technology-Entrepreneurship
5. http://articles.bplans.com/11-excellent-free-online-courses-for-entrepreneurs

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21CYP06	PROFESSIONALPRACTICES	L T P C
		0 0 6 3

COURSE OBJECTIVES

1. To examine important professional issues in contemporary practice and to help students become an effective participant in a team of IT professionals.
2. To have gained a thorough understanding of the various issues/factors an IT professional faces and how one should respond.
3. To have learned what are considered professional behavior in the IT field
4. To have learned about the current IT practices.
5. To Develop professional attitude from the perspectives of experienced IT practitioners

COURSE OUTCOMES

1. Describethevariousissues/factorsaninformationtechnologyprofessional
2. Describe professional behavior in the information technology.
3. Recognize what are the current issues in IT and the emerging technology
4. Write properly formatted and organized technical reports
5. Acquire and integrate knowledge to appreciate industry practices

CONTENT:

1. **Discipline-specific knowledge and capabilities**: the level of study related to an Information Technology profession.
2. **Communication**:
3. **Digital literacy**
4. **Critical thinking**:
5. **Problem solving:**
6. **Self-management:**.
7. **Teamwork**
8. **Global citizenship:**

I. Information Technology Professionalism

A. Privacy and confidentiality
B. Computer ethics
C. Intellectual property issues
D. Computer crime and fraud
E. Professional bodies
F. Impact of information technology on society

II. Information Technology Practices

A. Effects of standardization
B. Effectiveness sufficiency
C. Distributed systems issues
D. Emerging technologies
E. Quality issues
F. Current issues

TOTAL HOURS: 90

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TEXT BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Schultz, Robert A	Contemporary Issues in Ethics and Information Technology	IRM Press	2006
2.	Baase S	A Gift of Fire, Social, Legal and Ethical Issues for Computers and the Internet	Prentice Hall	2003

REFERENCE BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1	Johnson DG	Computer Ethics	Prentice Hall	2001
2	Spinello RA	CyberEthics: Morality and Law in Cyberspace	Jones and Bartlett	2000

WEB URLs

1. www.infosec.gov.hk
2. www.pcpd.org.hk
3. www.ipd.gov.hk
4. www.ogcio.gov.hk
5. www.hkcs.org.h

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OPEN ELECTIVE COURSES (OEC)

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21MEE07 INDUSTRIAL AUTOMATION & ROBOTICS L T P C
3 0 0 3

COURSE OBJECTIVES

- To learn the levels of automation and production economics
- To impart the knowledge on Material handling and Identification Technologies.
- To know the Automated Assembly Systems.
- To impart clear knowledge about the techniques and applications of Automation and Robotics Programming in an industrial environment.
- To understand robotic systems and apply what they learned to a career in the Automation and Robotics field.

COURSE OUTCOMES

- Understand levels of automation and production economics.
- Understand the Material handling and Identification Technologies.
- Explain the Automated Assembly Systems.
- Understand the techniques and applications of Automation and Robotics Programming in an industrial environment.
- Design and implement robotic systems and apply what they learned to a career in the Automation and Robotics field.

UNIT I INTRODUCTION 9

Automation in Production System, Principles and Strategies of Automation, Basic Elements of an Automated System, Advanced Automation Functions, Levels of Automations. Production Economics: Methods of Evaluating Investment Alternatives, Costs in Manufacturing, Break Even Analysis, Unit cost of production, Cost of Manufacturing Lead time and Work-in-process.

UNIT II MATERIAL HANDLING AND IDENTIFICATION TECHNOLOGIES 9

The material handling function, Types of Material Handling Equipment, Analysis for Material Handling Systems, Design of the System, Conveyor Systems, Automated Guided Vehicle Systems. Automated Storage Systems: Storage System Performance, Automated Storage/Retrieval Systems, Work-in-process Storage, Interfacing Handling and Storage with Manufacturing. Product identification system: Barcode, RFID etc.

UNIT III AUTOMATED ASSEMBLY SYSTEMS 9

Design for Automated Assembly, Types of Automated Assembly Systems, Part Feeding Devices, Analysis of Multi-station Assembly Machines, Analysis of a Single Station Assembly Machine.

