

S.A.ENGINEERING COLLEGE, CHENNAI -600 077
(An Autonomous Institution, Affiliated to Anna University)

REGULATION 2020A

B.TECH INFORMATION TECHNOLOGY

CHOICE BASED CREDIT SYSTEM

VISION OF THE DEPARTMENT

The department vision is clearly defined and it is in line with the college's vision. The vision of the department is

- To transform our department into a quality hub, by providing technology updated education with ethical values.

MISSION OF THE DEPARTMENT

The mission of the Department is concise and supports the College's mission. The mission of the Department is,

- To develop our students, with comprehensive knowledge across the technological areas and to build their ability, to apply the technical theory, design and implementation for the given problems.

- To prepare our students, by facilitating an prominent environment for their learning and applications of Information Technology, which will enable them to work in teams and to become successful in their careers.

- To motivate Scientific Research among students, that will help them in establishing technological innovations and management for the society.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

- I. Demonstrate core competence in basic engineering and mathematics to design, formulate, analyze, and solve hardware/software engineering problems.
- II. Develop insights in foundational areas of Information Technology and related engineering to address real-world problems using digital and cognitive technologies.
- III. Collaborate with industry, academic and research institutions for state-of-the- art product development and research.
- IV. Inculcate a high degree of professionalism, effective communication skills and team spirit to work on multidisciplinary projects in diverse environments.

2. PROGRAMME OUTCOMES (POs):

After going through the four years of study, our Information Technology Graduates will exhibit ability to:

PO#	Graduate Attribute	Programme Outcome
1	Engineering knowledge	Apply knowledge of mathematics, basic science and engineering science.
2	Problem analysis	Identify, formulate and solve engineering problems.

3	Design/development of solutions	Design a system or process to improve its performance, satisfying its constraints.
4	Conduct investigations of complex problems	Conduct experiments & collect, analyze and interpret the data.
5	Modern tool usage	Apply various tools and techniques to improve the efficiency of the system.
6	The Engineer and society	Conduct themselves to uphold the professional and social obligations.
7	Environment and sustainability	Design the system with environment consciousness and sustainable development.
8	Ethics	Interact in industry, business and society in a professional and ethical manner.
9	Individual and team work	Function in a multidisciplinary team.
10	Communication	Proficiency in oral and written communication.
11	Project management and finance	Implement cost effective and improved system.
12	Life-long learning	Continue professional development and learning as a life-long activity.

3. PROGRAM SPECIFIC OUTCOMES (PSOs):

PSO1: Ability to apply programming principles and practices for the design of software solutions in an internet-enabled world of business and social activities.

PSO2: Ability to identify the resources to build and manage the IT infrastructure using the current technologies in order to solve real world problems with an understanding of the tradeoffs involved in the design choices.

4. PEO / PO Mapping:

PROGRAMME EDUCATIONAL OBJECTIVES	PROGRAMME OUTCOMES											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
I	✓	✓	✓	✓	✓							✓
II	✓	✓	✓	✓	✓							✓
III						✓	✓	✓	✓	✓	✓	✓
IV		✓				✓	✓	✓	✓	✓	✓	✓

SEMESTER I

Sl.No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	HS1101A	Technical English	HS	3	3	0	0	3
2	MA1101A	Calculus and its Applications	BS	4	3	1	0	4
3	PH1101A	Applied Physics	BS	3	3	0	0	3
4	CY1101A	Engineering Chemistry	BS	3	3	0	0	3
5	CS1101A	Problem Solving and Python Programming	ES	3	3	0	0	3
6	ME1101A	Engineering Graphics	ES	4	2	0	2	3
PRACTICAL								
7	BS1101A	Physics and Chemistry Laboratory	BS	4	0	0	4	2
8	CS1102A	Problem Solving and Python Programming Laboratory	ES	4	0	0	4	2
MANDATORY COURSE								
9	CI1101A	Indian Constitution	MC	2	2	0	0	0
10	FL0001A	French/Japanese	MC	2	2	0	0	0
TOTAL				32	21	1	10	23

SEMESTER II

Sl.No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	HS1201A	English for Communication	HS	3	3	0	0	3
2	MA1201A	Complex Variables and Transforms	BS	4	3	1	0	4
3	PH1201A	Materials Science	BS	3	3	0	0	3
4	EE1202A	Basic Electrical ,Electronics and Measurement Engineering	ES	3	3	0	0	3
5	CS1201A	Programming in C	PC	3	3	0	0	3
6	IT1201A	Information Technology Essentials	PC	3	3	0	0	3
PRACTICAL								
7	CS1203 A	Programming in C Laboratory	ES	4	0	0	4	2

8	GE1201A	Engineering Practices Laboratory	ES	4	0	0	4	2
9	IT 1202A	Information Technology Essentials Laboratory	PC	2	0	0	2	1
MANDATORY COURSE								
10	CY1201A	Environmental Science and Engineering	MC	2	2	0	0	0
TOTAL				31	20	1	10	24

SEMESTER III

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT HOURS	L	T	P	C
THEORY								
1.	MA1303A	Discrete Mathematics	HS	4	3	1	0	4
2.	IT1301A	Object Oriented Programming	PC	3	3	0	0	3
3.	CS1301A	Data Structures	PC	3	3	0	0	3
4.	EC1306A	Digital Principles and System Design	ES	3	3	0	0	3
5.	EC1307A	Analog and Digital Communication	ES	3	3	0	0	3
PRACTICALS								
6.	IT1302A	Object Oriented Programming Laboratory	PC	4	0	0	4	2
7.	CS1303A	Data Structures Laboratory	PC	4	0	0	4	2
8.	HS1301A	Interpersonal Skills Laboratory	EEC	2	0	0	2	1
TOTAL				26	15	1	10	21

SEMESTER IV

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT HOURS	L	T	P	C
THEORY								
1.	MA1403A	Probability and Statistics	BS	4	3	1	0	4

2.	CS1401A	Computer Architecture	PC	3	3	0	0	3
3.	IT1401A	Database Management Systems	PC	3	3	0	0	3
4.	CS1402A	Design and Analysis of Algorithms	PC	3	3	0	0	3
5.	EC1503A	Microprocessors and Microcontrollers	ES	3	3	0	0	3
6.	HV1401A	Universal Human Values	MC	2	2	1	0	3

PRACTICALS

7.	IT1402A	Database Management Systems Laboratory	PC	4	0	0	4	2
8.	CS1404A	Design and Analysis of Algorithms Laboratory	PC	4	0	0	4	2
9.	HS1401A	Employability and Soft Skills Laboratory	EEC	2	0	0	2	1
	TOTAL			28	17	2	10	24

SEMESTER V

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT HOURS	L	T	P	C
THEORY								
1.	MA1501A A	Algebra and Number Theory	BS	4	3	1	0	4
2.	IT1501A	Computer Networks	PC	3	3	0	0	3
3.	CS1501A	Operating Systems	PC	3	3	0	0	3
4.	CS1603A	Artificial Intelligence	PC	3	3	0	0	3
5.	IT1502A	Web Technology	PC	3	3	0	0	3
6.		Open Elective I	OE	3	3	0	0	3
PRACTICALS								
7.	IT1503A	Networks Laboratory	PC	4	0	0	4	2
8.	IT1504A	Web Technology Laboratory	PC	4	0	0	4	2
9.	CS1503A	Operating Systems Laboratory	PC	4	0	0	4	2
TOTAL				31	18	1	12	25

SEMESTER VI

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT HOURS	L	T	P	C
THEORY								
1.	CS1604A	Cryptography and Network Security	PC	3	3	0	0	3
2.	IT1601A	Mobile Communication	PC	3	3	0	0	3
3.	IT1602A	Big Data Analytics	PC	3	3	0	0	3
4.	CS1302A	Software Engineering	PC	3	3	0	0	3
5.		Professional Elective I	PE	3	3	0	0	3
PRACTICALS								
6.	IT1603A	Mobile Application and Development Laboratory	PC	4	0	0	4	2
7.	HS1601A	Professional Communication	PC	4	0	0	4	2
8.		Professional Readiness for Innovation, Employability and Entrepreneurship	EEC	3	0	0	3	3
9.		NPTel Course	EEC	2	0	0	2	1
TOTAL				27	15	0	12	23

SEMESTER VII

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT HOURS	L	T	P	C
THEORY								
1.	MG1701A	Principles of Management	HS	3	3	0	0	3
2.	IT1701A	Distributed Systems and Cloud Computing	PC	3	3	0	0	3
3.		Machine Learning	PC	3	3	0	0	3
4.		Open Elective II	OE	3	3	0	0	3
5.		Professional Elective II	PE	3	3	0	0	3
PRACTICALS								

6.	CS1605A	Artificial Intelligence & Machine Learning Laboratory	PC	4	0	0	4	2
	IT1605A	Distributed Systems and Cloud Computing Laboratory						
7.	-	Project phase - I	EEC	2	0	0	2	1
TOTAL				21	15	0	6	18

SEMESTER VIII

S.NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT HOURS	L	T	P	C
THEORY								
1.		Professional Elective III	PE	3	3	0	0	3
2.		Professional Elective IV	PE	3	3	0	0	3
PRACTICALS								
3.	IT1815A	Project Work	EEC	20	0	0	20	10
TOTAL				26	6	0	20	16

SUMMARY OF CREDITS-REGULATUON 2020

S.NO	SUBJECT AREA	CREDITS AS PER SEMESTER								CREDITS TOTAL	Percentage
		I	II	III	IV	V	VI	VII	VIII		
1.	HS	3	3	1	1			3		11	6.43%
2.	BS	12	7	4	4	4				31	18.12%
3.	ES	8	7	6	3					24	14.03%
4.	PC		7	10	13	18	16	8		72	42.1%
5.	PE						3	3	6	12	7.01%
6.	OE					3		3		6	3.5%
7.	EEC						1	1	10	12	7.01%
8.	Non Credit/ Mandatory	*	*		3					3	1.75%
	Total	23	24	21	21	25	21	18	16	171	

PROFESSIONAL ELECTIVE – I SEMESTER-VI

Sl. No	COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	C
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1.	IT1606A	Software Testing	PE	3	0	0	3
2.	IT1607A	Information Storage and Management	PE	3	0	0	3
3.	IT1608A	Intellectual Property Rights	PE	3	0	0	3
4.	IT1609A	Web Development Frameworks	PE	3	0	0	3
5.	IT1610A	Virtualization Techniques	PE	3	0	0	3
6.	IT1611A	Agile Methodologies	PE	3	0	0	3
7.	IT1612A	Internet of Things	PE	3	0	0	3

PROFESSIONAL ELECTIVE – II
SEMESTER-VII

Sl. No	COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	C
1.	IT1705A	Human Computer Interaction	PE	3	0	0	3
2.	IT1706A	C# and .Net Programming	PE	3	0	0	3
3.	IT1707A	Wireless Adhoc and Sensor Networks	PE	3	0	0	3
4.	IT1708A	Quantum Computation	PE	3	0	0	3
5.	IT1709A	Advanced Database	PE	3	0	0	3
6.	IT1710A	Human Rights	PE	3	0	0	3
7.	IT1711A	Software Defined Networking	PE	3	0	0	3

PROFESSIONAL ELECTIVE – III
SEMESTER-VIII

Sl. No	COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	C
1.	IT1801A	Social Network Analysis	PE	3	0	0	3
2.	IT1802A	Service Oriented Architecture	PE	3	0	0	3
3.	IT1803A	Cyber Forensics	PE	3	0	0	3
4.	IT1804A	Information Security	PE	3	0	0	3
5.	IT1805A	Software Project Management	PE	3	0	0	3
6.	IT1806A	Network Management	PE	3	0	0	3
7.	IT1807A	Professional Ethics in Engineering	PE	3	0	0	3

PROFESSIONAL ELECTIVE – IV
SEMESTER-VIII

Sl. No	COURSE CODE	COURSE TITLE	CATE GORY	L	T	P	C
1.	IT1808A	Information Retrieval Techniques	PE	3	0	0	3
2.	IT1809A	Green Computing	PE	3	0	0	3
3.	IT1810A	Natural Language Processing	PE	3	0	0	3
4.	IT1811A	Speech Processing	PE	3	0	0	3
5.	IT1812A	Web Design and Management	PE	3	0	0	3
6.	IT1813A	Electronic Commerce	PE	3	0	0	3
7.	IT1814A	Fundamentals of Nano Science	PE	3	0	0	3

OPEN ELECTIVES OFFERED TO OTHER DEPARTMENT

OPEN ELECTIVE -I

SEMESTER V

S.No	Subject Code	Course Title	OFFERING DEPT	Contact Periods	L	T	P	C
1.	OIT501A	Database Management Systems	IT	3	3	0	0	3
2.	OIT502A	Cloud Computing	IT	3	3	0	0	3
3.	OIT503A	Artificial Intelligence	IT	3	3	0	0	3

OPEN ELECTIVES OFFERED BY OTHER DEPARTMENT

OPEN ELECTIVE -I

SEMESTER V

S.No	Subject Code	Course Title	OFFERING DEPT	Contact Periods	L	T	P	C
1.	OCS501A	Software Engineering	CSE	3	3	0	0	3
2.	OCS502A	Data Structures and Algorithms	CSE	3	3	0	0	3
3.	OCS503A	Telehealth Technology	CSE	3	3	0	0	3
4.	OEE501A	Basics of Bio medical Instrumentation	EEE	3	3	0	0	3
5.	OEE502A	Sensors and Transducers	EEE	3	3	0	0	3
6.	OEC501A	5G Communications	ECE	3	3	0	0	3
7.	OEC502A	Internet of things	ECE	3	3	0	0	3
8.	OEC503A	Information Security	ECE	3	3	0	0	3
9.	OME501	Internal Combustion Engines	MECH	3	3	0	0	3
10.	OME502A	Robotics	MECH	3	3	0	0	3
11.	OCE501A	Geographical Information System	CIVIL	3	3	0	0	3

12.	OCE502A	Remote Sensing and GIS Techniques	CIVIL	3	3	0	0	3
13.	OCE503A	Air and Noise Pollution	CIVIL	3	3	0	0	3
14.	OCE504A	Pollution Control and Monitoring	CIVIL	3	3	0	0	3
15.	OCE505A	Environmental and Social Impact Assessment	CIVIL	3	3	0	0	3
16.	OHS501A	Material Science	PHYSICS	3	3	0	0	3
17.	OHS502A	Fundamentals of Nano Science	PHYSICS	3	3	0	0	3
18.	OHS503A	Advanced Engineering Chemistry	CHEMISTRY	3	3	0	0	3
19.	OHS504A	Environment and Agriculture	CHEMISTRY	3	3	0	0	3

HS1101A

TECHNICAL ENGLISH

L T P C

3 0 0 3

Programme: B.E./B.Tech. (Common to all Branches)

Category: HS

Prerequisites: Basic Language Proficiency.

Objective:

- Develop strategies and skills to enhance their ability to read and comprehend engineering and technology texts.
- Nurture their ability in technical writing like to prepare professional job applications and effective reports.
- Develop their speaking skills by participating in various speaking activities.
- Strengthen their listening skill to comprehend lectures and talks in their areas of specialization.
- Improve their ability to explicit their excellence in all modes of technical communication

Course Outcomes:

The Students will be able to

CO1: Read technical texts and write area- specific texts effortlessly.

CO2: Listen and comprehend lectures and talks in their area of specialization successfully.

CO3: Speak appropriately and effectively in varied formal and informal contexts.

CO4: Write correctly, clearly and concisely with coherence and cohesion.

CO5: Prepare job applications and resume in an inspiring manner.

