SRI VENKATESWARA COLLEGE OF ENGINEERING
(An Autonomous Institution, Affiliated to Anna University, Chennai)
SRIPERUMBUDUR TK. - 602 117
REGULATION – 2018 (CBCS)
B.TECH. INFORMATION TECHNOLOGY
CURRICULUM

SEMESTER I										
S. No	**Course Code**	**Course Title**	**Category**	**Contact Periods**	**L**	**T**	**P**	**C**	**Pre requisite**	**F/M**
THEORY										
1	HS18151	Communicative English (Common to all Branches)	HS	3	3	0	0	3	-	F
2	MA18151	Engineering Mathematics I (Common to all Branches Except MR)	BS	4	3	1	0	4	-	F
3	PH18151	Engineering Physics (Common to all Branches)	BS	3	3	0	0	3	-	F
4	CY18151	Engineering Chemistry (Common to all Branches Except MR)	BS	3	3	0	0	3	-	F
5	EE18151	Basic Electrical and Electronics Engineering (Common to AE, BT, CE, CS,IT,MR & ME)	ES	3	3	0	0	3	-	F
6	IT18101	Programming for Problem Solving (Common to all Branches Except MR)	ES	3	3	0	0	3	-	F
PRACTICAL										
7	PC18161	Physics and Chemistry Laboratory (Common to all Branches)	BS	2	0	0	2	1	-	F
8	GE18161	Engineering Practices Laboratory (Common to all Branches)	ES	3	0	0	3	1.5	-	F
9	IT18111	Programming for Problem Solving Laboratory (Common to all Branches Except MR)	ES	3	0	0	3	1.5	-	F
			TOTAL	27	18	1	8	23		

SEMESTER II										
S. No	**Course Code**	**Course Title**	**Category**	**Contact Periods**	**L**	**T**	**P**	**C**	**Pre requisite**	**F/ M**
THEORY										
1	HS18251	Technical English (Common to all Branches)	HS	3	3	0	0	3	-	F
2	MA18251	Engineering Mathematics II (Common to all Branches Except MR)	BS	4	3	1	0	4	-	F
3	GE18151	Engineering Drawing (Common to all Branches)	ES	5	3	0	2	4	-	F
4	GE18251	Environmental Science and Engineering (Common to all branches Except MR)	BS	3	3	0	0	3	-	F
5	CS18201	Digital Principles and System Design (Common to CS & IT)	ES	3	3	0	0	3	-	F
6	IT18201	OOPS using C++ and Python	PC	3	3	0	0	3	-	F
PRACTICAL										
7	CS18211	Digital Principles and System Design Laboratory (common to CS & IT)	ES	3	0	0	3	1.5	-	F
8	IT18211	OOPS using C++ and Python Laboratory	PC	3	0	0	3	1.5	-	F
			TOTAL	27	18	1	8	23		

SEMESTER III										
S. No	**Course Code**	**Course Title**	**Category**	**Contact Periods**	**L**	**T**	**P**	**C**	**Pre requisite**	**F/ M**
THEORY										
1	MA18352	Discrete Mathematics (common to CS & IT)	BS	4	3	1	0	4	-	F
2	IT18301	IT Essentials	PC	3	3	0	0	3	-	F
3	IT18302	Computer Organization and Architecture	PC	3	3	0	0	3	-	F
4	IT18303	Information and Coding Theory	ES	3	3	0	0	3	-	F
5	IT18304	Data structures and Algorithms	PC	3	3	0	0	3	-	F
6	IT18305	Database Systems	PC	3	3	0	0	3	-	F
PRACTICAL										
7	IT18311	IT Essentials Laboratory	PC	3	0	0	3	1.5	-	F
8	IT18312	Data structures and Algorithms Laboratory	PC	3	0	0	3	1.5	-	F
9	IT18313	Database Systems Laboratory	PC	3	0	0	3	1.5	-	F
			TOTAL	28	18	1	9	23.5		

SEMESTER IV										
S. No	**Course Code**	**Course Title**	**Category**	**Contact Periods**	**L**	**T**	**P**	**C**	**Pre requisite**	**F/ M**
THEORY										
1	MA18453	Probability and Queuing Theory (common to CS & IT)	BS	4	3	1	0	4	-	F
2	IT18401	Paradigms of Algorithm Design	PC	4	3	1	0	4	IT18304	F
3	IT18402	Microprocessors and Microcontroller Interfacing	PC	3	3	0	0	3	-	F
4	IT18403	Operating System Concepts	PC	3	3	0	0	3	-	F
5	IT18404	Software Engineering Methodologies	PC	3	3	0	0	3	-	F
PRACTICAL										
6	IT18411	Microprocessors and Microcontroller Interfacing Laboratory	PC	3	0	0	3	1.5	-	F
7	IT18412	Operating System Concepts Laboratory	PC	3	0	0	3	1.5	-	F
8	IT18413	Software Engineering Methodologies Laboratory	PC	3	0	0	3	2	-	F
			TOTAL	26	15	2	9	22		

SEMESTER V										
S. No	**Course Code**	**Course Title**	**Category**	**Contact Periods**	**L**	**T**	**P**	**C**	**Pre requisite**	**F/ M**
THEORY										
1	IT18501	Data Communication and Networking	PC	3	3	0	0	3	-	F
2	CS18501	User Interface Technologies (Common to CS & IT)	PC	3	3	0	0	3	-	F
3	IT18502	Mobile Computing (Common to IT & CS)	PC	4	3	1	0	4	-	F
4		Professional Elective –I	PE	3	3	0	0	3	-	M
5	IT18503	Internet of Things (Common to IT & CS)	PC	3	3	0	0	3	-	F
PRACTICAL										
6	CS18511	User Interface Technologies Laboratory (Common to CS & IT)	PC	3	0	0	3	1.5	-	F
7	IT18511	Data Communication and Networking Laboratory	PC	3	0	0	3	1.5	-	F
8	IT18512	Internet of Things Laboratory (Common to IT & CS)	PC	3	0	0	3	1.5	-	F
			TOTAL	25	15	1	9	20.5		