UNIT IV FUNDAMENTALS OF ROBOT AND END EFFECTORS 9

Robot - Definition - Robot Anatomy - Co ordinate Systems, Work Envelope Types and Classification- Specifications-Pitch,Yaw, Roll, Joint Notations, Speed of Motion, Pay Load- Robot Parts and their Functions-Need for Robots-Different Applications. End Effectors-Grippers-Mechanical Grippers, Pneumatic and Hydraulic- Grippers, Magnetic Grippers,Vacuum Grippers; Two Fingered and Three Fingered Grippers; Internal Grippers and External Grippers; Selection and Design Considerations.

UNIT V ROBOT KINEMATICS AND ROBOT PROGRAMMING 9

Forward Kinematics, Inverse Kinematics and Difference; Forward Kinematics and Reverse Kinematics of manipulators with Two, Three Degrees of Freedom (in 2 Dimension), Velocity and Forces-Manipulator Dynamics, Trajectory Generator. Lead through Programming, Robot programming Languages-VAL Programming-Motion Commands, Sensor Commands, End Effector commands and simple Programs.

TOTAL = 45

TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	M.P.Grover	Automation, Production Systems and Computer IntegratedManufacturing	Pearson Education	2015
2	Krishna Kant	Computer Based Industrial Control	EEE-PHI	2017

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1	Tiess Chiu Chang & Richard A. Wysk	An Introduction to Automated Process Planning Systems	PHI	1985
2	Amber G.H & P.S. Amber	Anatomy of Automation	Prentice Hall	2009
3	S.R. Deb	Robotics Technology and flexible automation	Tata McGraw-Hill Education	2009

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21MEE18 POWERPLANTENGINEERING L T PC
3 0 0 3

COURSE OBJECTIVES

1. To provide an overview of Power Plants and detailing the role of Mechanical Engineers in their operation and maintenance.
2. To understand about Thermal power plants and working
3. To know about Diesel engine power plants and working
4. To know the working of Nuclear power plants and other power plants
5. To understand Environmental problems related to power plants

COURSE OUTCOMES

1. Comprehend the working principles of coal based thermal powerplants
2. Illustrate the working principles of diesel, gas turbine and combined cycle powerplants
3. Illustrate and explain the working principle and components of nuclear powerplants
4. Explain the techniques to extract power from renewable energysources
5. Understand the economic and environmental issues of powerplants.

UNIT I COAL BASED THERMALPOWER PLANTS 9

Rankine cycle - improvisations, Layout of modern coal power plant, Super Critical Boilers, FBC Boilers, Turbines, Condensers, Steam & Heat rate, Subsystems of thermal power plants – Fuel and ash handling, Draught system, Feed water treatment. Binary Cycles and Cogeneration systems.

UNIT II DIESEL, GAS TURBINE AND COMBINED CYCLEPOWER PLANTS 9

Otto, Diesel, Dual & Brayton Cycle - Analysis & Optimisation. Components of Diesel and Gas Turbine power plants. Combined Cycle Power Plants. Integrated Gasifier based Combined Cycle systems.

UNIT III NUCLEARPOWER PLANTS 9

Basics of Nuclear Engineering, Layout and subsystems of Nuclear Power Plants, Working of Nuclear Reactors : Boiling Water Reactor (BWR), Pressurized Water Reactor (PWR), CANada Deuterium-Uranium reactor (CANDU), Breeder, Gas Cooled and Liquid Metal Cooled Reactors. Safety measuresfor Nuclear Power plants.

UNIT IV POWER FROMRENEWABLEENERGY 9

Hydro Electric Power Plants – Classification, Typical Layout and associated components including Turbines. Principle, Construction and working of Wind, Tidal, *Solar* Photo Voltaic (SPV), SolarThermal, Geo Thermal, Biogas and Fuel Cell power systems.

UNIT V ENERGY, ECONOMIC AND ENVIRONMENTAL ISSUES OFPOWER PLANTS 9

Power tariff types, Load distribution parameters, load curve, Comparison of site selection criteria,relative merits & demerits, Capital & Operating Cost of different power plants. Pollution control technologies including Waste Disposal Options for Coal and Nuclear Power Plants.