UNIT 1

9

Reading- Reading short texts **Listening-** Listening to different formal / informal conversations

Writing- Instructions, Jumbled sentences **Speaking-** Self introduction **Language development-**

Parts of speech, Prepositions **Vocabulary development-** Word formation- root words from foreign language and their use in English

UNIT 2 **9**
Reading-Skimming and Scanning to find specific information **Listening**- Listening to INK talks
Writing- Job Application – cover letter, resume writing **Speaking**- Asking and Giving directions
Language development- Conjunctions, Types of Nouns **Vocabulary development**- Prefixes and Suffixes

UNIT 3 **9**

Reading- Reading for predicting the content **Listening**- Listening to situational short tal
Writing- Types of paragraphs- Descriptive/Analytical/ compare and contrast **Speaking**-
presentations, Expressing greeting and thanks **Language development**- Adjectives, Num
Adjectives, Conditional Clauses **Vocabulary development**- Homophones, Homonyms

UNIT 4 **9**

Reading- Practice in speed reading **Listening**- Listening to short texts and fill the data **Writing**-
Interpretation of Graphics / Information, Note making **Speaking**-Contributing for Group Discussion
Language development- Active, Passive, Impersonal passive voice **Vocabulary development**-
Definitions, Nominal Compounds

UNIT 5 **9**

Reading- Reading short stories **Listening**- Listening for note taking **Writing**- Report writing, E-mail
Writing **Speaking**- Picture descriptions, Speaking in familiar situations **Language development**-
Tenses **Vocabulary development**- British and American Vocabulary

Total Periods: 45

Text Books

- Richards, C. Jack. Interchange Students' Book-2 New Delhi: CUP, 2015.
- Board of editors. Fluency in English A Course book for Engineering and Technology.Orient Blackswan, Hyderabad: 2016

Extensive Reading

- Khera, Shiv. You can Win, Macmillan, 2000

Reference

- Bailey, Stephen. Academic Writing: A practical guide for students. New York:Rutledge,2011.
- Comfort, Jeremy, et al. Speaking Effectively : Developing Speaking Skills for Business English. Cambridge University Press, Cambridge: Reprint 2011
- [Darlene Smith-Worthington](#), [Sue Jefferson](#), Technical writing for Success, South-Western Cengage Learning,USA-2011

- Means, L. Thomas and Elaine Langlois, English & Communication For Colleges. Cengage Learning, USA: 2007
- Raman, Meenakshi and Sharma, Sangeetha- Technical Communication Principles and Practice.Oxford University Press: New Delhi, 2014

Recommended Websites

MA1101A

CALCULUS AND ITS APPLICATIONS

L T P C

3 1 0 4

OBJECTIVES:

- To understand the concepts of limits, continuity, differentiation and use it to find maxima and minima of functions of one variable.
- To make the student acquire sound knowledge of techniques in solving ordinary differential equations of first and second order that model in various engineering problems.
- To familiarize the student with functions of several variables that is needed in many branches of engineering.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.

UNIT I- DIFFERENTIAL CALCULUS

Representation of functions – Limit of a function – Continuity – Derivatives – Differentiation rules – Maxima and Minima of functions of one variable.

UNIT II -ORDINARY DIFFERENTIAL EQUATIONS OF FIRST ORDER WITH APPLICATIONS:

Basic concepts- Separable differential equations - Exact differential equations - Integrating factors - Linear differential equations - Bernoulli's equation - Geometric Applications- Orthogonal trajectories - Physical Applications - Simple electronic circuits-Newton law of cooling-Heat flow-Rate of decay of radioactive materials-Chemical reaction and solutions.

UNIT III - DIFFERENTIAL EQUATIONS

Higher order linear differential equations with constant coefficients - Method of variation of parameters – Homogenous equation of Euler's and Legendre's type – System of simultaneous linear differential equations with constant coefficients - Method of undetermined coefficients.

UNIT IV- FUNCTIONS OF SEVERAL VARIABLES

Partial differentiation – Homogeneous functions and Euler's theorem – Total derivative – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables – Maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers.

UNIT V- MULTIPLE INTEGRALS

Double integrals – Change of order of integration – Double integrals in polar co-ordinates – Area enclosed by plane curves – Triple integrals – Volume of solids – Change of variables in double and triple integrals.

COURSE OUTCOMES:

After completing this course, students should demonstrate competency in the following skills:

- Use both the limit definition and rules of differentiation to differentiate functions.
- apply differentiation to solve maxima and minima problems.
- The subject helps the students to develop the fundamentals and basic concepts in ODE
- Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.

TEXTBOOKS:

1. Grewal, B.S., Higher Engineering Mathematics, 43rd Edition, Khanna Publishers, 2016.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons, Inc., 2016.

REFERENCE BOOKS:

1. Bali, N.P., Goyal, M., Watkins, C., Advanced Engineering Mathematics, Laxmi Publications Pvt. Limited, 2007.
2. Boyce, W.E., and DiPrima, R.C., Elementary Differential Equations and Boundary Value Problems, Wiley India, 2012.
3. O'Neil, P. V., "Advanced Engineering Mathematics", 7th Edition, Cengage Learning India Pvt., Ltd, New Delhi, 2011.
4. T. Veerarajan, Engineering Mathematics, Mc Grawhill Publications, New Delhi 2017.

Sub Code: PH1101A

APPLIED PHYSICS
(Common to all B.E / B.TECH Branches)

L T P C
3 0 0 3

OBJECTIVES:

To enhance the fundamental knowledge in Physics and its applications relevant to various streams of Engineering and Technology.

UNIT 1 PROPERTIES OF MATTER 9

Elasticity- plasticity – Different Types of Stress and Strain- concept of stress-strain diagram and its application - three types of modulus of elasticity- Poisson's Ratio – Bending of beams- Expression for bending moment – young's modulus uniform and Non uniform bending : Theory and Experiment – I Shape girders – Torsional oscillation Theory and Experiment- Application of Elastic Materials.

UNIT 2 APPLIED OPTICS 9

Laser : characteristics of laser - Principle of spontaneous emission and stimulated emission – Laser action – Einstein A & B coefficients - Population inversion - Pumping – Basic requirement of laser – Types of laser : Nd-YAG and CO₂ – Applications : Welding , Drilling & Cutting – Medical field

Fiber optics: Introduction- Principle and propagation of light – Numerical aperture and acceptance angle – classification of optical fibers – Losses in optical fibers (Qualitative) – Fiber optics communication system (Block Diagram) – Advantages with fiber optic communication system.

UNIT-3 THERMAL PHYSICS 9

Modes of heat transfer- thermal conduction, convection and radiation – Specific heat capacity- thermal conductivity- - Searle's and Lee's disc methods: theory and experiment- **Newton's law of cooling** - conduction through compound media (series and parallel) – thermal expansion of solids, liquids and gases - Applications: heat exchangers, refrigerators and solar water heaters.

UNIT-4 WAVE AND PARTICLE PHYSICS

9

Inadequacy of Classical Mechanics - Development of quantum theory- Planck's Black body radiation and Distribution Laws(Qualitative) – Compton Effect (Derivation) - **de - Broglie** wavelength – properties of matter waves – Experimental Verification (G.P Thomson experiment) – Heisenberg's uncertainty principle - Schrodinger's wave equation – time dependent – time independent wave equations – physical significance of Wave function – applications: particle in a one dimensional potential box.

UNIT-5 CRYSTALLOGRAPHY

9

Single crystalline, polycrystalline and amorphous materials Lattice - unit cell- Crystal systems- Bravais lattices- Lattice planes- Miller indices- Interplanar- d- Spacing in cubic Lattice- calculation of number of atoms per unit cell – atomic radius – packing factor for SC, BCC, FCC and HCP structures- **Crystal Defects – types.**

Total Periods : 45

OUTCOMES:

At the end of this course,

1. The students will gain knowledge on the basics of properties of matter and its applications
2. Use the concepts of waves and optical devices and their applications in Laser and fiber optics
3. The students will understand the properties of thermal materials and its applications
4. The students will get knowledge on advanced physics concepts of quantum theory and its application in one dimensional box.
5. The students will understand the different types of crystals structures and different crystal growth techniques.

TEXT BOOKS :

1. Gupta S.L. and Sanjeev Gupta, Modern Engineering Physics , Dhanpat Rai Publishers, 2015.
2. R. K. Gaur and S.C. Gupta, Engineering Physics, Dhanpat Rai Publication (P) Ltd, New Delhi, 2014.
3. Bhattacharya, D.K. and Poonam, T. Engineering Physics, Oxford University Press, 2015.

REFERENCES :

1. C. Kittel ,Introduction to Solid State Physics 8th Edition , Wiley Eastern Ltd,2004.
2. Halliday, D., Resnick, R. and Walker, J. Principles of Physics. Wiley, 2015.
3. Tipler, P.A. and Mosca, G. Physics for Scientists and Engineers with Modern Physics, W.H.Freeman, 2007.
4. Einstein coefficient calculation, Prof.Manabendra-chandra-IIT <https://youtu.be/TvfiZHXUtXg>
5. Lattice structures, Mark McClure-University of North Carolina <https://youtu.be/Rm-i1c7zr6Q>

COURSE OBJECTIVES:

- To make the students conversant with boiler feed water requirements, related problems and water treatment techniques.
- To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys.
- It enables the students to gain information about Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells
- It deals with the information about the types of fuels, calorific value calculations and manufacture of solid, liquid and gaseous fuels.
- To impart knowledge about the nanomaterials synthesis, properties and applications

UNIT I WATER TREATMENT AND TECHNOLOGY

9

Introduction – characteristics, Water quality parameters -hardness– types, Determination-EDTA method, Alkalinity ,boiler feed water requirements-boiler troubles – scale & sludge - Caustic Embrittlement , boiler explosion -softening of hard water - external treatment process - demineralization and zeolite, internal treatment - boiler compounds (phosphate, calgon, carbonate and colloidal conditioning methods) – desalination of brackish water –reverse osmosis.

UNIT II PHASE RULE AND ALLOYS

9

Phase rule: Introduction, definition of terms with examples, One Component System- water system,Sulphur,CO₂ system, Thermal Analysis and cooling curves, Reduced phase rule - Two Component Systems- classification – lead-silver system-problems. Alloys: Introduction- Definition- Properties of alloys- Significance of alloying,Functions and effect of alloying elements- Ferrous alloys- Nichrome and Stainless steel – heat treatment of steel.

UNIT III ENERGY SOURCES AND STORAGE DEVICES

9

Energy – Types – Non-renewable energy - Nuclear energy -renewable energy - solar energy conversion - solar cells. Introduction to Electrochemistry, Nernst Equation-Electrochemical cells – reversible and irreversible cells –Cell construction and representation - Batteries -types of batteries – characteristics – construction and working of primary battery (dry cell) - secondary battery (lithium-ion-battery) - fuel cells (H₂-O₂).

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- manufacture of metallurgical coke (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)- producer gas- water gas. Power alcohol and bio diesel. Combustion of fuels: introduction- theoretical calculation of calorific value- ignition temperature- explosive range – flue gas analysis (ORSAT Method).

UNIT V NANOCHEMISTRY

9

Basics - distinction between nanoparticles and bulk materials; size-dependent properties, nano cluster, nano rod, nanotube(CNT)-Types of CNT and nanowire. Synthesis: precipitation, thermolysis, chemical vapour deposition, Properties, Characterisation and applications.

COURSE OUTCOMES:

- The knowledge gained on water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.
- With the help of phase rule, they could understand the various phase diagrams and able to predict the low melting alloys.

- Students can get knowledge about various fuels and its applications based on its calorific value.
- It provides the students to understand about conventional and non-conventional energy sources and its applications
- Students gain an insight about the recent trends in nano materials.

TEXT BOOKS

Jain P.C. and Monica Jain, “Engineering Chemistry”, Dhanpat Rai Publishing Company (P) Ltd., New Delhi, 2010

REFERENCES

1. Dara S.S, Umare S.S, “Engineering Chemistry”, S. Chand & Company Ltd., New Delhi 2010
2. Sivasankar B., “Engineering Chemistry”, Tata McGraw-Hill Publishing Company, Ltd., New Delhi, 2008.
3. Ozin G. A. and Arsenault A. C., “Nanochemistry: A Chemical Approach to Nanomaterials”, RSC Publishing, 2005.

CS1101A PROBLEM SOLVING AND PYTHON PROGRAMMING

L T P C

3 0 0 3

OBJECTIVES:

- To know the basics of algorithmic problem solving
- To read and write simple Python programs.
- To develop Python programs with conditionals and loops.
- To define Python functions and call them.
- To use Python data structures — lists, tuples, dictionaries.
- To do input/output with files in Python.

UNIT I ALGORITHMIC PROBLEM SOLVING

9

Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: find minimum in a list, insert a card in a list of sorted cards, guess an integer number in a range, Towers of Hanoi.

UNIT II DATA, EXPRESSIONS, STATEMENTS

9

Python interpreter and interactive mode; values and types: int, float, boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; modules and functions, function definition and use, flow of execution, parameters and arguments; Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points.

UNIT III CONTROL FLOW, FUNCTIONS

9

Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; 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. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search.

UNIT IV 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; Illustrative programs: selection sort, insertion sort, mergesort, histogram.

UNIT V FILES, MODULES, PACKAGES & TURTLE

9

Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages; Illustrative programs: word count, copy file- **Case study: Simple Graphics**

using Turtle: Draw a Random Pattern of Circle, Square and Rectangle; Draw a Pattern of Straight Lines, **Plotting Graphs in Python:** Menu Driven Program to Create Mathematical 3D Objects.

TOTAL PERIODS: 45

OUTCOMES:

Upon completion of the course, students will be able to

- Develop algorithmic solutions to simple computational problems
- Read, write, execute by hand simple Python programs.
- Structure simple Python programs for solving problems.
- Decompose a Python program into functions.
- Represent compound data using Python lists, tuples, dictionaries.
- Read and write data from/to files in Python Programs.

TEXT BOOKS:

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016 (<http://greenteapress.com/wp/thinkpython/>)
2. Reema Thareja, Problem Solving and Programming with python, 2nd edition, Oxford University press, 2019.
3. Guido van Rossum and Fred L. Drake Jr, "An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

REFERENCES:

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", Revised and expanded Edition, 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", Second edition, Pragmatic Programmers,LLC,2013.
5. Robert Sedgewick, Kevin Wayne, Robert Dondero, "Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.
6. Timothy A. Budd, "Exploring Python", Mc-Graw Hill Education (India) Private Ltd.,, 2015.

ME1101A

ENGINEERING GRAPHICS L T P C

2 0 2 3

OBJECTIVES:

- To develop in students, graphic skills for communication of concepts, ideas and design of engineering products.
- To expose them to existing national standards related to technical drawings.

CONCEPTS AND CONVENTIONS (Not for Examination)

1

Importance of graphics in engineering applications –Use of drafting instruments – BIS conventions and specifications – Size and layout of drawing sheets – Lettering and dimensioning.

UNIT I

PLANE CURVES AND ORTHOGRAPHIC PROJECTIONS

6+6

Basic Geometrical constructions, 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. Visualization principles – Layout of views- Orthographic projection of multiple views(Free Hand Sketching) from pictorial views of objects-Principal planes-Projection of points-Demo using CAD software for above topics.

UNITII PROJECTION OF POINTS STRAIGHT LINES AND PLANE SURFACES 6+6

Orthographic projections-principles-Principal planes-First angle projection-Projection of points- Projection of straight lines (only First angle projections) inclined to one of the principal planes - Determination of true lengths and true inclinations - Projection of planes (polygonal and circular surfaces) inclined to one of the principal planes - Demo using CAD software for above topics.

UNITIII PROJECTION OF SOLIDS 6+6

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one of the principal planes by rotating object method-Demo using CAD software for above topics.

UNITIV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES 6+6

Sectioning of above solids in simple vertical position - the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones-Demo using CAD software for above topics.

UNITV ISOMETRIC AND PERSPECTIVE PROJECTIONS 6+6

Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions –Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method-Demo using CAD software for above topics.

TOTAL: 61 PERIODS

OUTCOMES:

On successful completion of this course, the student will be able to

- familiarize with the fundamentals and standards of Engineering graphics
- perform freehand sketching of basic geometrical constructions and multiple views of objects.
- project orthographic projections of lines and plane surfaces.
- draw projections and solids and development of surfaces.
- visualize and to project isometric and perspective sections of simple solids.

TEXT BOOK:

1. Natrajan K.V., “A text book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2009.
2. Venugopal K. and Prabhu Raja V., “Engineering Graphics”, New Age International (P) Limited, 2008.

REFERENCES:

1. Bhatt N.D. and Panchal V.M., “Engineering Drawing”, Charotar Publishing House, 50th Edition, 2010.
2. Basant Agarwal and Agarwal C.M., “Engineering Drawing”, Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
3. Gopalakrishna K.R., “Engineering Drawing” (Vol. I&II combined), Subhas Stores, Bangalore, 2007.
4. 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.
5. N S Parthasarathy and Vela Murali, “Engineering Graphics”, Oxford University, Press, New Delhi, 2015.
6. Shah M.B., and Rana B.C., “Engineering Drawing”, Pearson, 2nd Edition, 2009.

Publication of Bureau of Indian Standards:

1. IS 10711 – 2001: Technical products Documentation – Size and lay out of drawing sheets.
2. IS 9609 (Parts 0 & 1) – 2001: Technical products Documentation –Lettering.
3. IS 10714 (Part 20) – 2001 & SP 46 – 2003: Lines for technical drawings.

4. IS 11669 – 1986 & SP 46 – 2003: Dimensioning of Technical Drawings.
5. IS 15021 (Parts 1 to 4) – 2001: Technical drawings – Projection Methods.

Special points applicable to University Examinations on Engineering Graphics:

1. There will be five questions, each of either-or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size.
4. The examination will be conducted in appropriate sessions on the same day

BS1101A	PHYSICS AND CHEMISTRY LABORATORY	L	T	P	C
		0	0	4	2

OBJECTIVES:

To introduce different experiments to test basic understanding of physics concepts applied in optics, thermal physics, properties of matter and liquids.