SEMESTER VI										
S. No	**Course Code**	**Course Title**	**Category**	**Contact Periods**	**L**	**T**	**P**	**C**	**Pre requisite**	**F/ M**
THEORY										
1	IT18601	Computational Intelligence	PC	4	3	1	0	4	-	F
2	IT18602	Automata and Compiler Design	PC	4	3	1	0	4	-	F
3	IT18603	Information Security	PC	3	3	0	0	3	-	F
4		Professional Elective – II	PE	3	3	0	0	3	-	M
5		Open Elective I	OE	3	3	0	0	3	-	M
PRACTICALS										
6	IT18611	Automata and Compiler Design Laboratory	PC	3	0	0	3	1.5	-	F
7	HS18561	Interview and career skills Laboratory (Common to all Branches Except BT & EE)	EEC	4	0	0	4	2	-	F
8	IT18612	Information Security Laboratory	PC	3	0	0	3	1.5	-	F
			TOTAL	27	15	2	10	22		

SEMESTER VII										
S. No	**Course Code**	**Course Title**	**Category**	**Contact Periods**	**L**	**T**	**P**	**C**	**Pre requisite**	**F/ M**
THEORY										
1	IT18701	Cyber Forensics	PC	3	3	0	0	3	IT18603	F
2	IT18702	Big Data Analytics	PC	3	3	0	0	3	-	F
3	IT18703	Cloud Computing	PC	3	3	0	0	3	-	F
4		Professional Elective – III	PE	3	3	0	0	3	-	M
5		Open Elective II	OE	3	3	0	0	3	-	M
PRACTICALS										
6	IT18711	Project Work - I	EEC	3	0	0	3	2	-	F
7	IT18712	Big Data Mining and Analytics Laboratory	PC	3	0	0	3	1.5	-	F
8	IT18713	Cloud computing Laboratory	PC	3	0	0	3	1.5	-	F
			TOTAL	24	15	0	9	20		

SEMESTER VIII										
S. No	**Course Code**	**Course Title**	**Category**	**Contact Periods**	**L**	**T**	**P**	**C**	**Pre requisite**	**F/ M**
THEORY										
1		Professional Elective - IV	PE	3	3	0	0	3	-	M
2		Professional Elective –V	PE	3	3	0	0	3	-	M
PRACTICAL										
3	IT18811	Project Work- II	EEC	20	0	0	20	10	-	F
			TOTAL	26	6	0	20	16		

Total Credits : 170

Professional Electives – I & III (offered in ODD semester)

S. No	Course Code	Course Title
1	CS18002	Advanced User Interface Technologies (Common to CS & IT)
2	IT18003	Embedded Systems
3	IT18005	Free and Open Source Software
4	IT18007	Functional Programming using SCALA
5	IT18009	Graphics and Multimedia
6	IT18011	Information Retrieval
7	GE18051	Intellectual Property Rights (Common to all branches)
8	CS18604	Machine Learning Techniques (Common to CS & IT)
9	IT18013	Principles of Digital Image Processing (Common to IT &CS)
10	IT18015	Statistical analysis using R-Programming
11	IT18017	Software Testing and Quality Assurance (Common to IT & CS)

Professional Electives – II, IV & V (offered in EVEN semester)

S. No	Course Code	Course Title
12	CS18004	Agile Methodologies (Common to CS & IT)
13	IT18002	Deep Learning
14	IT18004	Digital Forensics Tools & Techniques
15	IT18006	Ethical Hacking
16	IT18008	Information Systems Security Engineering and Management
17	IT18010	Next Generation Cloud
18	GE18054	Professional Ethics in Engineering (Common to CE, CS, IT,EE, EC& MR)
19	IT18012	Security Principles and Techniques
20	IT18014	Service Oriented Architecture
22	IT18016	Software Project Management
22	IT18018	Web Technology

Professional Electives – Special Electives (can be chosen whenever offered)

S. No	Course Code	Course Title
1	SE18001	Artificial Intelligence & Robotics (Common to all branches except MR)
2	SE18002	Corporate Finance (Common to all branches except MR)
3	SE18003	Financial Statement Analysis (Common to all branches except MR)
4	SE18004	Managerial Economics (Common to all branches except MR)
5	SE18005	Market Research(Common to all branches except MR)
6	SE18006	Production Management(Common to all branches except MR)
7	SE18007	Project Management(Common to all branches except MR)
8	SE18008	Securities Market – Beginner's Module(Common to all branches except MR)
9	SE18009	Supply Chain Management(Common to all branches except MR)

List of Open Electives Offered To All Branches Except IT

OFFERED DURING ODD SEMESTER		
S. No	**Course Code**	**Course Title**
1	OE18801	IT essentials for engineers
2	OE18803	Internet of Everything
3	OE18805	Foundation on Mobile App Development

OFFERED DURING EVEN SEMESTER		
S. No	**Course Code**	**Course Title**
1	OE18802	Embedded and Real Time Systems
2	OE18804	Ethical hacking and IT security
3	OE18806	User Interface Design
4	OE18808	AI for Android

List of Value Added Courses

S.No	Course Code	Course Name	L	T	P	C
1	VD18801	Statistical Analysis using R	2	0	0	2
2	VD18802	Introduction to Block chaining	2	0	0	2
3	VD18803	Web design essentials	2	0	0	2
4	VD18804	Programming Essentials	2	0	0	2
5	VC18001	Communicative German (Common to all branches except MR)	2	0	0	2
5	VC18002	Communicative Japanese (Common to all branches except MR)	2	0	0	2
6	VC18003	Communicative Hindi (Common to all branches except MR)	2	0	0	2
7	VC18004	Design Thinking (Common to all branches except MR)	2	0	0	2

List of Mandaatory Courses

S.No	Course Code	Course Name	L	T	P	C
1	MC18801	Indian Constitution (Common to All Branches Except MR)	2	0	0	0

HS18151	COMMUNICATIVE ENGLISH (Common To All Branches)	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To enable learners to interact fluently on everyday social contexts.
- To enable learners engage in conversations in an academic/scholarly setting.
- To enable learners overcome public speaking barriers.
- To develop learners' ability to take notes and in the process, improve their listening skills
- To develop learners' reading skill through reading text passages for comprehension and contemplation.
- To enable learners write on topics of general interest and drafting correspondences for general purposes.

UNIT I 9

Listening – short video clips – conversational scenes form movies, celebrities' speeches/interviews. Speaking – several ways of introducing oneself at several situations, introducing others at several situations, inviting people for several occasions, describing people and their places. Reading – short comprehension passages – making inferences, critical analysis. Writing – completing the incomplete sentences– developing hints from the given information. Grammar – Wh- Questions and Yes or No questions –Parts of speech. Vocabulary development– prefixes- suffixes- articles – countable / uncountable nouns.