TOTAL: 45

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Nag. P.K.,	Power Plant Engineering	Tata McGraw – Hill	2010
2	C. Elanchezhian, L. Saravanakumar,B. Vijaya Ramnath	Power Plant Engineering	I.K.International Publishing house pvt ltd	2007

REFERENCE BOOKS:

1.	El-Wakil. M.M	Power Plant Technology	Tata McGraw – Hill Publishing Company Ltd.,	2010
2.	Thomas C. Elliott	Power Plant Engineering	Standard Handbook of McGraw – Hill	2003
3.	Godfrey Boyle	Renewable energy	Oxford University Press	2004
4	R.K.Rajput	Power Plant Engineering	Laxmi Publications	2016
5	S. C. Arora and S. Domkundwar	A COURSE in Power Plant Engineering	Dhanpatrai & Sons,	2008

WEB URLs

1. www.youtube.com/watch?v=IdPTuwKEfmA
2. www.youtube.com/watch?v=Uhjhufhg3Xk
3. www.youtube.com/watch?v=9q7_n2E32_g
4. www.youtube.com/watch?v=riRzpm0u81I
5. www.youtube.com/watch?v=hrFeyue--g

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21MEC26	TOTALQUALITYMANAGEMENT	L T PC 3 0 03

COURSE OBJECTIVES

1. TounderstandtheTotalQualityManagementconceptandprinciplesandthevarioustoolsavailabletoachieve Total Quality Management
2. To understand the application of statistical approach for quality control
3. To create an awareness about the ISO and QS certification process and its need for the industries
4. To apply the quality concepts in product design, manufacturing etc in order to maximize customer Satisfaction
5. Human involvement to improve quality and the development and transformation

COURSE OUTCOMES

1. Understand the concept of total quality management
2. Comprehend and illustrate the TQM principles
3. Solve quality related problems using statistical process control
4. Understand proven methodologies to enhance management processes
5. Illustrate the salient features of quality systems

UNIT I: INTRODUCTION 9

Definition of Quality – Dimensions of Quality – Quality Planning – Quality costs – Analysis Techniques for Quality Costs – Basic concepts of Total Quality Management – Historical Review – Quality Statements – Strategic Planning, Deming Philosophy – Crosby philosophy – Continuous Process Improvement – Juran Trilogy, PDSA Cycle, 5S, Kaizen-Obstacles to TQMImplementation

UNIT II: TQMPRINCIPLES 9

Principles of TQM, Leadership – Concepts – Role of Senior Management – Quality Council, Customer satisfaction – Customer Perception of Quality, Customer Complaints, Service Quality, Customer Retention, Employee Involvement – Motivation, Empowerment, Teams, Recognition and Reward, Performance Appraisal, Benefits– Supplier Partnership – Partnering, sourcing, Supplier Selection, Supplier Rating, Relationship Development, Performance Measures – Basic Concepts, Strategy, Performance Measure

UNIT III: STATISTICAL PROCESSCONTROL (SPC) 9

The seven tools of quality – Statistical Fundamentals – Measures of central Tendency and Dispersion,Population and Sample, Normal Curve, Control Charts for variables X bar and R chart and attributes P, nP, C, and u charts, Industrial Examples, Process capability, Concept of six sigma – New seven Management tools

UNIT IV: TQMTOOLS 9

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

UNIT V: QUALITYSYSTEMS 9

Need for ISO 9000 and Other Quality Systems – ISO 9000:2000 Quality System – Elements, Implementation of Quality System, Documentation, Quality Auditing, ISO 9000:2005 (definitions), ISO 9001:2008 (requirements) and ISO 9004:2009 (continuous improvement), TS 16949, ISO 14000, AS9100 – Concept, Requirements and Benefits-Case studies

Total:L: 45

TEXT BOOKS:

S.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Dale H. Besterfiled	Total Quality Management	Pearson Education Inc, New Delhi	2003
2.	James R. Evans and William M. Lidsay,	The Management and Control of Quality	South-Western	2002

REFERENCE BOOKS:

S.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	N. Gupta and B. Valarmathi,	Total Quality Management	Tata McGraw-Hill Publishing Company Pvt Ltd., New Delhi	2009
2	Dr S. Kumar	Total Quality Management,	Laxmi Publications Ltd., New Delhi	2006
3	P. N. Muherjee	Total Quality Management	Prentice Hall of India, New Delhi	2006
4	James R. Evans and William M. Lindsay	The Management and Control of Quality	8th Edition, First Indian Edition, Cengage Learning	2012
5	Suganthi.L and Anand Samuel	Total Quality Management	Prentice Hall (India) Pvt. Ltd	2006

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1. www.nptel.iitm.ac.in/COURSEs/WebCOURSE-contents/IIT-roorkee/industrialengineering/index.htm
2. www.statit.com/services/SPCOverview_mfg.pdf
3. www.3.ha.org.hk/qeh/wiser/doc/7bqt.pdf
4. www.directory.umm.ac.id/Data%20Elmu/pdf/TQMTools.pdf
5. www.pqm-online.com/assets/files/lib/books/holye2.pdf

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21ECE06 TELECOMMUNICATIONSWITCHINGNETWORKS L P TC
3 0 03

COURSE OBJECTIVES

1. To introduce fundamentals functions of a telecom switchingSystems
2. To provide statistical modeling of telephone traffic and characteristics of blocking and queuingsystem
3. To learn the various switchingnetworks
4. To introduce the concepts of Digital SwitchingSystems
5. To study signaling, packet switching andnetworks.

COURSE OUTCOMES

1. Describe the Basic Switching concepts oftelecommunication.
2. Analyze and evaluate fundamental telecommunication trafficmodels
3. Solve problems in switching networks
4. Understand the concepts of Digitalswitching
5. Understand the signaling and packet switchingtechniques

UNIT I SWITCHINGSYSTEMS 9

Evolution of Telecommunications; Basics of a Switching System; Functions of a Switching System; Crossbar Switching-Principle of Crossbar Switching; Crossbar Switch Configurations; Cross-Point Technology; Crossbar Exchange Organization; A General Trunking; Electronic Switching; Digital Switching Systems.

UNIT II TRAFFICENGINEERING 9

Congestion – Network traffic load and Parameters – Traffic measurement – Lost-call system – Grade of Service and Blocking probability – Modeling switching systems – Incoming traffic and service time characterization – Blocking models and loss estimates – Queuing systems – Simulationmodels.

UNIT III SWITCHINGNETWORKS 9

Single Stage Networks; Gradings-Principle; Two Stage Networks; Three Stage Networks; Four Stage Networks Gradings – Link systems – Grades of service of link systems – Application of graph theory to link systems – Use of expansion – Call packing – Rearrangeable networks – Strict-sense non-blocking networks –Sectionalized switching networks.

UNIT IV DIGITAL SWITCHING SYSTEMS 9

Space and time switching – Time-division switching networks – Grades of service of time-division switching networks— hybrid time and space division multiplexes – Non-blocking networks – Synchronization – Call-processing functions – Common control – Reliability, availability and security – Stored program control.

UNIT V SIGNALING AND PACKET SWITCHING 9

Customer line signaling – FDM carrier systems – PCM signaling – Inter-register signaling – Common-channel signaling principles – CCITT signaling – Digital customer line signaling – Statistical multiplexing – Local area and wide area networks – Large scale and Broadbandnetworks.

Total:45 Hrs

TEXT BOOKS

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Thiagarajan Viswanathan	elecommunication Switching Systems and Networks	Prentice Hall of India Pvt.Ltd	2006
2.	William Stallings	ireless Communication and Networks	Pearson Education, New Delhi	Second edition 2004

REFERENCE BOOKS

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	J.E. . Flood	Telecommunications Switching, Traffic and Networks	Pearson Education Ltd	2006

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2.	John C Bellamy	Digital Telephony	John Wiley	3rd Edition, 2000
3.	Behrouz Forouzan	Introduction to Data Communication and Networking	Tata Mc-Graw Hill New York	1996
4.	Tomasi	Introduction to Data Communication and Networking	Pearson Education	1st Edition, 2007
5.	R.A.Thomson	Telephone switching Systems	Artech House Publishers	2000