LIST OF EXPERIMENTS: PHYSICS LABORATORY (Any 5 Experiments)

1. Determination of rigidity modulus – Torsion pendulum
2. Determination of unknown resistance using Carey- Foster's bridge
3. (a) Determination of wavelength, and particle size using Laser
- (b) Determination of acceptance angle in an optical fiber.
4. Determination of thermal conductivity of a bad conductor – Lee's Disc method.
5. Determination of velocity of sound and compressibility of liquid – Ultrasonic interferometer
6. Determination of wavelength of mercury spectrum – spectrometer grating
7. Determination of band gap of a semiconductor
8. Determination of thickness of a thin wire – Air wedge method

TOTAL: 30 PERIODS

OUTCOMES:

Upon completion of the course, the students will be able to apply principles of elasticity, optics and thermal properties for engineering applications.

CHEMISTRY LABORATORY

OBJECTIVES:

To make the student to acquire practical skills in the determination of water quality parameters through volumetric and instrumental analysis.

LIST OF EXPERIMENTS (Any seven experiments to be conducted) Estimation of HCl using Na_2CO_3 as primary standard and Determination of alkalinity in water sample.

1. Determination of total, temporary & permanent hardness of water by EDTA method.
2. Determination of DO content of water sample by Winkler's method.
3. Determination of TDS of water sample.
4. Determination of strength of acids in a mixture of acids using conductivity meter.
5. Estimation of iron content of the given solution using potentiometer.
6. Estimation of iron content of the water sample using spectrophotometer (1, 10-Phenanthroline / thiocyanate method).
7. Determination of molecular weight of polyvinyl alcohol using Ostwald viscometer.
8. Conductometric titration of strong acid vs strong base.

OUTCOMES:

The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.

CS1102A PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY **L T P C**

0 0 4 2

Objectives:

- To study python programs with conditionals and loops
- To use functions for python structured programs.
- Use strings for structuring Python programs.
- Represent compound data using Python lists, tuples, dictionaries.
- To read and write data from and to files in python.

LIST OF EXPERIMENTS:

1. Write a program to display the largest number among three numbers.
2. Write a program to display the Fibonacci series by using looping constructs.
3. Write a function to compute the GCD of two numbers.
4. Explore String Functions
5. With the help of strings, array or list, display a simple calendar in python program without using the calendar module.
6. With the help of list perform Linear search and Binary search.
7. Write a program to perform Selection sort, Insertion sort, Merge sort
8. Create a text file using python file I/O. Read the content of the file and change them from lower to upper case characters.
9. Programs that take command line arguments (word count)
10. Find the most frequent words in a text read from a file
11. Simulate bouncing ball using Pygame

TOTAL PERIODS: 60

Course Outcomes:

- Design simple programs using conditionals and loops.
- Write functions to solve mathematical problems
- Use strings for structuring Python programs.
- Represent compound data using Python lists, tuples, dictionaries.
- Identify to read and write data from and to files in python.

Prerequisites: Basic law.

The Constitution of India is the supreme law of India. Parliament of India cannot make any law which violates the Fundamental Rights enumerated under the Part III of the Constitution. The Parliament of India has been empowered to amend the Constitution under Article 368, however, it cannot use this power to change the “basic structure” of the constitution, which has been ruled and explained by the Supreme Court of India in its historical judgments. The Constitution of India reflects the idea of “Constitutionalism” – a modern and progressive concept historically developed by the thinkers of “liberalism” – an ideology which has been recognized as one of the most popular political ideology and result of historical struggles against arbitrary use of sovereign power by state. The historic revolutions in France, England, America and particularly European Renaissance and Reformation movement have resulted into progressive legal reforms in the form of “constitutionalism” in many countries. The Constitution of India was made by borrowing models and principles from many countries including United Kingdom and America.

The Constitution of India is not only a legal document but it also reflects social, political and economic perspectives of the Indian Society. It reflects India’s legacy of “diversity”. It has been said that Indian constitution reflects ideals of its freedom movement; however, few critics have argued that it does not truly incorporate our own ancient legal heritage and cultural values. No law can be “static” and therefore the Constitution of India has also been amended more than one hundred times. These amendments reflect political, social and economic developments since the year 1950. The Indian judiciary and particularly the Supreme Court of India has played an historic role as the guardian of people. It has been protecting not only basic ideals of the Constitution but also strengthened the same through progressive interpretations of the text of the Constitution. The judicial activism of the Supreme Court of India and its historic contributions has been recognized throughout the world and it gradually made it “as one of the strongest court in the world”.

Course content

1. Meaning of the constitution law and constitutionalism
2. Historical perspective of the Constitution of India
3. Salient features and characteristics of the Constitution of India
4. Scheme of the fundamental rights
5. The scheme of the Fundamental Duties and its legal status
6. The Directive Principles of State Policy – Its importance and implementation
7. Federal structure and distribution of legislative and financial powers between the Union and the States
8. Parliamentary Form of Government in India – The constitution powers and status of the President of India
9. Amendment of the Constitutional Powers and Procedure
10. The historical perspectives of the constitutional amendments in India
11. Emergency Provisions: National Emergency, President Rule, Financial Emergency
12. Local Self Government – Constitutional Scheme in India
13. Scheme of the Fundamental Right to Equality
14. Scheme of the Fundamental Right to certain Freedom under Article 19
15. Scope of the Right to Life and Personal Liberty under Article 21

OBJECTIVES:

The Course enables the second semester Engineering and Technology students to:

- Improve their language ability to improve the four basic skills of communication (LSRW).
- Enhance the skills and methods to enrich their reading and comprehending ability.
- Strengthen their skills to listen to the lectures and talks related to their fields of studies.
- Foster their ability to write effectively in all contexts.
- Cultivate their oral presentation skills through technical presentations and contribution in group discussions.

Course Outcomes:

At the end of the course the students will be able to:

- CO1:** Read for comprehending and responding in general and professional settings.
- CO2:** Demonstrate the communication skills (LSRW) in academic, professional and social Environment.
- CO3:** Participate effectively in formal and informal conversations and express findings and opinions with proper language ability.
- CO4:** Comprehend conversations and short talks delivered in English.
- CO5:** Use the language effectively to write with clarity and accuracy in general and technical contexts.

UNIT – 1

9

Reading- Reading for detailed comparison **Listening-** Listening to interviews **Writing-** Developing hints, summarizing **Speaking-** Talk about future plans, arrangements intentions **Language development-** Sentence structures **Vocabulary development-** Synonyms, Antonyms, Adverbs

UNIT – 2

9

Reading- Extended reading **Listening-** Listening to telephonic conversations **Writing-** Formal Letter Writing - Letters for bona fide certificate - to the principal for permission for in plant training, industrial visit, paper presentations, inter college events, Letter to the Editor, Recommendations **Speaking-** Formal conversation **Language development-** Use of Punctuation, Modal verbs **Vocabulary development-** One word substitutes, Common Phrasal verbs

UNIT – 3

9

Reading- Identify topic sentences by reading a short story **Listening-** Listening to TED talks **Writing-** Process/product description **Speaking-** Formal Conversations **Language development-** Relative Clauses, Concord, Error correction **Vocabulary development-** Idioms & Phrases, Minimal pairs

UNIT – 4

9

Reading- Reading newspaper articles **Listening-** Listening to inspirational speeches **Writing-** Essays, Checklist **Speaking-** Technical Presentations **Language development-** Degrees of Comparison **Vocabulary development-** Articles, Cause and Effect Expressions

UNIT – 5

9

Reading- Close reading **Listening-** Listening for summarizing **Writing-** Dialogue conversations **Speaking-** Movie/ Book Review **Language development-** Wh Questions, Yes/ no Questions **Vocabulary development-** Foreign Expressions and its applications, Reference words

Total Periods: 45

Extensive Reading:

- Kalam, Abdul Dr.A.P.J. - The Wings of Fire, Universities press: 1999

Reference:

- Booth-L. Diana, Project Work, Oxford University Press, Oxford: 2014
- Grussendorf, Marion, English for Presentations, Oxford University Press, Oxford: 2007
- Kumar, Suresh. E. Engineering English. Orient Blackswan: Hyderabad, 2015
- Dutt P. Kiranmai and Rajeevan Geeta. Basic Communication Skills, Foundation Books: 2013
- Means, L. Thomas and Elaine Langlois. English & Communication For Colleges. Cengage Learning, USA: 2007.

Recommended websites:

- TED.com
- learningenglish.voanews.com
- islcollective.com
- examenglish.com
- englishclass101.com

MA1201A COMPLEX VARIABLES AND TRANSFORMS**L T P C****3 1 0 4****OBJECTIVES**

- Understand the concept of Divergence and curl and use it in evaluating Line, Surface and Volume integrals.
- Understand C-R equations and use it in the construction of Analytic Functions.
- Understand the methods of Complex Integration using Cauchy's Integral Formula and Cauchy Residue theorem, finding Taylor's and Laurent's Series expansions.
- Find the Laplace Transforms of standard Functions and to find the Inverse Laplace Transform of a function and use it in solving Differential Equations.
- To introduce the effective mathematical tools for the solutions of partial differential equations that model several physical processes and to develop Z transform techniques for discrete time systems

UNIT I**VECTOR CALCULUS****9**

Gradient and directional derivative – Divergence and curl – Vector identities – Irrotational and Solenoidal vector fields – Line integral over a plane curve – Surface integral – Area of a curved surface – Volume integral – Green's, Gauss divergence and Stoke's theorems – Verification and application in evaluating line, surface and volume integrals-simple applications involving cubes and rectangular parallelepipeds.

UNIT II**ANALYTIC FUNCTIONS****9**

Analytic functions – Necessary and sufficient conditions for analyticity in Cartesian and polar coordinates – Properties – Harmonic conjugates – Construction of analytic function – Conformal mapping – Mapping by functions ($w = 1/z$, $w = z^2$, $w = e^z$, $w = \sinh z$, $w = \cosh z$) – Bilinear transformation.

UNIT III**COMPLEX INTEGRATION****9**

Line integral – Cauchy's integral theorem – Cauchy's integral formula – Taylor's and Laurent's series – Singularities – Residues – Residue theorem – Application of residue theorem for evaluation of real integrals – Use of circular contour and semicircular contour.

UNIT IV**LAPLACE TRANSFORMS****9**

Existence conditions – Transforms of elementary functions – Transform of unit step function and unit impulse function – Basic properties – Shifting theorems -Transforms of derivatives and integrals – Initial and final value theorems – Inverse transforms – Convolution theorem –Transform of periodic functions – Application to solution of linear second order ordinary differential equations with constant coefficients.

UNIT V**Z - TRANSFORMS AND DIFFERENCE EQUATIONS****9**

Z-transforms - Elementary properties – Inverse Z-transform (using partial fraction and residues) – Initial and final value theorems - Convolution theorem - Formation of difference equations – Solution of difference equations using Z - transform.

OUTCOMES

On successful completion of this course, the student will be able to

- Solve problems using divergence and curl and evaluate line, Surface and Volume integrals.

- Solve problems in Analytic functions and construction of analytic functions using C-R Equations.
- Evaluate problems using Cauchy's integral formula and Cauchy residue theorem and find Taylor's and Laurent's series expansion of a given function.
- Obtain the Laplace Transforms of standard functions.
- Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.

TEXTBOOKS

1. Grewal, B.S., Higher Engineering Mathematics, 43rd Edition, Khanna Publishers, 2016.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons, Inc., 2016.

REFERENCE BOOKS

1. Bali, N.P., Goyal, M., Watkins, C., Advanced Engineering Mathematics, Laxmi Publications Pvt. Limited, 2007.
2. Boyce, W.E., and DiPrima, R.C., Elementary Differential Equations and Boundary Value Problems, Wiley India, 2012.
3. O'Neil, P. V. "Advanced Engineering Mathematics", 7th Edition, Cengage Learning India Pvt., Ltd, New Delhi, 2011.
4. T. Veerarajan, Engineering Mathematics, Tata McGraw Hill publications co. Ltd, New Delhi, 2017.

PH1201A

MATERIAL SCIENCE
(Common to all B.E / B.TECH Branches)

L T P C
3 0 0 3

OBJECTIVES:

To enrich the understanding of various types of materials and their applications in engineering and technology.

UNIT I CONDUCTING MATERIALS

9 Conductors –

classical free electron theory of metals – Electrical and thermal conductivity – Wiedemann – Franz law – Lorentz number – Draw backs of classical theory – Quantum theory – Fermi distribution function – Effect of temperature on Fermi Function – Density of energy states – carrier concentration in metals.

UNIT II SEMICONDUCTING MATERIALS

9 Intrinsic

semiconductor – carrier concentration derivation – Fermi level – Variation of Fermi level with temperature – electrical conductivity – band gap determination – Elemental and Compound Semiconductors – **N-type and P-type semiconductor (Qualitative)** – Hall effect – Determination of Hall coefficient – Applications.

UNIT III MAGNETIC AND SUPERCONDUCTING MATERIALS

9 Origin of magnetic

moment – Bohr magneton – comparison of Dia, Para and Ferro magnetism – Domain theory – Hysteresis – soft and hard magnetic materials – antiferromagnetic materials – Ferrites and its applications. **Electro static Discharge (ESD)**-Superconductivity: properties – Type I and Type II superconductors – BCS theory of superconductivity (Qualitative) - High T_c superconductors – Electrical, medical, magnetic and computer application of superconductors.

UNIT IV DIELECTRIC MATERIALS

9 Electrical

susceptibility – dielectric constant – electronic, ionic, orientation and space charge polarization – frequency and temperature dependence of polarisation – **Clausius - mosotti relation** - dielectric loss – dielectric breakdown – uses of dielectric materials (capacitor and transformer).

UNIT V ADVANCED ENGINEERING MATERIALS

9

Metallic glasses - melt spinning process, applications - shape memory alloys: Ni-Ti alloy, applications – nanomaterials: preparation (bottom up and top down approaches), properties and applications- Bio materials – introduction- properties of bio materials-examples- medical applications- Ophthalmology- bio sensors-characteristics.

Total Periods: 45

OUTCOMES:

At the end of this course,

- ❖ The students will gain knowledge of conducting materials and variation of its properties with temperature.
- ❖ Acquire knowledge on basics of semiconductor physics and its applications in various devices.
- ❖ Get knowledge on magnetic and superconducting materials properties and their various applications.
- ❖ The students will understand the basics of dielectric materials, properties and applications of dielectric materials.
- ❖ The students will get knowledge about new engineering materials and its applications in social applications.

TEXT BOOKS:

1. S.Mohan, Principles of Materials Science, MJP Publishers, 2018.
2. Jasprit Singh, Semiconductor Devices, Basic Principles, Wiley 2012.
3. Umesh K Mishra and Jasprit Singh, Semiconductor Device Physics and Design, Springer, 2008.

REFERENCES:

1. Wahab, M.A. Solid State Physics: Structure and Properties of Materials, Narosa Publishing House, 2009.
2. William D.Callister Jr, David G. Rethwisch, Materials Science and Engineering, An Introduction, Wiley India (P) Ltd., 8th Edition, 2009.
3. Pillai S.O., Solid State Physics, New Age International (P) Ltd., Publishers, 2009.
4. Semiconductor Introduction, Electronic materials, devices, and fabrication by Prof S. Parasuraman, Department of Metallurgy and Material Science, IIT Madras. <https://youtu.be/k6ZxP9Yr02E>
5. Superconductivity, Physics of Materials by Dr. Prathap Haridoss, Department of Metallurgical & Materials Engineering, IIT Madras. <https://youtu.be/D-9M3GWOBw>

**EE1202A BASIC ELECTRICAL, ELECTRONICS AND MEASUREMENT
ENGINEERING****L T P C****3 0 0 3****OBJECTIVES:**

- To learn the fundamental laws, theorems of electrical circuits and also to analyze them
- To study the basic principles of electrical machines and their performance
- To study the different energy sources, protective devices and their field applications
- To understand the fundamentals of electronic circuit constructions
- To understand the principles and operation of measuring instruments and transducers

UNIT I ELECTRICAL CIRCUITS ANALYSIS**9**

Ohms Law, Kirchhoff's Law-Instantaneous power- series and parallel circuit analysis with resistive, capacitive and inductive network - nodal analysis, mesh analysis- network theorems –Thevenin's theorem, Norton theorem and superposition theorem, three phase supply-Instantaneous, Reactive and apparent power-star delta conversion.