UNIT II **9**

Listening – customer care voice files, short narratives – identifying problems and developing telephone etiquettes. Speaking – speaking over skype/whatsapp, making business calls, making self-recorded informative videos, inquiring about a concept/activity, describing a concept/activity. Reading – reading the headlines on news magazines – slogans and taglines from advertisements. Writing - free writing – writing - headlines , slogans and taglines individual inspirations. Grammar – conjunctions, idioms, phrases, quotes. Vocabulary development – guessing the meanings of words in various different contexts.

UNIT III **9**

Listening – courtroom scenes from movies, debates and talks from news channels, notes taking. Speaking – language and tone for arguments, discussion, deliberation, contemplation, expressing opinions, reacting to different situations in an alien country. Reading–language used in instruction manuals of household appliances, cookery and other basic instructions. Writing- understanding the structure of texts - use of reference words, discourse markers-coherence, rearranging the jumbled sentences. Grammar – adjectives - degrees of comparison, framing direct and indirect questions. Vocabulary development – concise approach, single word substitution.

UNIT IV **9**

Listening – Sports commentaries, advertisements with users' criticisms; Speaking –for social causes, for promoting a concept, negotiating and bargaining; Reading – review of a product, movie, movement or a system; Writing – writing for advertisements, selling a product; Grammar – Tenses – Simple Past, Present and Future, Continuous - Past, Present and Future; Vocabulary Development – synonyms, antonyms and phrasal verbs.

UNIT V **9**

Listening – video lectures, video demonstration of a concept; Speaking – presenting papers/concepts, delivering short speeches, discourses on health, suggesting natural home remedies, cleanliness, civic sense and responsibilities; Reading – columns and articles on home science; Writing – correspondences of requests, basic enquiry/observation and basic complaints; Grammar - modal verbs, perfect tenses – Vocabulary development – collocations.

TOTAL : 45 PERIODS

OUTCOMES:

At the end of course,learners will be able to

- Read articles and infer meanings from specific contexts from magazines and newspapers.
- Participate effectively in informal/casual conversations; introduce themselves and their friends and express opinions in English.
- Comprehend conversations and short talks delivered in English.
- Write short write-ups and personal letters and emails in English.

REFERENCES:

1. Department of English, Anna University. "Mindscapes : English for Technologists and Engineers" Orient Black swan, Chennai. 2017.
2. Downes and Colm, "Cambridge English for Job-hunting", Cambridge University Press, New Delhi. 2008.
3. Murphy and Raymond,"Intermediate English Grammar with Answers", Cambridge University Press 2000.
4. Thomson, A.J." Practical English Grammar 1& 2 "Oxford 1986.

WEBSITES:

1. http://www.usingenglish.com
2. http://www.uefap.com3.
3. https://owl.english.purdue.edu/owl/
4. www.learnenglishfeelgood.com/esl-printables-worksheets.html

SOFTWARE:

1. Face 2 Face Advance – Cambridge University Press, 2014
2. English Advance Vocabulary- Cambridge University Press
3. IELTS test preparation – Cambridge University Press 2017
4. Official Guide to the TOEFL Test With CD-ROM, 4th Edition
5. CAMBRIDGE Preparation for the TOEFL TEST- Cambridge University Press, 2017

MA18151	ENGINEERING MATHEMATICS I	L	T	P	C
	(Common To All Branches Except MR)	3	1	0	4

OBJECTIVES:

- To understand and apply matrix techniques for engineering applications.
- To make the student knowledgeable in statistical methods of analyzing and interpret the data for engineering problems.
- To familiarize the student with basic calculus including functions of several variables. This is needed in many branches of engineering.
- To acquaint the student with Mathematical tools needed in evaluating multiple integrals and their usage.

UNIT I MATRICES 12

Eigen values and Eigen vectors of a real matrix – Characteristic equation – Properties of Eigen values and Eigen vectors – Statement and Applications of Cayley-Hamilton Theorem – Diagonalization of matrices– Reduction of a quadratic form into canonical form by orthogonal transformation-Nature of quadratic forms.

UNIT II STATISTICAL METHODS 12

Scatter diagram- Karl Pearson coefficient of correlation for raw data- Spermann rank correlation coefficient- lines of regression – Regression equation X on Y and Y on X- Curve fitting by Principle of least squares – Fitting a straight line $y = ax + b$ and a parabola $y = ax^2 + bx + c$.

UNIT III APPLICATION OF DIFFERENTIAL CALCULUS 12

Curvature in Cartesian co-ordinates – Centre and radius of curvature – Circle of curvature – Evolutes – Envelopes.

UNIT IV DIFFERENTIAL CALCULUS OF SEVERAL VARIABLES 12

Limits and Continuity - Partial derivatives – Total derivatives – Differentiation of implicit functions – Jacobians and properties– 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 12

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

TOTAL (L:45+T:15): 60 Periods

OUTCOMES:

- This course equips the students to have basic knowledge and understanding of fundamental statistics to analyze and interpret data.
- Basic application of calculus in engineering problems and to tackle for different geometries.
- To apply the idea of reducing complex Engineering problems into simple form using matrix technique.

TEXT BOOKS:

1. Erwin Kreyszig, "Advanced Engineering Mathematics", 8th Edition, John Wiley, 1999
2. Bali N. P and Manish Goyal, “A Text book of Engineering Mathematics”, Eighth Edition, Laxmi Publications Pvt Ltd., 2011.
3. Grewal. B.S, “Higher Engineering Mathematics”, 41stEdition, Khanna Publications, Delhi, 2011.

REFERENCES:

1. S C Gupta and V K Kapoor, "Fundamentals of Mathematical Statistics", S.Chand Private Ltd.,11th Edition 2005.
2. Glyn James, “Advanced Modern Engineering Mathematics”, 3rd Edition, Pearson Education, 2012.
3. Peter V.O’Neil, “Advanced Engineering Mathematics”, 7th Edition, Cengage learning, 2012.
4 Ramana B.V, “Higher Engineering Mathematics”, Tata McGraw Hill Publishing Company New Delhi, 2008.
5 Sivarama Krishna Das P. and Rukmangadachari E., “Engineering Mathematics”, Volume I, Second Edition, Pearson Publishing 2011.