WEB URLs

1. www.nptel.ac.in/courses/117104128/12
2. wwwnptel.ac.in/courses/106105082/20
3. wwwnptel.ac.in/courses/117104104/
4. wwwnptel.ac.in/courses/117101050/25
5. wwwnptel.ac.in/courses/106105080/pdf/M4L1.pdf

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21ECE08 MOBILEAD-HOCNETWORKS L T PC
3 0 03

COURSE OBJECTIVES

6. To gain knowledge in wireless network protocol and standards.
7. To study the MAC, Routing protocols for ad hocnetworks.
8. To gain knowledge about NetworkSimulator.
9. To learn the concept of security mechanism for wirelessnetworks.
10. To study about Characteristics of securityprotocols.

COURSE OUTCOMES

1. Demonstratethecurrentad-hoc/sensortechnologiesbyresearchingkeyareassuchas algorithms, protocols andapplications
2. Identify the major issues associated with ad-hoc/sensor networks and supporting software inadhoc/sensor networks.
3. Create a wireless network scenario and analyze its performance using networksimulator
4. Choose security component for five layers ofnetworks
5. Analyze the characteristics of different securityprotocols.

UNIT I INTRODUCTION 9

Introduction to Ad-Hoc wireless networks- Packet radio networks-Key definitions of ad-hoc and sensor networks-Advantages of ad-hoc and sensor networks -Unique constraints and challenges and Vulnerabilities- Wireless Communications/Radio Characteristics. Applications of Ad-Hoc/Sensor Network and Future Directions: Driving Applications- Ultra wide band radio communication- Wireless fidelity systems-optical wireless networks - Simulation of Wi-Fi using QUALNET simulator.

UNIT II MEDIA ACCESS CONTROL(MAC)PROTOCOLS 9

Issues in designing MAC protocols-Bandwidth efficiency-Quality of service support-Synchronization hidden node-exposed node problems. Classifications of MAC protocols: Contention based protocols- MACAW- Media access protocol for wireless LAN-media access with reduced handshake- contention based with reservation mechanisms-Distributed priority-scheduling. Mac protocols using directional antenna. Simulation of 802.11using QUALNET

UNIT III ROUTINGPROTOCOLS 9

Issues in designing routing protocols-Mobility-bandwidth constraint-Table driven routing protocols :DSDV,WRP, CHGSRP, - On demand routing protocol : AODV,DSR, TORA,LAR,ANODR- zone routing protocol-Fish eye state routing protocol-power aware routing protocol. Simulation of routing protocols using QUALNET simulator.

UNIT IV WIRELESS SENSOR NETWORKS 9

Introduction-sensor network architecture-Data dissemination-data gathering-self organizing, MAC Protocols for Sensor Networks - Location discovery- Quality of a Sensor Network - Evolving Standards - Energy efficient issues-Transport layer. Synchronizationissues.

UNIT V SECURITY ISSUES IN AD HOC /SENSOR NETWORK 9

Introduction -Need for Security- classification of attack-MAC layer attacks-Network layer attacks-Wired Equivalent Privacy(WEP)-Intrusion prevention scheme- Confidentiality : Symmetric Encryption- DES and Triple DES detection systems- Authentication :Digital Signatures, Certificates, User Authentication, Elliptic Curve Cryptosystems. Intrusion detection systems : behavior based detection knowledge based detection-watch dog-path rater. Reputation based system: CORE, CONFIDENT

Total: 45

TEXT BOOKS

Sl.N.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Siva Ram Murthy C. and Manoj B S,	Ad Hoc Wireless Networks: Architectures and Protocols	Prentice Hall,	2014.
2.	Toh C K,	Ad Hoc Mobile Wireless Networks: Protocols and Systems	Prentice Hall	2008