UNIT II ELECTRICAL MACHINES**9**

DC and AC rotating machines: Types, Construction, principle, Emf and torque equation, application -Speed Control- Basics of Stepper Motor – Brushless DC motors- Transformers-Introduction- types and construction, working principle of Ideal transformer-Emf equation

UNIT III UTILIZATION OF ELECTRICAL POWER

9

Overview of Renewable Energy Sources”. (Wind and Solar), . Illumination by lamps- Energy Saving lamps(Compact Fluorescent Lamp, Cold Cathode Tube, LED bulbs). Domestic refrigerator and air conditioner- Electric circuit, construction and working principle. Li-Ion Battery’s Operation & Maintenance. Protection-need for earthing, fuses and circuit breakers – MCB, RCB and ELCB. Energy Tariff calculation for domestic loads.

UNIT IV ELECTRONIC CIRCUITS

9

Introduction to Electron Devices – PN Junction diode, Zener Diode, Transistor)-. Op-amps- Amplifiers, differentiator, integrator, ADC, DAC. Multi vibrator using 555 Timer IC . Voltage regulator IC using LM 723,LM 317.

UNIT V ELECTRICAL MEASUREMENT

9

Characteristics of measurement-errors in measurement, torque in indicating instruments- moving coil and moving iron meters, Energy meter and watt meter. Transducers- classification-RTD, Strain gauge, LVDT, LDR and piezoelectric. functional Block diagram of DSO

OUTCOMES:

Upon completion of the course, the students will be able to:

- Discuss the essentials of electric circuits and analysis
- Discuss the basic operation of electric machines and transformers
- Introduction of renewable sources and recent trends in illumination
- Discuss the basics of electronics components
- Introduction to measurement and metering for electric circuits

TEXT BOOKS:

1. D.P. Kothari and I.J Nagrath, Basic Electrical and Electronics Engineering, Mc Graw Hill, 2016,Third Edition.
2. M.S. Sukhija and T.K. Nagsarkar, Basic Electrical and Electronic Engineering, Oxford, 2016.

REFERENCES:

1. S.B. Lal Seksena and Kaustuv Dasgupta, fundamentals of Electrical Engineering, Cambridge,2016.
2. B.L. Theraja, Fundamentals of Electrical Engineering and Electronics, Chand & Co, 2008.
3. S.K.Sahdev, Basic of Electrical Engineering, Pearson 2015.
4. John Bird,-Electrical and electronic principles and Technology, Fourth Edition, Elsevier, 2010.
5. Mittle, Mittal, Basic Electrical Engineering, 2nd edition, Tata McGraw-Hill Edition, 2016.
6. C.L.Wadhwa, “Generation, Distribution and utilization of Electrical Energy”, New Age international pvt ltd .2003.

CS1201A

PROGRAMMING IN C

L T P C

3 0 0 3

OBJECTIVE:

- To develop C Programs using basic programming constructs.
- To develop C programs using arrays and strings.
- To develop applications in C using functions and functions.
- To develop applications in C using structures.
- To do input/output and file handling in C.

UNIT I BASICS OF C PROGRAMMING

9

Introduction to programming paradigms - Structure of C program - C programming: Identifiers- Keywords-Data Types - Variables - Constants. Operators: Precedence and Associativity - Expressions
- Input/ Output statements - Decision making statements - Switch statement - Looping statements - Pre-processor directives - Compilation process

UNIT II ARRAYS AND STRINGS

8

Introduction to Arrays: Declaration, Initialization - One dimensional array - Example Program: Computing Mean, Median and Mode - Two dimensional arrays - Example Program: Matrix Operations (Addition, Scaling, Determinant and Transpose) - String- String operations – String Arrays.

UNIT III FUNCTIONS AND POINTERS

10

Introduction to functions: Function prototype,- function definition,- function call, - Built-in functions (string functions, , math functions) - Recursion-Types of Recursion - Example Program: Computation of Sine series, Scientific calculator using built-in functions, Binary Search using recursive functions-Storage Classes - Pointers - Pointer operators - Null Pointers- Pointer arithmetic - Arrays and pointers - Array of pointers - Example Program: Sorting of names - Parameter passing: Pass by value, Pass by reference - Example Program: Swapping of two numbers and changing the value of a variable using pass by reference.

UNIT IV STRUCTURES

9

Structures-Introduction – need for structure data type – structure definition – Structure declaration – Structure within a structure – Passing structures to functions – Array of structures – Pointers to structures – Union - Programs using structures and Unions, Enumerated data type-Dynamic Memory Allocation.

UNIT V FILE PROCESSING

9

Files - Types of file processing: Sequential access,, Random access - Sequential access file - Example Program: Finding average of numbers stored in sequential access file - Random access file - Example Program: Payroll System and Transaction processing using random access files - Command line arguments

TOTAL PERIODS:-45

OUTCOMES:

Upon completion of the course, the students will be able to

- Develop simple applications in C using basic constructs
- Design and implement applications using arrays and strings
- Develop and implement applications in C using functions and pointers.
- Develop applications in C using structures.
- Design applications using sequential and random access file Processing.

TEXTBOOKS:

1. Reema Thareja, "Programming in C", Oxford University Press, Second Edition, 2016.
2. Kernighan, B.W and Ritchie,D.M, "The C Programming language", Second Edition, Pearson Education, 2006

REFERENCES:

1. Paul Deitel and Harvey Deitel, "C How to Program", Seventh edition, Pearson Publication
2. Juneja, B. Land Anita Seth, "Programming in C", CENGAGE Learning India pvt. Ltd., 2011
3. Pradip Dey, Manas Ghosh, "Fundamentals of Computing and Programming in C", First Edition, Oxford University Press, 2009.

4. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011.
5. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C", McGraw-Hill Education, 1996.

IT1201A INFORMATION TECHNOLOGY ESSENTIAL L T P C

3 0 0 3

COURSE OBJECTIVES:

- To acquire the concepts of web essentials
- To know the basics of scripting languages.
- To understand Network Essentials related to information Technology
- To understand Mobile Communication Essentials
- To understand various applications related to Information technology

UNIT I WEB ESSENTIALS 9

Creating a Website - Working principle of a Website - Browser fundamentals - Authoring tools - Types of servers: Application Server - Web Server - Database Server

UNIT II SCRIPTING ESSENTIALS 9

Need for Scripting languages – Types of scripting languages – Client side scripting – Server side scripting – PHP : Introduction to PHP-Incorporating PHP Within HTML
-The Structure of PHP - Using Comments - Basic Syntax -Variables -Operators - Variable Assignment -Multiple-Line Commands - The Difference Between the echo and print Commands - Functions - Variable Scope.

UNIT-III NETWORKING ESSENTIALS 9

What is a Computer Network? – Network fundamentals – The Internet & World Wide Web – Network Applications: Discovery, Communication, Collaboration, and Education.

UNIT IV MOBILE COMPUTING ESSENTIALS 9

Wireless Technologies – Wireless Computer Networks & Internet access –Mobile Computing & Mobile Commerce – The Internet of Things –Wireless Security.

UNIT V APPLICATION ESSENTIALS 9

Creation of simple interactive applications - Simple database applications - Multimedia applications - Design and development of information systems – Personal Information System – Information retrieval system – Social networking applications.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

On Completion of the course, the students should be able to:

- Design and deploy web-sites
- Design and deploy simple web-applications using PHP
- Gain knowledge on Basics of Networking
- Apply the concepts of Mobile communications.
- Develop information system

TEXT BOOKS:

1. Robin Nixon, “Learning PHP, MySQL, JavaScript, CSS & HTML5” Third Edition, O’REILLY, 2014.
2. R. Kelly Rainer , Casey G. Cegielski , Brad Prince, Introduction to Information Systems, Fifth Edition, Wiley Publication, 2014.

REFERENCE BOOKS:

1. Gottapu Sasibhushana Rao, "Mobile Cellular Communication", Pearson, 2012.
2. James F. Kurose, —Computer Networking: A Top-Down Approach, Sixth Edition, Pearson, 2012.
3. it-ebooks.org

CS1203A

PROGRAMMING IN C LABORATORY L T P C

0 0 4 2

Course Objectives:-

- To develop programs in C using basic constructs.
- To develop programs in C using control statements.
- To develop applications in C using arrays, strings, pointers.
- To develop applications in C using functions, structures.
- To develop applications in C using file processing

LIST OF EXPERIMENTS

1. Input and Output statements
2. Control statements – Branching & Looping
 - a) Write a C program to generate Pascal's triangle.
 - b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use Switch Statement)
 - c) Write a C program to find the sum of individual digits of a positive integer.
 - d) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
 - e) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
 - f) Write a C program to swap Numbers Using Temporary Variables.
3. Arrays
 - a) Write a C program to search an array element using linear search.
 - b) Write a C program to find both the largest and smallest number in a list of integers.
 - c) Write a C program that uses functions to perform the following:
 - i) Addition of Two Matrices
 - ii) Multiplication of Two Matrices
 - d) Write a C program to implement Bubble sort.
4. Strings
 - a) Write a C program that uses functions to perform the following operations:
 - i) To insert a sub-string in to given main string from a given position.
 - ii) To delete n Characters from a given position in a given string.
 - b) Write a C program to determine if the given string is a palindrome or not
5. Functions & Pointers:

Write C programs that use recursive functions

 - i) To find factorial of given number
 - ii) To solve Towers of Hanoi Problem.
 - iii) To swap the variables using call by value and call by reference.
6. a. Generate mark sheet of students using structures.
6. b. Compute salary slip for five employees using structures and functions.
7. Insert, Update, delete and append telephone details of an individual or a company into a telephone

directory using random access file.

TOTAL PERIODS:- 60

COURSE OUTCOMES:

Upon completion of the course, the students will be able to

- Develop C programs for simple applications making use of basic constructs
- Develop C programs for control statements.
- Develop C programs involving arrays, strings and pointers.
- Develop C programs involving functions, and structures.
- Design applications using sequential and random access file processing.

CE 1202A

ENGINEERING PRACTICES LABORATORY

L T P C

0 0 4 2

OBJECTIVES:

To provide exposure to the students with hands on experience on various basic engineering practices in Civil, Mechanical, Electrical and Electronics Engineering.

GROUP A (CIVIL & MECHANICAL)

I CIVIL ENGINEERING PRACTICE

13

Buildings:

- (a) Study of plumbing and carpentry components of residential and industrial buildings.
Safety aspects.

Plumbing Works:

- (a) Study of pipeline joints, its location and functions: valves, taps, couplings, Unions, reducers, elbows in household fittings.
- (b) Study of pipe connections requirements for pumps and turbines.
- (c) Preparation of plumbing line sketches for water supply and sewage works.
- (d) Hands-on-exercise: Basic pipe connections – Mixed pipe material connection – pipe connections with different joining components.
- (e) Demonstration of plumbing requirements of high-rise buildings.

Carpentry using Power Tools only:

- (a) Study of the joints in roofs, doors, windows and furniture.
- (b) Hands-on-exercise: Wood work, joints by sawing, planing and cutting.

II MECHANICAL ENGINEERING PRACTICE

18

Welding:

- (a) Preparation of butt joints, lap joints and T- joints by Shielded metal arc welding.
- (b) Gas welding practice

Basic Machining:

- (a) Simple Turning and Taper turning
- (b) Drilling Practice

Sheet Metal Work:

- (a) Forming & Bending:
- (b) Model making – Trays and funnels.
- (c) Different type of joints.

Machine assembly practice:

- (a) Study of centrifugal pump
- (b) Study of air conditioner

Demonstration on:

- (a) Smithy operations, upsetting, swaging, setting down and bending. Example – Exercise – Production of hexagonal headed bolt.
- (b) Foundry operations like mould preparation for gear and step cone pulley.

(c) Fitting – Exercises – Preparation of square fitting and V – fitting models.

GROUP -B (ELECTRICAL & ELECTRONICS)

III ELECTRICAL ENGINEERING PRACTICE

13

1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fluorescent lamp wiring.
3. Stair case wiring
4. Measurement of electrical quantities – voltage, current, power & power factor in RLC circuit.
5. Measurement of energy using single phase energy meter.
6. Measurement of resistance to earth of electrical equipment.

IV ELECTRONICS ENGINEERING PRACTICE

16

1. Study of Electronic components and equipments – Resistor, colour coding measurement of AC Signal parameter (peak-peak, rms period, frequency) using CR.
2. Study of logic gates AND, OR, EX-OR and NOT.
3. Generation of Clock Signal.
4. Soldering practice – Components Devices and Circuits – Using general purpose PCB.
5. Measurement of ripple factor of HWR and FWR.

TOTAL: 60 PERIODS

OUTCOMES:

On successful completion of this course, the student will be able to

1. Fabricate carpentry components and pipe connections including plumbing works.
2. Use welding equipments to join the structures.
3. Carry out the basic machining operations
4. Make the models using sheet metal works
5. Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry and fittings
6. Carry out basic home electrical works and appliances
7. Measure the electrical quantities
8. Elaborate on the components, gates, soldering practices.

IT1202A

INFORMATION TECHNOLOGY ESSENTIALS LAB L T P C

0 0 2 1

COURSE OBJECTIVES:

To Write Simple Scripts for the creation of Websites

- To Create various Information Technology enabled Applications
-

LIST OF EXPERIMENTS

1. Creation of interactive web sites - Design using HTML and authoring tools
2. Creation of simple PHP scripts - Dynamism in web sites
3. Handling multimedia content in web sites
4. Database applications using PHP and MySQL
5. Study of computer networking components
6. Creation of information retrieval system using web, PHP and MySQL
7. Study of Technologies associated with mobile devices
8. Creation of Personal Information System

COURSE OUTCOMES:

On Completion of the course, the students should be able to:

- Design interactive websites using basic HTML tags, different styles, links and with all Basic control elements.
- Create client side and server side programs using scripts using PHP.
- Design dynamic web sites and handle multimedia components.
- Create applications with PHP connected to database.
- Create Personal Information System.
- Implement the technologies behind computer networks and mobile Communication.

CY1201A ENVIRONMENTAL SCIENCE AND ENGINEERING

L T P C
2 0 0 0

COURSE OBJECTIVES

- To understand nature and the facts about the environment.
- To find and implement scientific, technological, economic and political solutions to environmental problems.
- To study the interrelationship between living organism and environment.
- To appreciate the importance of environment by assessing its impact on the human world; envision the surrounding environment, its functions and its value.
- To study the dynamic processes and understand the features of the earth's interior and surface.
- To study the integrated themes and biodiversity, natural resources, pollution control and waste management

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY

14

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, types, characteristic features, structure and function of major ecosystem – Introduction to biodiversity definition: genetic, species and ecosystem diversity – value of biodiversity – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.

UNIT II ENVIRONMENTAL POLLUTION

8

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 – solid waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides.

UNIT III NATURAL RESOURCES

10

Forest resources: Use and over-exploitation, deforestation, case studies- dams and their effects on forests and tribal people – Water resources: Use and over- utilization of surface and ground water – Mineral resources: environmental effects of extracting and using mineral resources, case studies – Food resources: changes caused by agriculture and overgrazing, effects of modern agriculture, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. case studies – Land

resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – 12 Principles of Green chemistry, role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT

7

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies – environment protection act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – central and state pollution control boards.

UNIT V HUMAN POPULATION AND THE ENVIRONMENT

6

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 PERIODS

OUTCOMES

- Students will be able to understand the functions of ecosystems and appreciate the bio diversity.
- Students will be able to know the measures to control environmental pollution.
- Students will be able to understand the usage as well as the effects of over exploitation of natural resources.
- Students will have knowledge about finding technological, economic and political solutions to environmental problems with various Environmental Protection Act in mind.
- Students will be able to understand the interrelationship between population explosion and the environment and also role of IT in environment and human health.
- Students will be able to understand that Environmental problems can only be solved by Public participation in all aspects and cannot be solved by mere laws.

TEXT BOOKS

Environmental Science and Engineering by Anubha Kaushik and C.P.Kaushik-New Age International Publishers. New Delhi, 2017.

REFERENCES

- 1.Benny Joseph , Environmental Studies, Tata mcgraw-Hill Publishing Company, Ltd., New Delhi, 2006.
2. Dr.B.S.Chauhan,. Environmental Studies , University Science Press, New Delhi, 2011.

MA1303A

DISCRETE MATHEMATICS

3

L	T	P	C
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OBJECTIVES:

- To extend student's logical and mathematical maturity and ability to deal with abstraction.
- To introduce most of the basic terminologies used in computer science courses and application of ideas to solve practical problems.
- To understand the basic concepts of combinatorics and graph theory.
- To familiarize the applications of algebraic structures.

UNIT I LOGIC AND PROOFS 12
Propositional logic – Propositional equivalences - Predicates and quantifiers – Nested quantifiers – Rules of inference - Introduction to proofs – Proof methods and strategy.

UNIT II SET THEORY 12
Basic concepts – Notations – Subset – Algebra of sets – The power set – Ordered pairs and Cartesian product – Relations on sets –Types of relations and their properties – Relational matrix and the graph of a relation – Partitions – Equivalence relations – Partial ordering – Poset – Hasse diagram – Lattices and their properties – Sub lattices – Boolean algebra – Homomorphism.