PH18151	ENGINEERING PHYSICS	L	T	P	C
	(Common To All Branches)	3	0	0	3

OBJECTIVES:

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

UNIT I Crystal Physics 12

Unit cell - Bravais Lattices - Miller indices - Distance between Inter planar distance 'd' (derivation) - discussion of various crystal structures: calculation of Atomic radius, Coordination number, effective number of lattice points and Atomic Packing Factor for the SC, BCC, FCC, HCP, Diamond Cubic (derivation) - discussion about the NaCl, Graphite structures. Crystal defects : Zero dimensional, one dimensional, Two dimensional and Three dimensional defects. Diffraction of X-rays by crystal planes - Bragg's spectrometer - Powder Diffraction method.

UNIT II Thermal Physics 6

Modes of heat transfer: Newton's law of cooling – Thermal conductivity - Lee's disc method (derivation and expt) – Radial heat flow – Rubber tube method – Conduction through compound media (series and parallel).

UNIT III Wave Mechanics 9

Quantum principles: Black body radiation – Planck's Hypothesis (qualitative), Compton's effect (derivation).Wave-particle duality – de-Broglie's matter waves – Heisenberg's uncertainty principle - Wave function and its significance - Schrödinger's wave equation (Time dependent and Time independent) (derivation) – Application of Schrodinger's wave equation - Particle in one dimensional box (derivation) – Degenerate and non-degenerate energy states.

UNIT IV Acoustics and Ultrasonics 9

Acoustics: Classification of Sound – Characteristics of Musical Sound : Quality (Timbre), Pitch, Intensity of Sound – Units of Sound – decibel - Reverberation of sound – Reverberation time – absorption of sound energy by materials – Absorption coefficient – Sabine's Formula (derivation) – Factors affecting the acoustics of buildings – Remedies. Ultrasonics : Introduction to Ultrasonics – Properties of Ultrasonic waves – Production of Ultrasonics - Magnetostriction method, Piezo electric method – Detection of Ultrasonics – Ultrasonic Acoustic grating - Applications of Ultrasonic waves – SONAR, NDT, Sonogram.

UNIT V Optoelectronics and Fiber optics 9

Lasers: Basic properties of Lasers - Einstein's coefficients (Derivation) – Population inversion – Types of Lasers – Molecular Gas Lasers (CO_2 Laser) – Solid state Laser (Nd: YAG Laser) – Applications of Lasers in Engineering and Medicine. Fibre optics : Introduction - Principle and structure of optical fibers- Acceptance angle-Numerical aperture-Types of optical fibers- Fiber Optical communication system (block diagram) - Advantages and its applications.

TOTAL: 45 PERIODS

OUTCOMES:

Students will be able to

- gain working knowledge of fundamental physics and basic engineering principles in one or more engineering disciplines.
- to understand and to compute problems in Quantum Physics.
- to use modern engineering physics techniques and tools.
- to enhance knowledge about photonics and optical fiber communication system.

TEXT BOOKS:

1. Gaur R.K. and Gupta S.L, "Engineering Physics", Dhanput Publications, 2015.
2. Shatendra Sharma and Jyotsna Sharma, "Engineering Physics", Pearson, 2006.
3. Rajendran V, "Engineering Physics", Tata McGraw Hill, 2009.
4. Arumugam M, "Materials Science", Anuradha Publications, 2015.

REFERENCES:

1 David Halliday, Robert Resnick Jearl Walker, "Principles of Physics", 10th Edition, Wiley, 2015.

2. Peter Atkins and Julio De Paula, "Physical Chemistry", 10th Edition., Oxford University Press, 2014.

3. Arthur Beiser, Shobhit Mahajan and Rai Choudhury S, "Concepts of Modern Physics", 7th Edition, McGraw Hill Education, 2017.
4. Raghavan V, "Materials Science and Engineering", PHI Learning Pvt. Ltd., 2010.

CY18151	Engineering Chemistry	L	T	P	C
		3	0	0	3

(Common To All Branches Except MR)

OBJECTIVES:

- To make the students conversant with boiler feed water requirements, related problems and the water treatment techniques.
- To develop an understanding the principle, types and mechanism of corrosion and protective coatings.
- To acquaint the students with the basics of nanomaterials, their properties and applicants.
- To develop an understanding of the laws of photochemistry and basic spectral (UV and IR)analysis .
- To enable the students to understand the types of fuels, its calorific values and significance of flue gas analysis.

UNIT I WATER TECHNOLOGY 9

Sources, hard and soft water, estimation of hardness by EDTA method, boiler feed water, boiler problems, cause and preventive measures, softening of water, zeolite process and demineralization by ion exchangers, internal treatment methods, specifications for drinking water, BIS and WHO standards, treatment of water for domestic use, desalination - reverse osmosis and electrodialysis.

UNIT II CORROSION AND ITS CONTROL 9

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Corrosion: Basic concepts - mechanism of chemical, electrochemical corrosion - Pilling Bedworth rule – Types of Electrochemical corrosion - galvanic corrosion - differential aeration corrosion - pitting corrosion – stress corrosion – factors influencing corrosion. Corrosion control: Cathodic protection – sacrificial anodic method - corrosion inhibitors. Protective coatings: surface preparation for metallic coatings - electro plating (copper plating) and electroless plating (Nickel plating) - chemical conversion coatings - anodizing, phosphating and chromate coating.

UNIT III NANOCHEMISTRY 9

Basics - distinction between molecules, nanoparticles and bulk materials; size-dependent properties. Nanoparticles, nanocluster, nanorod, - nanotube (CNT) and nanowire. Synthesis: precipitation, thermolysis, hydrothermal, solvothermal, electrodeposition, chemical vapour deposition, laser ablation; Properties and applications of nanomaterials.

UNIT IV PHOTOCHEMISTRY AND SPECTROSCOPY 9

Photochemistry: Laws of photochemistry - Grotthuss - Draper law, Stark-Einstein law and Lambert Beer Law. Quantum efficiency - Photo processes - Internal Conversion, Inter-system crossing, Fluorescence, Phosphorescence and Photo-sensitization. Spectroscopy: Electromagnetic spectrum - Absorption of radiation - Electronic, Vibrational and rotational transitions. UV-visible and IR spectroscopy - principles, instrumentation (Block diagram only) and applications.