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REFERENCE BOOKS

Sl.N.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Charles Perkins, Addision Wesley,	Ad hoc Networking	Pearson	2008
2.	Toh C.K,	Ad Hoc Mobile wireless Networks : protocol and Systems	Prentice Hall PTR,	2008
3.	Feng zhao, Leonidas Guibas	Wireless sensor network,	Morgan Kaufmann publishers,	2015
4.	Kazem sohraby, Daniel minoli and Taieb Znati,	Wireless sensor networks- Technology, Protocols and Applications	Wiley	2007
5.	T.L.Singhal	Wireless Communication	TMH,	2012

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1. www.onlinecourses.nptel.ac.in/noc17_cs07
2. www.nptel.ac.in/courses/106105160/3
3. www.nptel.ac.in/courses/106105080/pdf/M5L7.pdf
4. www.ece.rochester.edu/courses/ECE586/lectures/MANETS_MAC.pdf
5. www.onlinecourses.nptel.ac.in/noc17_cs07/announcements

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21PC-CED11 WATERSUPPLYENGINEERING L T PC
3 0 03

COURSE OBJECTIVE

1. To make the students conversant with sources, demand and characteristics ofwater
2. To expose the students to understand the concept of various water supplylines.
3. To provide adequate knowledge about the water treatmentprocesses.
4. To prefer the suitable advanced treatmenttechniques.
5. To provide knowledge on water distribution and plumbing system

COURSE OUTCOMES

At the end of the course the student will be able to

1. Identify the quantity and quality of water from varioussources.
2. Explain the processes involved in the water conveyancesystems
3. Infer the design principles of unit operations and unit processes for watertreatment
4. Justify the suitable advanced treatment techniques for watertreatment
5. Choose the appropriate water distribution network for a city and plumbing systems for abuilding

UNIT I PLANNING FOR WATERSUPPLY SYSTEM 9

Public water supply system - Planning - Objectives -Design period - Population forecasting -Water demand - Sources of water and their characteristics - Surface and Groundwater- Impounding Reservoir -Development and selection of source-Water quality - Characterization andstandards.

UNIT II CONVEYANCE SYSTEM 9

Water supply -intake structures -Functions and drawings -Pipes and conduits for water- Pipe materials - Hydraulics of flow in pipes -Transmission main design -Laying, jointing and testing of pipes - Drawings appurtenances - Types and capacity of pumps -Selection of pumps and pipe materials.

UNIT III WATERTREATMENT 9

Objectives - Unit operations and processes - Principles, functions design and drawing of chemical feeding, Flash mixers, flocculators, sedimentation tanks and sand filters - Disinfection- Residue Management - Construction and Operation & Maintenance aspects of Water Treatment Plants.

UNIT IV ADVANCEDWATER TREATMENT 9

Principles and functions of Aeration - Iron and manganese removal, Defluoridation and demineralization -Water softening - Desalination - Membrane Systems - Recent advances.

UNIT V WATER DISTRIBUTION AND SUPPLYTOBUILDINGS 9

Requirements of water distribution -Components -Service reservoirs - Functions and drawings - Network design - Analysis of distribution networks - Appurtenances -operation and maintenance -Leak detection, Methods. Principles of design of water supply in buildings -House service connection -Fixtures and fittings -Systems of plumbing and drawings of types of plumbing.

TOTAL: 45

TEXT BOOKS:

S.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	S.K. Garg	Water Supply Engineering	Khanna Publications Pvt.Ltd. New Delhi.	2010
2	Modi, P.N	Environmental Engineering I	Standard Book House, Delhi	2015

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REFERENCE BOOKS:

S.No	Author(s)	Title of the Book	Publisher	Year of Publication
1	Cpheeco Manual	Manual on Water supply and Treatment	Government of India, New Delhi	2016
2	Birdie.G	Water Supply and Sanitary Engineering	Dhanpat Rai and sons	2011
3	Syed R Qasim, Motley E M	Water Works Engineering – Planning, Design and Operation	Prentice- hall of India, New Delhi,	2013
4	Babbit. H. E., and Donald. J. J	Water Supply Engineering	McGraw Hill book Co	2012

WEB URLs

1. www.ircwash.org/sites/default/files/202.6-89ES-3959.pdf
2. www.sswm.info/content/water-distribution-pipes
3. www.who.int/water_sanitation_health/dwq/S12.pdf
4. www.sswm.info/print/2820?tid=1257
5. www.sswm.info/content/water-distribution-pipes