UNIT III COMBINATORICS 12
Mathematical induction – 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 principle and its applications

UNIT IV GRAPHS 12
Graphs and graph models – Graph terminology and special types of graphs – Matrix representation of graphs and graph isomorphism – Connectivity – Euler and Hamilton paths.

UNIT V ALGEBRAIC STRUCTURES 12
Algebraic systems – Definitions-Examples-Properties-Semi groups and monoids–Homomorphism’s- Groups – Subgroups – – Normal subgroup and cosets – Lagrange’s theorem – Codes and group codes – Basic notions of error correction-Error recovery in group codes.

TOTAL: 60 PERIODS

OUTCOMES:

At the end of the course, students would:

- Have knowledge of the concepts needed to test the logic of a program.
- Have an understanding in identifying structures on many levels.
- Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.
- Be aware of the counting principles.
- Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.

TEXTBOOKS:

1. Rosen, K.H., "Discrete Mathematics and its Applications", 7th Edition, Tata McGraw Hill Pub. Co. Ltd., New Delhi, Special Indian Edition, 2011.
2. Tremblay, J.P. and Manohar.R., "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill Pub. Co. Ltd, New Delhi, 30th Reprint, 2011.

REFERENCES:

1. Grimaldi, R.P. "Discrete and Combinatorial Mathematics: An Applied Introduction", 4th Edition, Pearson Education Asia, Delhi, 2007.
2. Lipschutz, S. and Mark Lipson., "Discrete Mathematics", Schaum's Outlines, Tata McGraw Hill Pub. Co. Ltd., New Delhi, 3rd Edition, 2010.
3. Koshy, T. "Discrete Mathematics with Applications", Elsevier Publications, 2006.

IT1301A**OBJECT ORIENTED PROGRAMMING****L T P C****3 0 0 3****OBJECTIVES:**

- To understand Object Oriented Programming concepts and basic characteristics of Java
- To know the principles of packages, inheritance and interfaces
- To define exceptions and use I/O streams
- To develop a java application with threads and generics classes
- To design and build simple Graphical User Interfaces

UNIT I INTRODUCTION TO OOP AND JAVA FUNDAMENTALS**9**

Object Oriented Programming - Abstraction – objects and classes - Encapsulation- Inheritance - Polymorphism- OOP in Java – Characteristics of Java –Fundamental Programming Structures in Java – Defining classes in Java – constructors, methods -access specifiers - static members - Comments, Data Types, Variables, Operators, Control Flow, Arrays, Packages.

UNITII INHERITANCE AND INTERFACES**9**

Inheritance – Super classes- sub classes –Protected members – constructors in sub classes- the Object class – abstract classes and methods- final methods and classes – Interfaces – defining an interface, implementing interface, differences between classes and interfaces and extending interfaces - Object cloning -inner classes, ArrayLists - Strings

UNITIII EXCEPTION HANDLING AND I/O**9**

Exceptions - exception hierarchy - throwing and catching exceptions – built-in exceptions, creating own exceptions, Stack Trace Elements. Input / Output Basics – Streams – Byte streams and Character streams – Reading and Writing Console – Reading and Writing Files

UNITIV MULTITHREADING AND GENERIC PROGRAMMING**9**

Understanding Threads, Thread Priorities, Synchronizing Threads, Thread life cycle, Inter-thread communication. Generic Programming – Generic classes – generic methods – Bounded Types – Restrictions and Limitations-Introduction to JDBC, JDBC Drivers and Architecture, Accessing Database with JDBC.

UNIT V EVENT DRIVEN PROGRAMMING**9**

Graphics programming - Frame – Components - working with 2D shapes - Using color, fonts, and images - Basics of event handling - event handlers - adapter classes -actions - mouse events - Introduction to Swing –Swing GUI Components – Text Fields , Text Areas – Buttons- Check Boxes – Radio Buttons – Lists- choices- Scrollbars – Windows –Menus – Dialog Boxes. Swing packages-Swing Control classes and Methods.

TOTAL: 45 PERIODS**OUTCOMES:**

Upon completion of the course, students will be able to:

- Develop Java programs using OOP principles
- Develop Java programs with the concepts of inheritance and interfaces
- Build Java applications using exceptions and I/O streams
- Design problems solutions using Generic Collections and Exception Handling
- Create a Database connectivity and manipulate database using JDBC
- Develop interactive Java programs using swings

TEXT BOOKS:

1. Herbert Schildt, —Java The complete referencell, 8th Edition, McGraw Hill Education, 2011.
2. Cay S. Horstmann, Gary cornell, —Core Java Volume –I Fundamentalsl, 9th Edition, Prentice Hall, 2013.

REFERENCES:

1. Paul Deitel, Harvey Deitel, —Java SE 8 for programmersl, 3rd Edition, Pearson, 2015.
2. Steven Holzner, —Java 2 Black bookl, Dreamtech press, 2011.
3. Timothy Budd, —Understanding Object-oriented programming with Javall, Updated Edition, Pearson Education, 2000.

CS1301A**DATA STRUCTURES****L T P C****3 0 0 3****COURSE OBJECTIVES:-**

- To Study the concepts of ADTs
- To Acquire linear data structures – lists, stacks, and queues
- To learn non-linear data structures and apply Tree and Graph structures
- To understand sorting, searching and hashing algorithms

UNIT I LINEAR DATA STRUCTURES – LIST**9**

Abstract Data Types (ADTs) – List ADT – array-based implementation – linked list implementation —singly linked lists-doubly-linked lists – circularly-linked list-applications of lists –Polynomial Manipulation

UNIT II LINEAR DATA STRUCTURES – STACKS, QUEUES**9**

Stack ADT – Operations – Evaluating arithmetic expressions- Other Applications-Conversion of Infix to postfix expression – Queue ADT – Operations – Circular Queue – Priority Queue- Double Ended Queues – applications of queues.

UNIT III NON LINEAR DATA STRUCTURES – TREES**9**

Introduction to Tree ADT – Implementations of trees- Binary Tree ADT -tree traversals - expression trees — binary search tree ADT –Threaded Binary Trees- AVL Trees –Multi-way Search Trees-B-Tree – B+ Tree- applications of trees-Heaps-Application of heaps.

UNIT IV NON LINEAR DATA STRUCTURES – GRAPHS**9**

Graph and their representations-Graph Traversal Techniques: Breadth First Search (BFS) and Depth First Search (DFS)- Topological Sort -Minimum Spanning Tree: Prim's and Kruskals's Algorithm- Dijkstra's algorithm -Applications of graphs.

UNIT V SEARCHING, SORTING AND HASHING TECHNIQUES**9**

Searching- Linear Search – Binary Search. Sorting – Bubble sort – Selection sort – Insertion sort – Quick Sort-Merge sort-Shell sort – Radix sort. Hashing- Hash Functions – Collision in hashing-Separate Chaining – Open Addressing-Rehashing-Applications of Hashing.

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- Learn and apply the concept and operations of List ADT

- Understand and apply the concept and operations of Stack and Queue ADT
- Gain the knowledge about Tree ADT and its Applications.
- Ability to apply Graph data structures in real world scenarios.
- Ability to comprehend the implementation of sorting, searching and hashing Techniques.

TEXT BOOKS:-

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education, 1997.
2. Reema Thareja, "Data Structures Using C", Second Edition, Oxford University Press, 2011

REFERENCES:-

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, "Introduction to Algorithms", Second Edition, McGraw Hill, 2002.
2. Aho, Hopcroft and Ullman, "Data Structures and Algorithms", Pearson Education, 1983.
3. Stephen G. Kochan, "Programming in C", 3rd edition, Pearson Education.
4. Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, "Fundamentals of Data Structures in C", Second Edition, University Press, 2008.

EC1306A DIGITAL PRINCIPLES AND SYSTEM DESIGN

L T P C
3 0 0 3

OBJECTIVES:

- To design digital circuits using simplified Boolean functions
- To analyze and design combinational circuits
- To analyze and design synchronous and asynchronous sequential circuits
- To understand Programmable Logic Devices
- To write HDL code for combinational and sequential circuits

UNIT I BOOLEAN ALGEBRA AND LOGIC GATES 9

Number Systems – Decimal, Binary, Octal, Hexadecimal, 1's and 2's complements, Arithmetic Operations – Binary Codes- Boolean Algebra and Logic Gates – Theorems and Properties of Boolean Algebra – Boolean Functions – Canonical and Standard Forms – Simplification of Boolean Functions using Karnaugh Map – Logic Gates – NAND and NOR Implementations.

UNIT II COMBINATIONAL LOGIC 9

Combinational Circuits – Analysis and Design Procedures, Design of Half and Full Adders, Half and Full Subtractors – Binary Adder-Subtractor – Decimal Adder – Binary Multiplier – Magnitude Comparator – Decoders – Encoders – Multiplexers – Introduction to HDL – HDL Models of Combinational circuits.

UNIT III SYNCHRONOUS SEQUENTIAL LOGIC 9

Sequential Circuits – Storage Elements: Latches, Flip-Flops -SR, JK, T, D, – operation and excitation tables – Analysis of Clocked Sequential Circuits – Moore/Mealy models, State Reduction and Assignment – Design Procedure – Registers and Counters – HDL Models of Sequential Circuits.

UNIT IV ASYNCHRONOUS SEQUENTIAL LOGIC 9

Analysis and Design of Asynchronous Sequential Circuits – cycles and races, Reduction of State and Flow Tables – Race-free State Assignment – Hazards, Essential Hazards, Design of Hazard free circuits

UNIT V MEMORY AND PROGRAMMABLE LOGIC 9

RAM – Memory Decoding – Error Detection and Correction – ROM – Programmable Logic Array – Programmable Array Logic – Sequential Programmable Devices. Field Programmable Gate Arrays (FPGA) – Implementation of combinational logic circuits using PLA, PAL

1. H Taub, D L Schilling, G Saha, “Principles of Communication Systems” 3/e, TMH 2007
2. Simon Haykin “Digital Communications” John Wiley 2005
3. Simon Haykin, “Communication Systems” 4th Edition John Wiley

References:

1. Bruce A Carlson, "Communication Systems – An Introduction to Signals and Noise in Electrical Communication" 4th Edition. McGraw-Hill
2. John G. Proakis, "Digital Communication", 2014, 5th Edition, McGraw-Hill, India
3. Sklar, Digital Communications: Fundamentals and Applications, 2009, 2nd Edition, Pearson Education

IT1302A

OBJECT ORIENTED PROGRAMMING LABORATORY

L	T	P	C
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OBJECTIVES

- To build software development skills using java programming for real-world applications.
- To understand and apply the concepts of classes, packages, interfaces, arraylist, exception handling and file processing.
- To develop applications using generic programming and event handling.

LIST OF EXPERIMENTS

1. Develop a java application using classes & objects
2. Develop a java application using packages.
3. Develop a java application using Inheritance.
4. Design a Java interface for ADT Stack. Provide necessary exception handling.
5. Write a program to perform string operations using Array List. Write functions for the following
 - a. Append - add at end
 - b. Insert – add at particular index
 - c. Search
 - d. List all string starts with given letter.
6. Write a Java Program to create an abstract class named and demonstrate polymorphism.
7. Write a Java program to implement user defined exception handling.
8. Write a Java program that reads a file name from the user, displays information about whether the file exists, whether the file is readable, or writable, the type of file and the length of the file in bytes.
9. Write a java program that implements multi-threading.
10. Write a java program to create generic function.
11. Design a calculator using event-driven programming paradigm of Java with the following options.
 - a) Decimal manipulations
 - b) Scientific manipulations
12. Develop a simple student database management system using event-driven and concurrent programming paradigms of Java. Use JDBC to connect a back-end database.

TOTAL : 60 PERIODS

OUTCOMES

Upon completion of the course, the students will be able to

- Develop and implement Java programs for simple applications that make use of Classes, packages and interfaces.
- Develop and implement Java Programs with Arraylist.
- Develop and implement Java programs with exception handling and multithreading.
- Design applications using file processing, generic programming and event handling.
- Ability to solve real world problems using features of Object Oriented Programming
- Ability to write, debug and document well-structured Java Applications

COURSE OBJECTIVES: -

- ☐ To implement linear and non-linear data structures
- ☐ To understand the different operations of search trees
- ☐ To implement graph algorithms
- ☐ To get familiarized to sorting, searching and hashing algorithms

LIST OF EXPERIMENTS:-

1. Array implementation of List ADT
2. Implement the following data structures
 - i. Singly Linked List
 - ii. Doubly Linked List
3. Array implementation of Stack and Queue ADTs
4. Applications of List, Stack and Queue ADTs
5. Implementation of Binary Search Trees
6. Implementation of AVL Trees
7. Programs for implementation of graph traversals
 - (i) BFS and (ii) DFS
8. Programs to find out minimum spanning tree of simple connected undirected graph
 - i. Prim's Algorithm
 - ii. Kruskal's Algorithm
9. Program to implement Dijkstra's algorithm for solving single source shortest path.
10. Implementation of searching algorithms and Selection Sort, Insertion sort algorithms
11. Programs to implement hashing (i) Separate Chaining and (ii) Open Addressing

COURSE OUTCOMES:-

- CO1: Implement abstract data types for linear data structures
CO2: To apply different linear data structures to problem solutions
CO3: Comprehend and implement the different operations of various Trees.
CO4: Critically analyze the various algorithms
CO5: Understand and implement various sorting, searching and hashing algorithms

HS1301A INTERPERSONAL SKILLS LABORATORY L T P C
0 0 2 1

OBJECTIVES: The Course will enable learners to:

- Equip students with the English language skills required for the successful undertaking of academic studies with primary emphasis on academic speaking and listening skills.
- Provide guidance and practice in basic general and classroom conversation and to engage in specific academic speaking activities.
- Improve general and academic listening skills.
- Make effective presentation.

UNIT I

Listening as a key skill- its importance- Speaking- give personal information- ask for personal information- Improving pronunciation- pronunciation basics- Taking lecture notes- preparing to listen to a lecture- articulate a complete idea.

UNIT II

Interpersonal skills- nurturing- empathetic- self-control- patient- sociability- warmth- social skills-Team Work-Work Ethic- willing to work- initiative- self-motivated - Integrity.

UNIT III

Factors influence fluency- deliver a five-minute informal talk- greet- respond to greetings- describe health and symptoms- invite and offer- accept- decline- take leave- listen for and follow the gist- listen for detail.

UNIT IV

Being an active listener: giving verbal and non-verbal feedback- participating in a group discussion- asking and getting clarifications- Summarising academic readings and lectures- Conversational speech- listening to and participating in conversations- persuade.

UNIT V

Formal and informal talk- listen to follow and respond to explanations, directions and instructions in academic and business contexts- Strategies for formal presentations and interactive communication- group/pair presentations.

TOTAL : 30 PERIODS

OUTCOMES: At the end of the course Learners will be able to:

- Listen and respond appropriately.
- Participate in group discussions
- Make effective presentations
- Participate confidently and appropriately in conversations both formal and informal

TEXT BOOKS:

- 1.Brooks,Margret. Skills forSuccess. Listening and Speaking. Level 4 Oxford University Press, Oxford: 2011.
- 2.Richards,C. Jack. & David Bholke. Speak Now Level 3. Oxford University Press, Oxford: 2010

REFERENCES:

- 1.Bhatnagar, Nitin and MamtaBhatnagar. Communicative English for Engineers and Professionals. Pearson: New Delhi, 2010.
- 2.Hughes, Glyn and Josephine Moate. Practical English Classroom. Oxford University Press: Oxford, 2014.
- 3.Ladousse, Gillian Porter. Role Play. Oxford University Press: Oxford, 2014
- 4.Richards C. Jack. Person to Person (Starter). Oxford University Press: Oxford, 2006.
- 5.Vargo, Mari. Speak Now Level 4. Oxford University Press: Oxford, 2013.

MA1403A
C

PROBABILITY AND STATISTICS

L T P

3 1 0 4

OBJECTIVES:

- ☐ This course aims at providing the required skill to apply the statistical tools in engineering problems.
- ☐ To introduce the basic concepts of probability and random variables.
- ☐ To introduce the basic concepts of two dimensional random variables.
- ☐ To acquaint the knowledge of testing of hypothesis for small and large samples which plays an important role in real life problems.
- ☐ To introduce the basic concepts of classifications of design of experiments which plays very important roles in the field of agriculture and statistical quality control.

UNIT I PROBABILITY AND RANDOM VARIABLES 12

Probability – The axioms of probability – Conditional probability – Total probability – Baye's theorem – Discrete and continuous random variables – Probability mass function – Probability density function – Properties – Mathematical Expectations – Conditional Expectations – Moments – Moment generating functions – characteristic function – Chebyshev's inequality.