UNIT V 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- refining - 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. Combustion of fuels: introduction - theoretical calculation of calorific value - calculation of stoichiometry of fuel and air ratio - flue gas analysis by ORSAT Method.

TOTAL: 45 PERIODS

OUTCOMES:

The knowledge acquired on fuels, corrosion and its control, nanochemistry and water treatment techniques will make better understanding of engineering processes and applications for further learning.

TEXT BOOKS:

1. Jain P.C. and Monica Jain, "Engineering Chemistry", Dhanpat Rai Publishing Company (P) Ltd., New Delhi, 2010.
2. Dara S.S, Umare S.S, "Engineering Chemistry", S. Chand & Company Ltd., New Delhi 2010
3. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company, Ltd., New Delhi, 2008.

REFERENCES:

1 Ozin G. A. and Arsenault A. C., "Nanochemistry: A Chemical Approach to Nanomaterials", RSC Publishing, 2005.

2 B.R. Puri, L.R. Sharma, M.S. Pathania., "Principles of Physical Chemistry" Vishal Publishing Company, 2008.

EE18151	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (Common To AE, BT, CE, CS, IT, MR & ME)	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To understand the basic theorems used in Electrical circuits and the principles of measuring instruments.
- To educate the different concepts and function of electrical machines.
- To introduce the fundamentals of semiconductor and applications.
- To explain the principles of digital electronics.
- To impart knowledge of communication.

UNIT I ELECTRICAL CIRCUITS & MEASURMENTS 10

Ohm's Law – Kirchhoff's Laws – Steady State Solution of DC Circuits using Mesh Analysis – Introduction to AC Circuits – Waveforms and RMS Value – Power and Power factor – Single Phase and Three Phase AC Balanced Circuits. Construction and working Principle of Moving Coil and Moving Iron Instruments (Ammeters and Voltmeters), Dynamometer type Watt meters and Energy meters (Qualitative treatment only)

UNIT II ELECTRICAL MACHINES 10

Construction, Principle of Operation, Basic Equations and Applications of DC Generators, DC Motors, Single phase induction Motor-,Single Phase Transformer.

UNIT III SEMICONDUCTOR DEVICES AND APPLICATIONS 9

Characteristics of PN Junction Diode – Zener Effect – Zener Diode – LED, Photo diode and its Characteristics – Half wave and Full wave Rectifiers – Voltage Regulation. Bipolar Junction Transistor – CB, CE, CC Configurations and Characteristics – Photo transistors.

UNIT IV DIGITAL ELECTRONICS 9

Binary Number System – Logic Gates – Boolean Algebra – Half and Full Adders – Flip-Flops – Registers and Counters – A/D and D/A Conversion (single concepts).

UNIT V FUNDAMENTALS OF COMMUNICATION ENGINEERING 7

Types of Signals: Analog and Digital Signals – Modulation and Demodulation: Principles of Amplitude and Frequency Modulations.
Communication Systems: Radio, TV, Fax, Microwave, Satellite and Optical Fiber (Block Diagram approach only).

TOTAL : 45 PERIODS

OUTCOMES:

- Study the fundamental laws governing electrical circuits and to describe the working of measuring instruments.
- Understand the construction and characteristics of different electrical machines.
- Describe the fundamental behavior of different semiconductor devices and circuits.
- Learn the fundamental concepts of digital electronics circuits.
- Recognize the type of signals, data transfer and able to apply in communication systems.

TEXT BOOKS:

1. Mittle V.N, Arvind Mittal “Basic Electrical Engineering”, Tata McGraw Hill(India), Second Edition, 2013.
2. Sedha R.S., “A Text Book of Applied Electronics”, S. Chand & Co., 2014.

REFERENCES:

1 Muthusubramanian R, Salivahanan S and Muraleedharan K A, “Basic Electrical, Electronics Engineering”, Tata McGraw Hill, 2013.
2 I.J.Nagrath and D.P. Kothari, “Basic Electrical Engineering”, Tata McGraw Hill ((India), Third Edition, 2010.
3 Mehta V K, “Principles of Electronics”, S.Chand & Company Ltd, 2010
4 M.Morris Mano, “Digital Logic & Computer Engineering”,Printice Hall of India, 2004.
5 Mahmood Nahvi and Joseph A. Edminister, “Electric Circuits”, Schaum’ Outline Series, McGraw Hill, Fourth Edition,2007

IT18101	PROGRAMMING FOR PROBLEM SOLVING	L	T	P	C
		3	0	0	3

(Common to All Branches Except MR)

OBJECTIVES

The students should be made to:

- Learn the organization of a digital computer.
- Learn to think logically and write algorithms or draw flow charts for problems.
- Be exposed to the syntax of C.
- Be familiar with programming in C.
- Learn to use arrays, strings, functions, pointers, structures and unions in C.

UNIT I INTRODUCTION TO PROBLEM SOLVING 9

Simple model of a Computer – Hardware – Software – Data Representation, Introduction to Computer Networks and Internet, Problem Solving Techniques – Bottom up design and top down design - applications, Introduction to Algorithms and Flow Chart.

UNIT II C PROGRAMMING BASICS 9

Introduction to 'C' programming – structure of a 'C' program – compilation and linking processes. Conversion of simple algorithm to program.

Constants, Variables – Data Types – Expressions using operators in 'C' – Managing Input and Output operations – Decision Making and Branching – Looping statements – solving simple scientific and statistical problems.

UNIT III ARRAYS AND STRINGS 9

Arrays – Initialization – Declaration – One dimensional and Two dimensional arrays - String- String operations –Arrays of strings.

UNIT IV FUNCTIONS AND USER DEFINED DATA TYPES 9

Function – definition of function – Declaration of function – Pass by value - Pass by reference– Recursion - Enumerators - Structures - Unions.

UNIT V POINTERS AND FILES 9

Macros - storage classes - Pointers- Definition – Initialization – Pointers arithmetic – Double Pointers, Basic file operations-Example problems.

TOTAL : 45 PERIODS

OUTCOMES:

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

- Design and represent solutions to problems as algorithm and flow chart
- Write simple C Programs
- Develop modularized applications in C

TEXT BOOKS:

1. Pradip Dey, Manas Ghosh, " Programming in C ", First Edition, Oxford University Press, 2018.
2. Byron S Gottfried, "Programming with C", Schaum's Outlines, Third Edition, Tata McGraw-Hill, 2010.