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Course Code & Course Name	:	21ADC26 - DATA AND INFORMATION SECURITY	L	T	P	C
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Course Objectives

1.	To understand the basics of Number Theory and Security
2.	To understand and analyze the principles of different encryption techniques
3.	To understand the security threats and attacks
4.	To understand and evaluate the need for the different security aspects in real time applications
5.	To learn the different applications of information security

Course Outcomes

1.	Understand the fundamentals of security and the significance of number theory in computer security
2.	Learn the public key cryptographic standards and authentication scheme
3.	Able to apply the security frameworks for real time applications
4.	Understand the security threats and attacks in IoT, Cloud.
5.	Able to develop appropriate security algorithms understanding the possible threats

Course Outcomes	Program Outcomes												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
21ADC26.CO1	x	-	-	x	x	-	x	-	x	-	-	-	x	-	-
21ADC26.CO2	x	-	-	-	-	x	-	x	x	x	-	-	x		-
21ADC26.CO3	x	x	x	-	-	x	-	x	x	x	-	-	-	x	-
21ADC26.CO4	x	x	x	x	x	-	-	-	x	x	x	x	-	x	x
21ADC26.CO5	x	x	x	x	x	-	x	-	x	x	x	x	-	x	x

Unit-I : FUNDAMENTALS OF SECURITY	9

Fundamental Security Design Principles – Attack Surfaces and Attack Trees. Computer Security Strategy– Number Theory: Prime Numbers and Factorization, Modular Arithmetic, GCD and Euclidean Algorithm, Chinese Remainder Theorem, Multiplication Modulo m and the Totient Function, Problems, Fermat and Euler Theorem. Primitive Roots and the Structure of F*p, Number in other Bases, Fast Computation of Powers in Z/mZ, Multiplicative Functions, Group Theory, Fields and Problems

Unit-II : ENCRYPTION TECHNIQUES AND KEY MANAGEMENT	9

Symmetric Encryption Principles – Data Encryption Standard – Advanced Encryption Standard –Stream Ciphers and RC4 - Cipher Block Modes Operation – Digital Signatures - Key Distributions - Public Key Cryptosystem: RSA, Elliptic Curve Cryptography - Key Exchange Algorithms: Diffie Hellmen and ELGamal Key Exchange

Unit-III : AUTHENTICATION, INTEGRITY AND ACCESS CONTROL	9

System Security: Firewall, Viruses, Worms, Ransomeware, Keylogger, Greyware, IDS, DDoS Network Security: SSL – TLs – HTTPS –IP Security; OS Security: Introduction to Operating System Security - System Security Planning - Operating Systems Hardening - ApplicationSecurity - Linux/Unix Security - Windows Security - Virtualization Security; Wireless Security: Risks and Threats of Wireless- Wireless LAN Security- Wireless Security Policy-Wireless Security Architectures-Wireless security Tools

Unit-IV : SECURITY	9

Genetic Algorithms-Hollands Observation-Fundamental Theorem of Genetic Algorithms-Markov Model for Convergence Analysis-Applications of Optimization problem, Intelligent Systems-Genetic Programming- Fuzzy Neural Nets-Cognitive Maps-Stability Analysis-Control Command by Cognitive Map-Visual perception- Case Study

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Unit-V : SECURITY APPLICATIONS			9
IOT security: Introduction- Architectures- Security challenges- Security requirements- Trust, Data confidentiality, and privacy in IOT- Security in future IOT systems; Cloud Security: Cloud Security Architecture- Security Management in the Cloud- Availability Management- SaaS Availability Management- PaaS Availability Management- IaaS Availability Management			
	Total	:	**45**

Text Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1	William Stallings	"Cryptography and Network Security Principles and Practice"	Pearson Education International, Fifth Edition	2011
2	William Stallings and Lawrie Brown	"Computer Security Principles and Practice"	Pearson Education International, Third Edition	2015