UNIT II STANDARD DISTRIBUTION 12

Discrete distribution – Bernoulli's trial – Binomial distribution – Poisson distribution – Geometric distribution – Negative Binomial distribution – Continuous distribution – Uniform distribution – Exponential distribution – Gamma distribution – Weibull distribution – Normal distribution.

UNIT III TWO – DIMENSIONAL RANDOM VARIABLES 12

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and linear regression – Transformation of random variables – Central limit theorem (for independent and identically distributed random variables).

UNIT IV TESTING OF HYPOTHESIS 12

Sampling distributions – Estimation of parameters – Statistical hypothesis – Large sample tests based on Normal distribution for single mean and difference of means -Tests based on t, Chi-square and F distributions for mean, variance and proportion – Contingency table (test for independent) – Goodness of fit.

UNIT V DESIGN OF EXPERIMENTS AND STATISTICAL QUALITY CONTROL 12

One way and Two way classifications – Completely randomized design – Randomized block design – Latin square design – 2^2 factorial design – Control charts for measurements (X and R charts) – Control charts for attributes (p, c and np charts) – Tolerance limits.

TOTAL : 60 PERIODS

OUTCOMES:

Upon successful completion of the course, students will be able to:

- ☐ Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.
- ☐ Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.
- ☐ Apply the concept of testing of hypothesis for small and large samples in real life problems.
- ☐ Apply the basic concepts of classifications of design of experiments in the field of agriculture and statistical quality control.
- ☐ Have the notion of sampling distributions and statistical techniques used in engineering and management problems.

TEXT BOOKS:

1. Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8th Edition, 2015.
2. Milton. J. S. and Arnold. J.C., "Introduction to Probability and Statistics", Tata McGraw Hill, 4th Edition, 2007.
3. Kapoor, V.K. and Gupta, S.P. (1978): Fundamentals of applied statistics, Sultan Chand & Sons.

REFERENCES:

1. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2014.
2. Papoulis, A. and Unnikrishnapillai, S., "Probability, Random Variables and Stochastic Processes", McGraw Hill Education India, 4th Edition, New Delhi, 2010.

3. Ross, S.M., "Introduction to Probability and Statistics for Engineers and Scientists", 3rd Edition, Elsevier, 2004.
4. Spiegel. M.R., Schiller. J. and Srinivasan, R.A., "Schaum's Outline of Theory and Problems of Probability and Statistics", Tata McGraw Hill Edition, 2004.
5. Walpole. R.E., Myers. R.H., Myers. S.L. and Ye. K., "Probability and Statistics for Engineers and Scientists", Pearson Education, Asia, 8th Edition, 2007.
6. Grant, E.L. and Laven Worth, R.S.: Statistical Quality Control, McGraw Hill.

CS1401A

COMPUTER ARCHITECTURE

L T P C
3 0 0 3

UNIT I FUNDAMENTALS OF COMPUTER ARCHITECTURE

9

Overview- Eight great Ideas in Computer architecture-components of computer system- Instructions – Operations and Operands – Representing Instructions – Arithmetic & Logical operations – control operations – Performance - needs and types of various addressing modes

UNIT II ARCHITECTURE OF COMPUTER ARITHMETIC OPERATIONS

9

Data Representation, Architecture of Hardware implementation of arithmetic unit for common arithmetic operations: addition, subtraction, multiplication, division(Fixed point and floating point)

UNIT III ORGANIZATION AND ARCHITECTURE OF INSTRUCTION EXECUTION 9

Introduction-Logic Design Convention-Building a datapath – A simple Control Implementation scheme – An Overview of Pipelining – Pipelined datapath and control – Handling Data hazards & Control hazards-Exceptions.

UNIT IV PARALLELISIM & MEMORY SYSTEM

9

Parallel processing challenges – Flynn's classification – SISD, MIMD, SIMD, SPMD, and Vector Architectures - Hardware multithreading – Multi-core processors and other Shared Memory Multiprocessors. Exploiting Memory Hierarchy:Introduction-Memory Technologies-Basics of caches-Measuring and improving Cache Performance-Virtual Memory-Cache Coherence.

UNIT V INPUT/ OUTPUT ORGANIZATION

9

Accessing I/O devices-Interrupts-External Devices-I/O Modules-Programmed I/O-Interrupt Driven I/O-Direct Memory Access-Bus Arbitration-Buses-synchronous Bus-Asynchronous Bus-Interface Circuits-Parallel Port-Serial; Port-Standard I/O Interfaces-Universal serial Bus(USB).

TEXT BOOKS:-

1. David A. Patterson and John L. Hennessy, Computer Organization and Design: The Hardware/Software Interface, Fifth Edition, Morgan Kaufmann / Elsevier, 2014.
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Computer Organization, Fifth Edition, Tata McGraw Hill, 2012.
3. W. Stallings, Computer organization and architecture, Prentice-Hall, 2012 M. M. Mano, Computer System Architecture, 3rd Edition, 1992, Prentice-Hall

REFERENCE BOOKS:-

1. John P. Hayes, Computer Architecture and Organization, Third Edition, Tata McGraw Hill, 2012.
2. John L. Hennessey and David A. Patterson, Computer Architecture – A Quantitative Approach, Morgan Kaufmann / Elsevier Publishers, Fifth Edition, 2012.

IT1401A

DATABASE MANAGEMENT SYSTEMS

L T P C

3 0 0 3

OBJECTIVES:

- To learn the fundamentals of data models, conceptualize and depict a database system using ER diagram.
- To study the principles to be followed to create an effective relational database and write SQL queries to store/retrieve data to/from database systems.
- To know the fundamental concepts of transaction processing, concurrency control techniques and recovery procedure.
- To learn about the internal storage structures using different file and indexing techniques and the basics of query processing and optimization.
- To study the basics of distributed databases, semi-structured and un-structured data models

UNIT I RELATIONAL DATABASES

9

Purpose of Database System – Views of data – Data Models – Database System Architecture – Introduction to relational databases – Relational Model – Keys – Relational Algebra – SQL fundamentals – Advanced SQL features – Embedded SQL– Dynamic SQL .

UNIT II DATABASE DESIGN

9

Entity-Relationship model – E-R Diagrams – Enhanced-ER Model – ER-to-Relational Mapping – Functional Dependencies – Non-loss Decomposition – First, Second, Third Normal Forms, Dependency Preservation – Boyce/Codd's Normal Form – Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form .

UNIT III TRANSACTIONS

9

Transaction Concepts – ACID Properties – Schedules – Serializability – Concurrency Control – Need for Concurrency – Locking Protocols – Two Phase Locking – Deadlock – Transaction Recovery - Save Points – Isolation Levels – SQL Facilities for Concurrency and Recovery.

UNIT IV IMPLEMENTATION TECHNIQUES

9

RAID – File Organization – Organization of Records in Files – Indexing and Hashing –Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing – Query Processing Overview – Algorithms for SELECT and JOIN operations – Query optimization using Heuristics and Cost Estimation .

UNIT V ADVANCED TOPICS

9

Overview of Distributed Databases – Data Fragmentation – Replication — Introduction to Object-based Databases - Enhanced Data bases: Temporal Database –Spatial Database –Multimedia Database - XML Databases: XML schema - NOSQL Database: Characteristics – Schema-less models– Applications – Current Trends.

OUTCOMES:

On completion of the course, the student will be able to:

CO1: Model an application's data requirements using conceptual modeling and design database schemas based on the conceptual model.

CO2: Formulate solutions to a broad range of query problems using relational algebra/SQL.

CO3: Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database.

CO4: Run transactions and estimate the procedures for controlling the consequences of concurrent data access.

CO5: Explain basic database storage structures, access techniques and query processing.

CO6: Describe distributed, semi-structured and unstructured database systems.

TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, —Database System Concepts, Sixth Edition, Tata McGraw Hill, 2014.

2. Ramez Elmasri, Shamkant B. Navathe, —Fundamentals of Database Systems, Sixth Edition, Pearson Education, 2017.

3. David Loshin, "Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph", Morgan Kaufmann/El Sevier Publishers, 2013.

REFERENCES:

1. C.J. Date, A. Kannan, S. Swamynathan, —An Introduction to Database Systems, Eighth Edition, Pearson Education, 2006.

2. Raghu Ramakrishnan, —Database Management Systems, Fourth Edition, McGraw-Hill College Publications, 2015. 3. G.K. Gupta, "Database Management Systems", Tata McGraw Hill, 2011.

3. G. K. Gupta, "Database Management Systems", Tata McGraw Hill, 2011.

4. Carlos Coronel, Steven Morris, Peter Rob, "Database Systems: Design, Implementation and Management", Ninth Edition, Cengage Learning, 2011.

CS1402A

DESIGN AND ANALYSIS OF ALGORITHMS

L T P C

3 0 0 3

COURSE OBJECTIVES:

- To construct algorithms that is efficient in space and time complexities.
- To understand different design technique like Brute force and Divide and Conquer
- To understand Greedy and Dynamic Programming design techniques
- To understand Backtracking and Branch & Bound design technique
- To understand the limitations of Algorithmic power.

UNIT I INTRODUCTION

9

Notion of an Algorithm – Fundamentals of Algorithmic Problem Solving – Important Problem Types – Fundamentals of the Analysis of Algorithmic Efficiency – Asymptotic Notations and their properties. Analysis Framework – Empirical Analysis- Mathematical analysis for Recursive and Non-recursive algorithms- Visualization

UNIT II BRUTE FORCE AND DIVIDE-AND-CONQUER

9

Brute Force: Closest-Pair - String Matching – Selection Sort – Bubble Sort- Divide and Conquer Methodology: Binary Search – Merge sort – Quick sort – Randomized version of Quick sort- Analysis of Quick sort– Multiplication of Large Integers

UNIT III DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE

9

Dynamic programming: Computing a Binomial Coefficient -Warshall's and Floyd's algorithm for All Pairs shortest Path Problem- Multi Stage Graph– 0/1 Knapsack Problem and Memory functions.

Greedy Technique: Prim's algorithm and Kruskal's Algorithm - Dijkstra's Algorithm - Bellman ford Problem – Fractional Knapsack problem, Huffman Trees.

UNIT IV BACKTRACKING AND BRANCH & BOUND

9

Backtracking: n-Queen's problem -Hamiltonian Circuit Problem – Subset Sum Problem-Graph Colouring.**Branch and Bound:** Assignment problem – Knapsack Problem – Travelling Salesman Problem .

UNIT V TRACTABILITY & SOLVABILITY

9

Lower – Bound Arguments – P, NP NP- Complete- Dominating Set Problem - NP Hard Problems – Clique Decision Problem – Node Cover Decision Problem – NP Hard Scheduling Problems –Job Shop Scheduling- Approximation Algorithm for NP Hard Problems – Travelling Salesperson Problem – Knapsack Problem.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- Apply efficient algorithms to reduce space and time complexity of both recurrent and non-recurrent relations.
- Critically analyze the different algorithms using design techniques like Brute force and Divide and Conquer.
- Construct algorithms using design paradigms like Greedy and Dynamic Programming for a given problem
- Construct algorithms using Backtracking and Branch & Bound design technique.
- Interpret various algorithms and interpret solutions to evaluate NP Hard problems.

TEXT BOOKS:

1. AnanyLevitin, —Introduction to the Design and Analysis of Algorithms, Third Edition, Pearson Education, 2012.
2. Ellis Horowitz, SartajSahni and SanguthevarRajasekaran, Computer Algorithms/ C++, Second Edition, Universities Press, 2007.
3. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, —Introduction to Algorithms, Third Edition, PHI Learning Private Limited, 2012

REFERENCES:

1. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, —The Design and Analysis of Computer Algorithms, Pearson Education, Twelfth impression, 2013.
2. Harsh Bhasin, —Algorithms Design and Analysis, Oxford university press, 2016.
3. S. Sridhar, —Design and Analysis of Algorithms, Oxford university press, 2014.

EC1503A MICROPROCESSOR AND MICROCONTROLLER L T P C 3 0 0 3

OBJECTIVES:

- To study the architecture of 8086 and 8051
- To study the addressing modes and instruction set of 8086 and 8051
- To introduce the need and use of interrupt structure in 8086 and 8051.
- To develop skill in simple program writing for 8086 and 8051 applications.
- To introduce commonly used peripheral / interfacing ICs.

UNIT I THE 8086 MICROPROCESSOR

9

Evolution of Microprocessors , Harvard and Von- Neumann architecture, RISC & CISC architectures, Introduction to 8086 – Microprocessor architecture – Addressing modes - Instruction set and assembler directives – Assembly language programming – Byte and String Manipulation.-Stacks - Interrupts and interrupt service routines – Modular programming using Macros and Procedures.

UNIT II 8086 SYSTEM BUS STRUCTURE

9

8086 signals – Basic configurations – System bus timing –System design using 8086 – I/O programming – Introduction to Multiprogramming – System Bus Structure –Multiprocessor configurations – Coprocessor, Closely coupled and loosely Coupled configurations

UNIT III I/O INTERFACING

9

Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – D/A and A/D Interface - Timer – Keyboard /display controller – Interrupt controller – DMA controller – Programming and applications Case studies: Traffic Light control, LED display , LCD display, Keyboard display interface and Alarm Controller.

UNIT IV MICROCONTROLLER

9

Architecture of 8051 – Special Function Registers(SFRs) - I/O Pins Ports and Circuits - Instruction set - Addressing modes - Assembly language programming- Introduction to PIC Microcontroller.

UNIT V INTERFACING MICROCONTROLLER

9

Programming 8051 Timers - Serial Port Programming - Interrupts Programming – LCD & Keyboard Interfacing - ADC, DAC & Sensor Interfacing - External Memory Interface- Stepper Motor and Waveform generation.

COURSE OUTCOMES:

At the end of the course, the students should be able to:

1. Understand and execute programs based on 8086 microprocessor.
2. Design Memory Interfacing circuits.
3. Design and interface I/O circuits.
4. Design and implement 8051 microcontroller based systems.

TEXT BOOKS:

TEXT BOOKS:

- 1.Yu-Cheng Liu, Glenn A.Gibson, —Microcomputer Systems: The 8086 / 8088 Family - Architecture, Programming and Design, Second Edition, Prentice Hall of India, 2007. (UNIT I- III)
- 2.Muhammad Ali Mazidi, Rolin D. Mckinlay, Danny Causey ‘ PIC Microcontroller and Embedded Systems using Assembly and C for PIC18’, Pearson Education 2008(UNIT-IV)
3. Peatman,J.B., “Design with PIC Micro Controllers”PearsonEducation,3rdEdition, 2004.(UNIT-IV)
- 4.Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin McKinlay, —The 8051 Microcontroller and Embedded Systems: Using Assembly and C, Second Edition, Pearson education, 2011. (UNIT IV-V)

REFERENCES:

- 1.Doughlas V.Hall, —Microprocessors and Interfacing, Programming and Hardware,TMH,2012
- 2.A.K.Ray,K.M.Bhurchandi, "Advanced Microprocessors and Peripherals" 3rd edition, Tata McGrawHill, 2012

- To learn and implement important commands in SQL.
- To learn the usage of nested and joint queries.
- To understand functions, procedures and procedural extensions of databases.
- To understand design and implementation of typical database applications.
- To be familiar with the use of a front end tool for GUI based application development

Experiments:

1. Data Definition Commands, Data Manipulation Commands for inserting, deleting, updating and retrieving Tables and Transaction Control statements
2. Database Querying – Simple queries, Nested queries, Sub queries and Joins
3. Views, Sequences, Synonyms
4. Database Programming: Implicit and Explicit Cursors
5. Procedures and Functions
6. Triggers
7. Exception Handling
8. Database Design using ER modeling, normalization and Implementation for any application
9. Create Document, column and graph based data using NOSQL database tools.
10. Develop a simple GUI based database application

OUTCOMES:

Upon completion of the course, the students will be able to:

- Use typical data definitions and manipulation commands.
- Design applications to test Nested and Join Queries
- Implement simple applications that use Views
- Critically analyze the use of Tables, Views, Functions and Procedures
- Implement a GUI application that require a Front-end and Back end Tool
- Create and manipulate data using NOSQL database.

CS1404A DESIGN AND ANALYSIS OF ALGORITHMS LABORATORY LTP C
0 0 4 2

COURSE OBJECTIVES:

- To understand and apply algorithm analysis technique
- To acquire and analyze knowledge to solve problems.
- To Design and implement efficient algorithms for a specified application.
- Strengthen the ability to identify and apply the suitable algorithm for the real world problem.
- To understand and analyse the Approximation algorithms

LIST OF EXPERIMENTS

1. To find the **factorial** of a given number using recursive algorithm
2. To find the **number of bits in integer**
3. Create **Diamond Pattern Printing**
4. Sort a given set of elements using the **quick sort** method and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the 1st to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator.
5. **Implement merge sort algorithm** to sort a given set of elements and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator.