REFERENCES:

1. Kernighan,B.W and Ritchie,D.M, "The C Programming language", Second Edition, Pearson Education, 2015.
2. Yashavant P. Kanetkar. "Let Us C", BPB Publications, 2011.
3. Paul J Deitel,Dr.Harvey M.Deitel,"C How to Program", Seventh Edition, Pearson Education, 2016.

PC18161	PHYSICS AND CHEMISTRY LABORATORY (Common To All Branches) PHYSICS LABORATORY	L	T	P	C
		0	0	2	1

OBJECTIVES

- To make the student to acquire practical skills in the determination of various physical properties of materials.

List of Exercises (Any 5 experiments to be conducted)

1. Determination of compressibility of the liquid - Ultrasonic interferometer.
2. Determination of thickness of the given object by Air wedge method.
3. Determination of dispersive power of a prism by Spectrometer.
4. Determination of Young's modulus of wooden scale by Non-Uniform bending.
5. Determination of wavelength, particle size and numerical aperture of fibre using Lasers.
6. Lee's Disc – Thermal conductivity of the poor conductor.
7. Torsional Pendulum – Determination of Rigidity modulus and moment of inertia.

OUTCOMES:

- The student will be able to analyze the physical principle using the various instruments, also relate the principle to engineering applications.
- The various experiments in the areas of optics, mechanics and thermal physics will nurture the students in all branches of Engineering.
- The students will be able to think innovatively and also improve the creative skills that are essential for engineering.

LIST OF EQUIPMENTS FOR THE BATCH OF 30 STUDENTS :

Spectrometer, Mercury Vapour lamp, Lee's disc experimental setup, Travelling microscope, Ultrasonic interferometer, Sodium vapour lamp, Diode laser, Optical fiber kit.

CHEMISTRY LABORATORY

OBJECTIVES

- To make the student to acquire practical skills in the determination of water quality parameters through volumetric and instrumental analysis.
- To acquaint the students with the determination of molecular weight of a polymer by viscometery.

List of Exercises (Any 5 experiments to be conducted)

1. Determination of total, temporary & permanent hardness of water by EDTA method.
2. Estimation of copper by EDTA.
3. Conductometric titration of a strong acid with a strong base
4. Estimation of iron content of the given solution using potentiometer.
5. Estimation of iron content of the water sample using spectrophotometer.
6. Determination of molecular weight of polymer using viscometer.
7. Determination of Alkalinity in water

TOTAL: 30 PERIODS

OUTCOMES:

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

LIST OF EQUIPMENTS FOR THE BATCH OF 30 STUDENTS :

1. Conductivity meter – 10 Nos
2. Spectrophotometer – 10 Nos
3. Ostwald Viscometer – 10 Nos
4. Potentiometer - 10 Nos
5. Electronic Balance - 2 Nos

Common Apparatus: Pipette, Burette, conical flask, iodine flask, porcelain tile, dropper (each 30 Nos.)

REFERENCES:

1. Rajendran V, "Engineering Physics", Tata McGraw Hill, 2009.
2. Furniss B.S. Hannaford A.J, Smith P.W.G and Tatchel A.R., "Vogels Textbook of Practical Organic Chemistry", 8th Edition, LBS Singapore, 2014.

GE18161	ENGINEERING PRACTICES LABORATORY	L	T	P	C
	(Common To All Branches)	0	0	3	1.5

OBJECTIVES:

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

LIST OF EXPERIEMNTS

GROUP A (CIVIL & MECHANICAL)

I **CIVIL ENGINEERING PRACTICE**

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, planning and cutting.

II **MECHANICAL ENGINEERING PRACTICE**

Welding:

a) Preparation of arc welding of butt joints, lap joints and tee joints.
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, funnels, etc.
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 vee – fitting models.

GROUP B (ELECTRICAL & ELECTRONICS)

III **ELECTRICAL ENGINEERING PRACTICE**

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 and comparison of energy for resistive and LED load using single phase energy meter.
6. Measurement of resistance to earth of electrical equipment.
7.

IV **ELECTRONICS ENGINEERING PRACTICE**

1. Identification of circuit components
   a) Resistor, capacitor, diode (PN & Zener), transistors.
   b) Soldering practice – Circuits – Using general purpose PCB.
2. Evaluating the parameters for DC power supply and AC power supply (peak-peak, rms, average, period, frequency) using function generator and CRO.
3. Study and implementation of logic functions using NAND, NOR, and NOT gates.
4. VI Characteristics of PN Junction diode.
5. VI Characteristics of Solar photovoltaic panel.
6. Design a 5V/12V Regulated Power Supply: using FWR rectifier and IC7805/IC7812.

TOTAL: 45 PERIODS

OUTCOMES:

- Fabricate carpentry components and to lay pipe connections including plumbing works.
- Use welding equipments to join the structures.
- Wiring of basic electrical system and measurement of electrical parameters.
- Study and implementation of basic electronic components, circuits and solar photovoltaic panel.
- Design a basic regulated power supply.

REFERENCES:

1. Jeyachandran K., Natarajan S. & Balasubramanian S., "A Primer on Engineering Practices Laboratory", Anuradha Publications, 2007.
2. Jeyapoovan T., Saravanapandian M. & Pranitha S., "Engineering Practices Lab Manual", Vikas Puplishing House Pvt.Ltd, 2006.
3. Bawa H.S., "Workshop Practice", Tata McGraw Hill Publishing Company Limited, 2007.