Reference Books:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1	Tim Mather, Subra Kumaraswamy and Shahed Latif	Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance	Oreilly	2009
2	Mikhail Gloukhovtsev	IoT Security: Challenges, Solutions & Future Prospects	Knowledge Sharing Article, Dell Inc	2018
3	Pradip KumarDas, Hrudaya Kumar Tripathy, Shafiz Affendi Mohd yusuf	Privacy and Security Issues in Big Data, An Analytical View on Business Intelligence	Springer	2021

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21PE-CEE05 **HEALTH MONITORINGOFSTRUCTURES** **L T P C**
3 0 0 3

COURSE OBJECTIVES

1. To Study about maintenance and repair ofstructure
2. To impart the quality and durability ofconcrete
3. To Study about special materials for repair ofstructures.
4. To learn about repair and demolitiontechnique.
5. To gain the knowledge about rehabilitation and strengthening ofstructures.

COURSE OUTCOMES

At the end of the course the student will able to,

1. Obtain the knowledge of maintenance and repair ofstructures.
2. Obtain the knowledge serviceability and durability ofconcrete
3. Select suitable material for repair.
4. Select appropriate techniques for repair anddemolition
5. Know about repair, rehabilitation and strengthening ofstructures.

UNIT I MAINTENANCE ANDREPAIRSTRATEGIES **9**

Maintenance, repair and rehabilitation - Facts of Maintenance - importance of Maintenance various aspects of Inspection-Assessment procedure for evaluating a damaged structure - causes of deterioration - Diagnosis of causesand preventivemeasures.

UNITII SERVICEABILITY AND DURABILITYOFCONCRETE **9**

Quality assurance for concrete construction concrete properties - strength, permeability, thermal properties and cracking - Effects due to climate, temperature, chemicals, corrosion - design and construction errors - Effects of cover thickness and cracking.

UNIT III SPECIAL MATERIALSFOR REPAIR **9**

Special concretes and mortar - concrete chemicals - special elements for accelerated strength gain - Expansive cement - polymer concrete - sulphur infiltrated concrete - ferro cement - Fibre reinforced concrete.

UNITIV TECHNIQUES FOR REPAIRANDDEMOLITION **9**

Rust eliminators and polymers coating for rebars during repair - foamed concrete - mortar and dry pack - vacuum concrete - Gunite and Shotcrete - Epoxy injection - Mortar repair for cracks - shoring and underpinning - Methods of corrosion protection - corrosion inhibitors - coating and cathodic protection - Engineered demolition techniques for Dilapildated structures - case studies.

UNIT V REPAIRS, REHABILITATION & STRENGTHENINGOFSTRUCTURES **9**

Repairs to overcome low member strength - Deflection, Cracking, Chemical disruption, weathering corrosion, wear, fire, leakage and marine exposure - Strengthening of Super Structures - plating - Conversion tocomposite constructionpost stressing - Jacketing - Reinforcement addition, strengthening the substructures - Increasing the load capacity of footing.

TOTAL : 45

TEXT BOOKS:

S.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Denison Campbell, Allen and Harold Roper	Concrete Structures, Materials, Maintenance and Repair	Longman Scientific and Technical UK	2006
2.	R.T.Allen and S.C.Edwards	Repair of Concrete structures	Blakie and Sons, UK	2007

REFERENCE BOCKS:

S.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Dr.B Vidivelli	Rehabilitation of Concrete Structures	Standard Publishers Distributors	2013
2.	M.S.Shetty	Concrete Technology -Theory and Practice	S.Chand and Company, New Delhi	2006
3.	M.L. Gambhir	Concrete Technology	Tata McGraw Hill Company, Noida	2011
4.	Santhakumar, A.R	Training Course notes on Damage Assessment and repairs in Low Cost Housing,"RHDC–NBO"	Anna University	1995
5.	Lakshmipathy, M	Lecture notes of Workshop on "Repairs and Rehabilitation of Structures"	-	1999

WEB URLs

1. www.youtube.com/watch?v=fikRPFpbgVo
2. www.brainkart.com/.../Important-Questions-and-Answers--Serviceability-and-Durabil...
3. www.iitk.ac.in/nicee/wcee/article/11_2089.PDF
4. www.brainkart.com/.../Important-Questions-and-Answers--Techniques-for-Repair-an...
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