6. Implement **0/1 Knapsack problem using Dynamic Programming.**
7. Compute the transitive closure of a given graph using **Warshall's algorithm**
8. Implement All-Pairs Shortest Paths Problem using **Floyd's algorithm**. Parallelize this algorithm, implement it using OpenMP and determine the speed-up achieved.
9. Find Minimum Cost Spanning Tree of a given graph using **Prim's and Kruskal's algorithm**
10. Implement the **Single source Shortest path algorithm**
11. Implement any scheme to find the optimal solution for the **Traveling Sales Person** problem and then solve the same problem instance using any **approximation algorithm** and determine the error in the approximation.
12. Implement N Queen's problem using **Back Tracking**.

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- Design algorithms for various computing problems
- Understand different algorithm to solve problems
- Implement efficient algorithms for a specified application
- Identify and apply the suitable algorithm for the given real world problem.
- Understand the approximation algorithms.

REFERENCES:

1. Levitin A, "Introduction to the Design And Analysis of Algorithms", Pearson Education, 2008.
2. Goodrich M.T., R Tomassia, "Algorithm Design foundations Analysis and Internet Examples", John Wiley and Sons, 2006.
3. Base Sara, Allen Van Gelder, "Computer Algorithms Introduction to Design and Analysis", Pearson, 3 rd Edition, 1999

HS1401A

EMPLOYABILITY AND SOFT SKILLS LAB

L T P C

0 0 2 1

OBJECTIVES:

- Strengthen the Employability skills of the students of engineering.
- Enhance their writing skills with specific reference to technical writing.
- Develop students' critical thinking skills.
- Provide more opportunities to develop their project and proposal writing skills.
- Enrich the Soft Skills of the students.

UNIT I

Soft Skills- Professionalism- Courtesy- manners - etiquette- business etiquette- Flexibility- Positive attitude- Responsibility-Teamwork- Time Management

UNIT II

Communication - oral speaking capability- written- presenting- listening- clear speech & writing- Motivation and **initiative**-Leadership- Reliability/dependability- **Adaptability**- Patience- **Problem solving**- Negotiation and persuasion

UNIT III

Writing- Plan before writing- Use of Graphic organisers- Develop a paragraph: topic sentence, supporting sentences, concluding sentence- Write a descriptive paragraph- opinion paragraph- argumentative- analytical.

UNIT IV

Reading- Genres and Organization of Ideas- **Writing-** Email writing- resumes- Job application- project writing- writing convincing proposals.

UNIT V

Aptitude- Verbal- Logical Reasoning- Critical reading and thinking- understanding how the text positions the reader- **Writing-** Statement of Purpose- letter of recommendation- Vision statement

TOTAL: 30 PERIODS

OUTCOMES: At the end of the course Learners will be able to:

- Write different types of paragraphs.
- Write winning job applications.
- Excel in Verbal aptitude, read and evaluate texts logically to solve the puzzles.
- Good in employability and soft skills.
- Display critical thinking in various professional contexts.

TEXT BOOKS:

1. Gramer F. Margot and Colin S. Ward Reading and Writing (Level 3) Oxford University Press: Oxford, 2011
2. Debra Daise, Charl Norloff, and Paul Carne Reading and Writing (Level 4) Oxford University Press: Oxford, 2011

REFERENCES:

1. Davis, Jason and Rhonda Liss. Effective Academic Writing (Level 3) Oxford University Press: Oxford, 2006
2. E. Suresh Kumar and et al. Enriching Speaking and Writing Skills. Second Edition. Orient Black swan: Hyderabad, 2012
3. Withrow, Jeans and et al. Inspired to Write. Readings and Tasks to develop writing skills. Cambridge University Press: Cambridge, 2004
4. Goatly, Andrew. Critical Reading and Writing. Routledge: United States of America, 2000
5. Petelin, Roslyn and Marsh Durham. The Professional Writing Guide: Knowing Well and Knowing Why. Business & Professional Publishing: Australia, 2004

IT1501A

COMPUTER NETWORKS

L T P C

3 0 0 3

OBJECTIVES:

- To understand the protocol layering and physical level communication.
- To analyze the performance of a network.
- To understand the various components required to build different networks.
- To learn the functions of network layer and the various routing protocols.
- To familiarize the functions and protocols of the Transport Layer.

UNIT I	INTRODUCTION AND PHYSICAL LAYER	9
Motivation-Goals of networking-Need for a layered architecture, Network hardware-Network software -Reference models - Network standardization, RS-232 over serial line - Guided Transmission media - Wireless transmission media		
UNIT II	THE DATA LINK LAYER	9
The Data Link Layer: Data link layer design issues – services provided to the network layer, Framing –Flow and error control :Error detection and correction - Elementary data link protocols – A simplex stop and wait protocol –stop and wait ARQ-Sliding window protocols, piggy backing - Wired LANs: Ethernet - Wireless LANs – IEEE 802.11, Bluetooth – Connecting Devices.		
UNIT III	THE NETWORK LAYER	9
Network layer design issues –Switching techniques, IP addressing modes- IPV4, IPV6 subnetting, Routing algorithms: Flooding, Distance vector and Link state routing, Hierarchical routing, Multicasting and broadcasting - Congestion control algorithms –Internetworking		
UNIT IV	THE TRANSPORT LAYER	9
Duties of Transport layer– Services – Port Numbers -Multiplexing -Demultiplexing- Congestion control, Internet transport protocols UDP, TCP, SCTP, Case Study: ATM protocols.		
UNIT V	THE APPLICATION LAYER	9
WWW and HTTP – FTP – Email –Telnet –SSH – DNS – SNMP.		
TOTAL: 45 PERIODS		

OUTCOMES:

On Completion of the course, the students should be able to:

- Understand the basic layers and its functions in computer networks.
- Evaluate the performance of a network.
- Understand the basics of how data flows from one node to another.
- Analyze and design routing algorithms.
- Design protocols for various functions in the network.
- Understand the working of various application layer protocols

TEXT BOOK:

1. Behrouz A. Forouzan, Data Communications and Networking, Fifth Edition TMH, 2013.

REFERENCES

1. Larry L. Peterson, Bruce S. Davie, Computer Networks: A Systems Approach, Fifth Edition, Morgan Kaufmann Publishers Inc., 2012.
2. William Stallings, Data and Computer Communications, Tenth Edition, Pearson Education, 2013.
3. Nader F. Mir, Computer and Communication Networks, Second Edition, Prentice Hall, 2014.
4. Ying-Dar Lin, Ren-Hung Hwang and Fred Baker, Computer Networks: An Open Source Approach, McGraw Hill Publisher, 2011.
5. James F. Kurose, Keith W. Ross, Computer Networking, A Top-Down Approach Featuring the Internet, Sixth Edition, Pearson Education, 2013.

CS1501A	OPERATING SYSTEMS	L T P C
3 0 0 3		

OBJECTIVES:

- To understand the basic concepts, functions, processes and threads of operating systems.
- To analyse Scheduling algorithms and understand the concept of Deadlocks.
- To analyse various memory management schemes.
- To understand I/O management and File systems.
- To be familiar with the basics of Linux system and Mobile OS like iOS and Android.

Operating system overview-objectives and functions, Evolution of Operating System - Computer System Organization-Virtualization-Operating System Structure and Operations-System Calls, OS Generations, Process Concept, Threads- Overview, Multithreading Models, Threading issues

Processes-Process Scheduling, Operations on Processes, Inter-process Communication; ; CPU Scheduling - Scheduling criteria, CPU Scheduling Algorithms, Process Synchronization - Critical Section Problem, Mutex Locks, Semaphores, Classic problems of synchronization, Critical regions, Monitors; Deadlock - Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock.

Main Memory-Non Contiguous Memory Allocation - Contiguous Memory Allocation, Paging, Segmentation, Examples; Virtual Memory- Demand Paging, Page Placement and Replacement policies - FIFO Page Replacement, Optimal Page Replacement, LRU Page Replacement, Allocation, Thrashing;

Mass Storage system – Overview of Mass Storage Structure, Disk Structure, Disk Scheduling and Management; swap space management; File concept, Access methods, Directory Structure, File Sharing and Protection, File System Structure, Directory Implementation, Allocation Methods, Free-Space Management, I/O Systems - I/O Hardware, Application I/O interface, Kernel I/O subsystem, Streams, Performance.

Linux System - Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, Input-Output Management, File System, Inter-process Communication; Mobile OS - iOS and Android - Architecture and SDK Framework, Media Layer, Services Layer, Core OS Layer, File System.

OUTCOMES: At the end of the course, the students should be able to:

- Understand the basic concepts, functions, processes and threads of operating systems.
- Analyze various scheduling algorithms, Understand deadlock, prevention and avoidance algorithms.
- Compare and contrast various memory management schemes.
- Understand the functionality of file systems.
- Perform administrative tasks on Linux Servers and compare iOS and Android Operating Systems.

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", 9th Edition, John Wiley and Sons Inc., 2012.

REFERENCES :

1. RamazElmasri, A. Gil Carrick, David Levine, "Operating Systems – A Spiral Approach", Tata McGraw Hill Edition, 2010.
2. AchyutS.Godbole, AtulKahate, "Operating Systems", McGraw Hill Education, 2016.
3. Andrew S. Tanenbaum, "Modern Operating Systems", Second Edition, Pearson Education, 2004.
4. Gary Nutt, "Operating Systems", Third Edition, Pearson Education, 2004.
5. Harvey M. Deitel, "Operating Systems", Third Edition, Pearson Education, 2004.
6. Daniel P Bovet and Marco Cesati, "Understanding the Linux kernel", 3rd edition, O'Reilly, 2005.
7. Neil Smyth, "iPhone iOS 4 Development Essentials – Xcode", Fourth Edition, Payload media, 2011.

CS1603A

ARTIFICIAL INTELLIGENCE

L T P C

3 0 0 3

OBJECTIVES:

- To understand the various characteristics of Intelligent agents
- To learn the different search strategies in AI
- To learn to represent knowledge in solving AI problems
- To understand the different learning methodologies.
- To know about the various applications of AI..

UNIT I INTRODUCTION

9

Introduction–Definition – Future of Artificial Intelligence-AI Applications, Production systems, Problem Characteristics, types of production systems – Characteristics of Intelligent Agents–Typical Intelligent Agents – Multi agent systems

UNIT II PROBLEM SOLVING METHODS

9

Problem solving Methods – Search Strategies- Uninformed – Informed – Heuristics – Local Search Algorithms and Optimization Problems – Searching with Partial Observations – Constraint Satisfaction Problems – Constraint Propagation – Backtracking Search – Game Playing – Optimal Decisions in Games – Alpha – Beta Pruning – Stochastic Games

UNIT III KNOWLEDGE REPRESENTATION AND REASONING

9

First Order Predicate Logic– Unification – Forward Chaining-Backward Chaining – Resolution – Knowledge Representation – Ontological Engineering-Categories and Objects – Events – Mental Events and Mental Objects – Reasoning Systems for Categories –Reasoning with Default Information

UNIT IV LEARNING

9

Forms of Learning-Supervised learning-Learning Decision Trees- Evaluating and choosing the Best Hypothesis-The Theory of Learning-The Theory of learning-Regression and Classification with Linear Models-Artificial Neural Networks- Nonparametric Models-Support Vector Machines-Ensemble Learning-Practical Machine Learning-Learning Probabilistic Models-Active and Passive Reinforcement Learning.

UNIT V APPLICATIONS

9

AI applications – Language Models – Information Retrieval- Information Extraction – Natural Language Processing – Machine Translation – Speech Recognition – Computer vision, Natural Language Processing- Robot – Hardware – Perception – Planning – Moving

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, the students will be able to:

- ☐ Use appropriate search algorithms for any AI problem
- ☐ Represent a problem using first order and predicate logic
- ☐ Provide the apt agent strategy to solve a given problem
- ☐ Provide a suitable learning strategy to solve a problem
- ☐ Design applications for NLP that use Artificial Intelligence

TEXT BOOK:

1. S. Russell and P. Norvig, "Artificial Intelligence: A Modern Approach", Prentice Hall, Third Edition, 2009.
2. I. Bratko, —Prolog: Programming for Artificial Intelligence, Fourth edition, Addison-Wesley Educational Publishers Inc., 2011.

REFERENCES:

1. M. Tim Jones, —Artificial Intelligence: A Systems Approach(Computer Science), Jones and Bartlett Publishers, Inc.; First Edition, 2008
2. Nils J. Nilsson, —The Quest for Artificial Intelligence, Cambridge University Press, 2009.
3. William F. Clocksin and Christopher S. Mellish, Programming in Prolog: Using the ISO Standard, Fifth Edition, Springer, 2003.
4. Gerhard Weiss, —Multi Agent Systems, Second Edition, MIT Press, 2013.
5. David L. Poole and Alan K. Mackworth, —Artificial Intelligence: Foundations of Computational Agents, Cambridge University Press, 2010.

IT1502A

WEB TECHNOLOGY

L T P C

3 0 0 3

OBJECTIVES:

- **To understand about client-server communication and protocols used during communication.**
- **To design interactive web pages using Scripting languages.**
- **To learn server side programming using servlets and JSP.**
- **To develop web pages using XML/XSLT.**
- **To develop web services using recent technologies.**

UNIT 1 WEB SITE BASICS AND HTML

9

Web Essentials: Clients, Servers, and Communication. The Internet-Basic Internet Protocols -The World Wide Web-HTTP request message-response message-Web Clients Web Servers. **Markup Languages:** XHTML. An Introduction to HTML History-Versions-Basic XHTML Syntax and Semantics-Some Fundamental HTML Elements-Relative URLs-Lists-tables-Frames-Forms-HTML 5.0.

UNIT II

CSS AND CLIENT SIDE SCRIPTING

9

Style Sheets: CSS-Introduction to Cascading Style Sheets-Features-Core Syntax-Style Sheets and HTML- Style Rule Cascading and Inheritance-Text Properties-Box Model Normal Flow Box Layout-Beyond the Normal Flow-CSS3.0. **Client-Side Programming:** The JavaScript Language-History and Versions Introduction JavaScript in Perspective-Syntax-Variables and Data Types-Statements-Operators-Literals-Functions-Objects-Arrays-Built-in Objects-JavaScript Debuggers.

UNIT III

SERVER SIDE SCRIPTING

9

Host Objects: Browsers and the DOM-Introduction to the Document Object Model DOM History and Level 1 Intrinsic Event Handling-Modifying Element Style-The Document Tree-DOM Event Handling-Accommodating Noncompliant Browsers Properties of window. **Server-Side Programming:** Java Servlets- Architecture Overview-A Servlet-Generating Dynamic Content-Life Cycle- Parameter Data-Sessions-Cookies-URL Rewriting-Other Capabilities-Data Storage Servlets and Concurrency- Databases and Java Servlets.

UNIT IV**JSP AND XML****9**

Separating Programming and Presentation: JSP Technology Introduction-JSP and Servlets-Running J Applications Basic JSP-JavaBeans Classes and JSP-Tag Libraries and Files-Support for the Model-View-Controller Paradigm- Databases and JSP. **Representing Web Data:** XML-Documents and Vocabulary Versions and Declaration-Namespaces- DOM based XML processing Event-oriented Parsing: SAX Transforming XML Documents-Selecting XML Data: XPATH-Template based Transformations: XSLT Displaying XML Documents in Browsers.

UNIT V**AJAX AND WEB SERVICES****9**

AJAX: Ajax Client Server Architecture-XML Http Request Object-Call Back Methods. **Web Services:** JAX-WS-RPC-Concepts-Writing a Java Web Service-Writing a Java Web Service Client-Describing Web Service WSDL- Representing Data Types: XML Schema-Communicating Object Data: SOAP, Introduction to new technologies: JSON, AngularJS, React, Node.JS, JQuery, and MongoDB.

TOTAL 45 PERIODS**OUTCOMES:**

At the end of the course, the student should be able to:

- Design simple web pages using markup languages like HTML and XHTML.
- Create dynamic web pages using DHTML and java script that is easy to navigate and use.
- Program server side web pages that have to process request from client side web pages.
- Represent web data using XML and develop web pages using JSP.
- Understand various web services and new technologies used.

TEXT BOOK:

1. Jeffrey C. Jackson, "Web Technologies-A Computer Science Perspective", Pearson Education, 2006.
2. Brown, Ethan, "Web Development with Node and Express: Leveraging the JavaScript Stack", O'Reilly Media, 2019.
3. Anthony, Accomazzo, Murray Nathaniel, Lerner Ari, "Fullstack React: The Complete Guide to React and Friends", Fullstack.io, 2017.
4. Kozlowski, Pawel, "Mastering Web Application Development with Angular JS", Packt Publishing Ltd 2013.