4. Rajendra Prasad A. and Sarma P.M.M.S., "Workshop Practice", Sree Sai Publication, 2002.
5. Kannaiah P. & Narayana K.L., "Manual on Workshop Practice", Scitech Publications, 1999.
6. Mittle V.N, Arvind Mittal, "Basic Electrical Engineering", Tata McGraw Hill(India), Second Edition,2013.
7. Sedha R.S., "A Text Book of Applied Electronics", S. Chand & Co., 2014.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

S. No.	Description of Equipment	Qty
	CIVIL	
1.	Assorted components for plumbing consisting of metallic pipes, plastic pipes, flexible pipes, couplings, unions, elbows, plugs and other fittings.	15 Sets.
2.	Carpentry vice (fitted to work bench)	15 Nos.
3.	Standard woodworking tools	15 Sets.
4.	Models of industrial trusses, door joints, furniture joints	5 each
5.	Power Tools: (a) Rotary Hammer (b) Demolition Hammer (c) Circular Saw (d) Planer (e) Hand Drilling Machine (f) Jigsaw	2 Nos
	MECHANICAL	
1.	Arc welding transformer with cables and holders	5 Nos.
2.	Welding booth with exhaust facility	5 Nos.
3.	Welding accessories like welding shield, chipping hammer, wire brush, etc.	5 Sets.
4.	Oxygen and acetylene gas cylinders, blow pipe and other welding outfit.	2 Nos.
5.	Centre lathe	2 Nos.
6.	Hearth furnace, anvil and smithy tools	2 Sets.
7.	Moulding table, foundry tools	2 Sets.
8.	Power Tool: Angle Grinder	2 Nos
9.	Study-purpose items: centrifugal pump, air-conditioner	1 each
	ELECTRICAL	
1.	Assorted electrical components for house wiring	15 Sets
2.	Electrical measuring instruments	10 Sets
3.	Study purpose items: Iron box, fan and regulator, emergency lamp	1 each
4.	Megger (250V/500V)	1 No.
5.	Power Tools: (a) Range Finder 2 Nos (b) Digital Live-wire detector	2 Nos.
6.	LED lamp 8 W & 16 W	2 Nos. each
	ELECTRONICS	
1.	Soldering guns	10 Nos.
2.	Assorted electronic components for making circuits	50 Nos.
3.	Small PCBs	10 Nos.
4.	Multimeters	10 Nos.
5.	Study purpose ICs: IC7805/IC7812	1 each
6.	Photovoltaic panel: 5 W/10 W	2 Nos.
7.	Light Source for PV panel	1 No.

IT18111 **PROGRAMMING FOR PROBLEM SOLVING LABORATORY** **(Common to All Branches Except MR)**

L	T	P	C
0	0	3	1.5

OBJECTIVES

The students should be made to:

- Be exposed to the syntax of C.
- Be familiar with programming in C.
- Learn to use arrays, strings, functions, pointers, structures and unions in C.

LIST OF EXERCISES

1. Usage of Basic Linux commands
2. C Programming using Simple statements and expressions
3. Scientific problem solving using decision making and looping.
4. Simple programming for one dimensional and two dimensional arrays.
5. Solving problems using Strings
6. C Programming using Pointers
7. C Programming using user defined functions (Pass by value and Pass by reference)
8. C Programming using Recursion
9. C Programming using structures and union
10. C Programming using enumerated data types
11. C Programming using macros and storage classes
12. C Programming using Files

TOTAL: 45 PERIODS

OUTCOMES:

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

- Write simple C Programs
- Able to solve scientific problems using C.

REFERENCES :

1. Pradip Dey, Manas Ghosh, " Programming in C ", First Edition, Oxford University Press, 2018.
2. Byron S Gottfried, "Programming with C", Schaum's Outlines, Third Edition, Tata McGraw-Hill, 2010

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.No.	Description of Equipment	Qty
HARDWARE:		
1.	Computer	30
SOFTWARE:		
2.	Open Source Linux OS	30
3.	C compiler	30

HS18251	TECHNICAL ENGLISH	L	T	P	C
		3	0	0	3

(Common to All Branches)

OBJECTIVES

- To enable learners define and understand technical communication and scientific writing
- To expose learners to nuances of seminar presentation, group discussion, and public speaking
- To expose learners to writing for scientific purposes
- To expose learners to drafting correspondences for business purposes
- To expose learners to writing for documenting purposes
- To enable students have a holistic understanding of job interviews and recruiting process.

UNIT I **9**

Listening – AV files pertaining to manufacturing processes of products, scientific documentaries; Speaking- syllable division and word stress, intonation, sharing opinions; Reading – news articles related to science and technology; Writing – definitions, instruction, recommendation, data interpretation, resume; Grammar – tenses and their aspects, sentence connectors - discourse markers, sequential words, active and passive voice, subject-verb agreement.

UNIT II **9**

Listening – AV pertaining to marketing strategies, peer reading and pronunciation; Speaking - turn taking, sharing opinions; conducting and attending a meeting, understanding the nuances of spoken communication among internal audience and external audience,; Reading - analytical documents, descriptive documents; Writing - fliers, brochures, resume- letter of application, checklists; Grammar - modal verbs, clauses – types and uses, conditional clauses, articles.

UNIT III **9**

Listening – AV related to how to use components, scientific description, Speaking - speaking for motivation and initiation, speaking at a seminar presentation; Reading – scientific journals, papers; Writing – Technical descriptions – process description, purpose and function, PowerPoint, Google forms, user manuals; Grammar - phrasal verbs, prepositions, technical and scientific affixes.

UNIT IV **9**

Listening - scientific debates, crisis management; Speaking - handling conflicts, speaking about the loss of benefits, progress or decline of business, identifying the connotative meanings, Reading- documented evidences of uses and functions of a product, review of a product, Writing – memos, follow-up letters, reports - proposal, project, progress reports, sales reports, reports on industrial visits, executive summary. Grammar - reported speech and tag questions, sentence structure – comparative, imperative, cause and effect, infinitive of result.

UNIT V **9**

Listening – AV of Group discussions, panel discussions, face to face interviews for recruitment purposes; Speaking- speaking at group discussions, interviewing a personality, answering at the interviews; Reading – WebPages of topnotch engineering companies, Writing - blogging, e-mails, letter of complaint, minutes of the meeting ; Grammar - one word substitution, collocations, better word/sentence substitution (rephrasing the content/improvising ideas).

TOTAL: 45 PERIODS

Suggested Activities [task based] – case study, guest lectures as models, problem solving, understanding team work.