REFERENCES

1. Robert. W. Sebesta, "Programming the World Wide Web", Fourth Edition, Pearson Education, 2007 .
2. Deitel, Deitel, Goldberg, "Internet & World Wide Web How To Program", Third Edition, Pearson Education 2006.
3. Marty Hall and Larry Brown, || Core Web Programming|| Second Edition, Volume I and II, Pearson Education 2001.
4. Bates, —Developing Web Applications||, Wiley, 2006
5. Dayley B., "Node.js, MongoDB, and AngularJS Web Development", Addison-Wesley Professional, 2014.
6. Vainikka J., "Full-Stack Web Development using Django REST Framework and React", 2018.

COURSE OBJECTIVES:

The student should be made to:

- To learn and use network commands.
- To learn socket programming.
- To implement and analyze various network protocols.
- To learn and use simulation tools.
- To use simulation tools to analyze the performance of various network protocols.
- To learn error detection and correction techniques

EXPERIMENTS

1. Learn to use commands like tcpdump, netstat, ifconfig, nslookup and traceroute. Capture ping and traceroute PDUs using a network protocol analyzer and examine.
2. Write a HTTP web client program to download a web page using TCP sockets.
3. Applications using TCP sockets like:
Echo client and echo server, Chat , File Transfer
4. Simulation of DNS using UDP sockets.
5. Write a code simulating ARP /RARP protocols.
6. Study of Network simulator (NS) and Simulation of Congestion Control Algorithms
7. Study of TCP/UDP performance using Simulation tool.
8. Simulation of Distance Vector/ Link State Routing algorithm.
9. Performance evaluation of Routing protocols using Simulation tool.
10. Simulation of error correction code (like CRC).
11. Configuring Network Operating Systems and network devices

At the end of the course, the student should be able to:

- Implement various protocols using TCP and UDP.
- Compare the performance of different transport layer protocols.
- Use simulation tools to analyze the performance of various network protocols.
- Analyze various routing algorithms.
- Implement simulation tools
- Implement error correction codes.

LABORATORY REQUIREMENT FOR BATCH OF 30 STUDENTS: HARDWARE:

1. Standalone desktops 30 Nos
2. Network simulator like NS2/Glomosim/OPNET/ Packet Tracer / Equivalent

IT1504A

WEB TECHNOLOGY LAB

L T P C 0 0 4 2

OBJECTIVES:

- To design interactive web pages using Scripting languages.
- To learn server side programming using servlets and JSP.
- To develop web pages using XML/XSLT.
- To develop web services using recent technologies.

LIST OF EXPERIMENTS

1. Create a web page with the following using HTML.
 - i) To embed an image map in a web page.
 - ii) To fix the hot spots.

- iii) Show all the related information when the hot spots are clicked.
2. Create a web page with all types of Cascading style sheets.
3. Client Side Scripts for Validating Web Form Controls using DHTML.
4. Installation of Apache Tomcat web server.
5. Write programs in Java using Servlets:
 - To invoke servlets from HTML forms.
 - Session Tracking.
6. Write programs in Java to create three-tier applications using JSP and Databases

For conducting on-line examination. For displaying student mark list. Assume that student information is available in a database which has been stored in a database server.

7. Programs using XML – Schema – XSLT/XSL.
8. Programs using DOM and SAX parsers.
9. Programs using AJAX.
10. Consider a case where we have two web Services- an airline service and a travel agent and the travel agent is searching for an airline. Implement this scenario using Web Services and Data base.
11. Write a client side scripting to demonstrate AngularJS.
12. Write a client side scripting to demonstrate ReactJS.

TOTAL: 60PERIODS

OUTCOMES: Upon Completion of the course, the students will be able to:

- Design simple web pages using markup languages like HTML and XHTML.
- Create dynamic web pages using DHTML and java script that is easy to navigate and use.
- Program server side web pages that have to process request from client side web pages.
- Represent web data using XML and develop web pages using JSP.
- Understand various web services and recent technologies.

SOFTWARE REQUIRED:

Dream Weaver or Equivalent, MySQL or Equivalent, Apache Server, WAMP/XAMPP, JQuery,AngularJS, ReactJS, Node JS.

CS1504A

OPERATING SYSTEMS LABORATORY

L T P C

0 0 4 2

OBJECTIVES

- To learn Unix commands and shell programming
- To implement Process Creation, Inter Process Communication and various CPU Scheduling Algorithms
- To implement Deadlock Avoidance and Deadlock Detection Algorithms
- To implement Page Replacement Algorithms
- To implement File Allocation Strategies

LIST OF EXPERIMENTS

1. Installation of LINUX using Virtual Machine
2. Basics of UNIX and LINUX commands
3. Write programs using the following system calls of UNIX operating system fork, exec, getpid, exit, wait, close, stat, opendir, readdir
4. Write C programs to simulate UNIX commands like cp, ls, grep, etc.

5. Shell Programming
6. Write C programs to implement the various CPU Scheduling Algorithms
7. Implementation of Semaphores
8. Implementation of Shared memory and IPC
9. Bankers Algorithm for Deadlock Avoidance
10. Implementation of Deadlock Detection Algorithm
11. Write C program to implement Threading & Synchronization Applications
12. Implementation of the following Memory Allocation Methods for fixed partition a) First Fit b) Worst Fit c) Best Fit
13. Implementation of Paging Technique of Memory Management
14. Implementation of the following Page Replacement Algorithms a) FIFO b) LRU c) LFU
15. Implementation of the various file organization techniques and the following File Allocation Strategies a) Sequential b) Indexed c) Linked

TOTAL: 60 PERIODS

OUTCOMES:

At the end of the course, the student should be able to

- Learn various UNIX commands, shell programming
- Compare the performance of various CPU Scheduling Algorithms
- Implement Deadlock avoidance and Detection Algorithms
- Create processes, implement IPC and Semaphores
- Analyze the performance of the various Page Replacement Algorithms
- Implement File Organization and File Allocation Strategies

IT1601A	MOBILE COMMUNICATION	L T P C
		3 0 0 3

OBJECTIVES:

The student should be made to:

- Understand the basic concepts of mobile computing
- Understand Wireless LAN, Bluetooth and WiFi Technologies
- Be familiar with the network protocol stack
- Learn the basics of mobile telecommunication system
- Be exposed to Ad-Hoc networks

UNIT I	INTRODUCTION	9
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Introduction to Mobile Computing & its Applications- Introduction to Generations of Mobile Communication Technologies-MAC Protocols – **Wireless MAC Issues**-SDMA- TDMA- FDMA- CDMA.

UNIT II	MOBILE TELECOMMUNICATION SYSTEM	9
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GSM – Architecture – Protocols – Connection Establishment – Frequency Allocation – Routing – Mobility Management – Security –GPRS- UMTS- Architecture.

UNIT III	WIRELESS NETWORKS	9
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Wireless LANs and PANs – IEEE 802.11 Standard – Architecture –**Physical Layer- MAC sublayer**- Services – Blue Tooth- Wi-Fi – WiMAX.

UNIT IV	MOBILE NETWORK & TRANSPORT LAYER	9
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Mobile IP –DHCP – AdHoc– Proactive and Reactive Routing Protocols – Multicast Routing- Vehicular Ad Hoc networks (VANET) –MANET Vs VANET – Security-Mobile TCP.

OUTCOMES:

At the end of the course, the student should be able to:

- Explain the basics of mobile telecommunication system.
- Illustrate the generations of telecommunication systems in wireless network
- Understand the architecture of Wireless LAN technologies.
- Determine the functionality of network layer and Identify a routing protocol for a given Ad hoc networks.
- Explain the functionality of Transport and Application layer.

TEXT BOOKS:

1. Jochen Schiller, —Mobile CommunicationsII, PHI, Second Edition, 2003.
2. Prasant Kumar Pattnaik, Rajib Mall, —Fundamentals of Mobile ComputingII, PHI Learning Pvt.Ltd, New Delhi – 2012.

REFERENCES:

1. Dharma Prakash Agarval, Qing and An Zeng, "Introduction to Wireless and Mobile systems", Thomson Asia Pvt Ltd, 2005.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, —Principles of Mobile ComputingII, Springer, 2003.
3. William.C.Y.Lee,—Mobile Cellular Telecommunications-Analog and Digital SystemsII, Second Edition,Tata Mc Graw Hill Edition ,2006.
4. C.K.ToH, —AdHoc Mobile Wireless NetworksII, First Edition, Pearson Education, 2002.
5. Android Developers : <http://developer.android.com/index.html>
6. Apple Developer : <https://developer.apple.com/>
7. Windows Phone Dev Center : <http://developer.windowsphone.com>
8. BlackBerry Developer : <http://developer.blackberry.com>

IT1602A **BIG DATA ANALYTICS** **L T P C**
3 0 0 3

OBJECTIVES:

- To know the fundamental concepts of big data and analytics.
- To explore tools and practices for working with big data
- To learn about stream computing.
- To know about the research that requires the integration of large amounts of data.

UNIT I **INTRODUCTION TO BIG DATA** **9**

Evolution of Big data – Best Practices for Big data Analytics - Big data characteristics - Big Data Use Cases- Characteristics of Big Data Applications -Big Data Analytics: Classification of Analytics – Challenges - Big Data Analytics important - Data Science - Data Scientist - Terminologies used in Big Data Environments - Top Analytics Tools

UNIT II **HADOOP AND MAP REDUCE** **9**

Introduction to Hadoop - Distributed Computing Challenges - History of Hadoop, Hadoop Eco System. Hadoop Overview – Use case of Hadoop – Hadoop Distributors – HDFS – Processing Data with Hadoop – Map Reduce - Managing Resources and Applications with Hadoop YARN – Interacting with Hadoop Ecosystem.

UNIT III **CLUSTERING AND CLASSIFICATION** **9**

Advanced Analytical Theory and Methods: Overview of Clustering - K-means - Use Cases - Overview of the Method - Determining the Number of Clusters - Diagnostics - Reasons to Choose and Cautions - Classification: Decision Trees - Overview of a Decision Tree - The General Algorithm - Decision Tree Algorithms - Evaluating a Decision Tree - Decision Trees in R - Naïve Bayes - Bayes' Theorem - Naïve Bayes Classifier.

UNIT IV **MINING DATA STREAMS** **9**

Introduction to Streams Concepts – Stream Data Model and Architecture - Stream Computing, Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating moments – Counting oneness in a Window – Decaying Window – Real time Analytics Platform(RTAP) applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.

UNIT V **NOSQL DATABASES** **9**

NoSQL - Introduction to Pig, Hive, HBase, MongoDB, Cassandra. Features of Hive- Comparison with Traditional Databases- User Defined Functions, Data Processing operators - Hive Shell, Hive Services, Hive Metastore, HiveQL, Tables, Querying –Needs-Terms-Data Types- Query Language –Querying Commands.

COURSE OUTCOMES:

Upon completion of the course, the students will be able to:

- Work with big data tools and its analysis techniques
- Analyze data by utilizing clustering and classification algorithms
- Learn and apply different mining algorithms and recommendation systems for large volumes of data
- Perform analytics on data streams
- Learn NoSQL databases and management.

TEXT BOOK:

- 1) Seema Acharya, Subhashini Chellappan, "Big Data and Analytics" Wiley India; Second Edition, ISBN:978- 8126579518
- 2) V.K. Jain, "Big Data & Hadoop", Khanna Book Publishing, 2017, ISBN: 978-9382609131
- 3) Anand Rajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", Cambridge University Press, 2012.
- 4) David Loshin, "Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph", Morgan Kaufmann/El sevier Publishers, 2013.

REFERENCES:

1. EMC Education Services, "Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data", Wiley publishers, 2015.
2. Bart Baesens, "Analytics in a Big Data World: The Essential Guide to Data Science and its Applications", Wiley Publishers, 2015.
3. Kim H. Pries and Robert Dunnigan, "Big Data Analytics: A Practical Guide for Managers " CRC Press, 2015.

IT1606A **SOFTWARE TESTING** **L T P C** **3 0 0 3**

COURSE OBJECTIVES:

- To understand and learn the basics of testing concepts.
- To understand and learn testing strategies and their importance.
- To know the levels of testing in developing a software.
- Will be exposed to the quality related issues.
- Will be familiar to test automation techniques.

UNIT I : TESTING PRINCIPLES **9**

Testing as an Engineering Activity – Testing as a Process – Testing Maturity Model- Testing axioms - Basic definitions-software testing principles- Role of tester in a Software Development Organization - testing as a process- Overview of Testing maturity model- Defects - Origins of Defect - Defect Classes- The Defect Repository-Requirements and Specification for Defects-Defect Examples, Developer/Tester Support for Developing a Defect Repository.

UNIT II : TEST CASE DESIGN STRATEGIES **9**

Test case Design Strategies – Using Black Box Approach to Test Case Design – Boundary Value Analysis – Equivalence Class Partitioning – State based testing – Cause-effect graphing – Compatibility

testing – user documentation testing – domain testing - Random Testing – Requirements based testing – Using White Box Approach to Test design – Test Adequacy Criteria – static testing vs. structural testing – code functional testing – Coverage and Control Flow Graphs – Covering Code Logic – Paths – code complexity testing –Evaluating Test Adequacy Criteria

UNIT III : LEVELS OF TESTING

9

The need for Levels of Testing – Unit Test – Unit Test Planning – Designing the Unit Tests – The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests – Integration Test Planning – Scenario testing – Defect bash elimination System Testing – Acceptance testing – Performance testing – Regression Testing – Internationalization testing – Ad-hoc testing – Alpha, Beta Tests – Testing OO systems – Usability and Accessibility testing – Configuration testing – Compatibility testing – Testing the documentation.

UNIT IV : TEST MANAGEMENT

9

People and organizational issues– organization structures for testing teams – testing services - Test Planning - Test Plan Components - Test Plan Attachments - Locating Test Items – test management – Reporting the Test Results - The role of three groups in Test Planning and Policy Development - The test specialist - Skills needed by a test specialist- Building a Testing Group - The Structure of Testing Group.

UNIT V : TEST AUTOMATION

9

Software test automation – skill needed for automation – scope of automation – Design and architecture for automation – Requirements for a test tool – challenges in automation – Test metrics and measurements – Project, progress and productivity metrics.

TOTAL PERIODS: 45 HOURS

COURSE OUTCOMES:

Upon completion of this course, student will be able to:

- 1.Summarize the basic concepts and principles of software testing.
- 2.Identify the various classes of defects present in the software.
- 3.Design test cases using appropriate test case design strategies.
- 4.Apply various levels of testing to test the software.
- 5.Outline test automation and metrics.
- 6.Create test reports using test result.

TEXT BOOKS:

- 1.Ilene Burnstein, Practical Software Testing, Springer Verlag International Edition, Springer (India) Pvt Ltd, 2012
- 2.Srinivasan Desikan and Gopalaswamy Ramesh, “Software Testing – Principles and Practices”, Pearson Education, 2006.

REFERENCES:

- 1.Edward Kit,” Software Testing in the Real World – Improving the Process”, Pearson Education, 1995.
2. Boris Beizer,” Software Testing Techniques” – 2nd Edition, Van Nostrand Reinhold, New York, 1990.
3. Aditya P. Mathur, “Foundations of Software Testing _ Fundamental Algorithms and Techniques”, Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008.

IT1603A

Mobile Application and Development Laboratory

OBJECTIVES:

- To understand the components and structure of mobile application development frameworks for Android and windows OS based mobiles.
- To understand how to work with various mobile application development frameworks.
- To learn the basic and important design concepts and issues of development of mobile applications.
- To understand the capabilities and limitations of mobile devices.

LIST OF EXPERIMENTS

1. Develop an application that uses GUI components, Font and Colours.

2. Develop an application that uses Layout Managers and event listeners.
3. Write an application that draws basic graphical primitives on the screen.
4. Develop an application that makes use of databases.
5. Develop an application that creates alarm clock.
6. Implement an application that uses Multi-threading.
7. Develop a native application that uses GPS location information.
8. Implement an application that writes data to the SD card.
9. Implement an application that creates an alert upon receiving a message.
10. Write a mobile application that makes use of RSS feed.
11. Develop a mobile application to send an email.
12. Develop a Mobile application for simple needs (Mini Project).

OUTCOMES:

Upon Completion of the course, the students will be able to:

- Develop mobile applications using GUI and Layouts.
- Develop mobile applications using Event Listener.
- Develop mobile applications using Databases.
- Develop mobile applications using RSS Feed, Internal/External Storage, SMS, Multi-threading and GPS.
- Analyze and discover own mobile app for simple needs.

LIST OF EQUIPMENTS FOR A BATCH OF 30 STUDENTS:

- Stand alone desktops with windows or Android or iOS or Equivalent Mobile Application Development.
- Tools with appropriate emulators and debuggers