OUTCOMES:

At the end of the course, learners will be able to:

- Understand the nuances of technical communication and scientific writing
- present papers and give seminars
- discuss in groups and brainstorm
- draft business correspondences and write for documenting purposes
- face job interviews with confidence

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REFERENCES:

1. Department of English, Anna University. Mindscapes : English for Technologists and Engineers. Orient Blackswan, Chennai. 2012.
2. Downes, Colm, Cambridge English for Job-hunting, Cambridge University Press, New Delhi. 2008
3. Murphy, Raymond, Intermediate English Grammar with Answers, Cambridge University Press 2000
4. Thomson, A.J. Practical English Grammar 1& 2 Oxford 1986.
5. Herbert A J, The Structure of Technical English Longman, 1965

WEBSITES:

1. http://www.usingenglish.com
2. http://www.uefap.com3
3. https://owl.english.purdue.edu/owl/
4. www.learnenglishfeelgood.com/esl-printables-worksheets.html

SOFTWARE:

- Face2Face Advance – Cambridge University Press, 2014
- English Advance Vocabulary- Cambridge University Press
- IELTS test preparation – Cambridge University Press 2017
- Official Guide to the TOEFL Test With CD-ROM, 4th Edition
- CAMBRIDGE Preparation for the TOEFL TEST- Cambridge University Press, 2017

MA18251	ENGINEERING MATHEMATICS II (Common to all Branches Except MR)	L	T	P	C
		3	1	0	4

OBJECTIVES

- To acquaint the student with the concepts of vector calculus needed for problems in all engineering disciplines.
- To make the student acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems.
- To develop an understanding of the standard techniques of complex variable theory so as to enable the student to apply them with confidence in application areas such as heat conduction, elasticity, fluid dynamics and flow of electric current.
- To make the student appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated.

UNIT I VECTOR CALCULUS 12

Gradient, divergence and curl – Directional derivative – Irrotational and solenoidal vector fields – Vector integration – Green's theorem in a plane, Gauss divergence theorem and Stokes' theorem (excluding proofs) – Simple applications involving cubes and rectangular parallelepipeds.

UNIT II ORDINARY DIFFERENTIAL EQUATIONS 12

Higher order linear differential equations with constant coefficients – Method of variation of parameters – Cauchy's and Legendre's linear equations – Simultaneous first order linear equations with constant coefficients.

UNIT III LAPLACE TRANSFORM 12

Laplace transform – Sufficient condition for existence – Transform of elementary functions – Basic properties – Transforms of derivatives and integrals of functions - Derivatives and integrals of transforms - Transforms of unit step function and impulse functions – Transform of periodic functions. Inverse Laplace transforms -Statement of Convolution theorem – Initial and final value theorems – Solution of linear ODE of second order with constant coefficients using Laplace transformation techniques.

UNIT IV ANALYTIC FUNCTION 12

Functions of a complex variable – Analytic functions: Necessary conditions – Cauchy-Riemann equations and sufficient conditions (excluding proofs) – Harmonic and orthogonal properties of analytic function – Harmonic conjugate – Construction of analytic functions – Conformal mapping- Translation, rotation and inversion (w = z+c, cz, 1/z, z2) - Bilinear transformation. .

UNIT V COMPLEX INTEGRATION 12

Complex integration –Statement and applications of Cauchy's integral theorem and Cauchy's integral formula –Taylor's and Laurent's series expansions – Singular points– Residues – Cauchy's residue theorem – Evaluation of real definite integrals as contour integrals around unit circle and semi-circle (excluding poles on the real axis).

TOTAL(L:45+T:15):60 PERIODS

OUTCOMES:

The subject helps the student to develop the fundamental and basic concepts in vector calculus, ODE, Laplace Transforms and complex functions. Students will be able to solve problems related to engineering applications by using these techniques.

TEXT BOOKS:

1. Erwin Kreyszig, Advanced engineering mathematics, 8th Edition, John Wiley, 1999.
2. Bali N. P and Manish Goyal, "A Text book of Engineering Mathematics", Eighth edition, Laxmi Publications Pvt Ltd., 2011.
3. Grewal. B.S, "Higher Engineering Mathematics", 41stEdition, Khanna Publications, Delhi, 2011.

REFERENCES:

1. Dass, H.K., and Er.Rajnish Verma, "Higher Engineering Mathematics", S.Chand Private Ltd.,2011.
2. Glyn James, "Advanced Modern Engineering Mathematics", 3rd Edition, Pearson Education, 2012.
3. Peter V.O'Neil, "Advanced Engineering Mathematics", 7th Edition, Cengage learning, 2012.
4. Ramana B.V, "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company New Delhi, 2008.
5. Sivarama Krishna Das P. and Rukmangadachari E., "Engineering Mathematics", Volume I, Second Edition, PEARSON Publishing, 2011.

GE18151	ENGINEERING DRAWING	L	T	P	C
	(Common To All Branches)	3	0	2	4

OBJECTIVES:

- This course will introduce students to Engineering Drawing and build their ability to read drawings and interpret the position and form of simple geometry, culminating into understanding of simple technical assemblies.

UNIT 0 ENGINEERING DRAWING FUNDAMENTALS 5
(Not for Examination)

Drawing standard: BIS, Lettering,Dimensioning, Type of lines, Conventions, Geometrical constructions: Dividing a straight line into equal parts, Bisecting a given angle, Construction of polygon – Triangle, Square, Pentagon and Hexagon using drawing tools.

UNIT I CURVES AND PROJECTION OF POINTS AND LINES 15

Construction of Engineering Curves: Conic Sections - Ellipse, Parabola, Hyperbola using Eccentricity method, Cycloid, Involute of Circle and Pentagon.
Projection: Principal Planes, Projection of Points using Four Angles of Projection, Projection of Straight Lines - Lines parallel or inclined to one or both planes using Rotating Line Method in First Angle of Projection.

UNIT II PROJECTION OF PLANES AND SOLIDS 15

Projection of Plane Figures – Inclined to any one Principal Plane, Projection of Solids – Simple Solids (Prisms, Pyramids, Cone and Cylinder) axis inclined to any one Principal Plane.

UNIT III SECTION OR SOLIDS & DEVELOPMENT OF SURFACES 15

Section of Solids –Sectional views of simple vertical solids cut by section plane inclined to any one Principal Plane.
Development of Surfaces – Development of lateral surfaces of truncated and frustum of simple solids.

UNIT IV PICTORIAL PROJECTION 15

Introduction to Pictorial Projection, Isometric Projection - Principle, Isometric Planes, Isometric Scales, Isometric Projection of simple solids and their combination.
Free Hand Drawing - Orthographic Projection - Orthographic views of simple blocks from their Isometric view, Isometric view of simple blocks from their Orthographic views.

UNIT V PERSPECTIVE PROJECTION 10

Perspective Projection of full solids in simple positions with respect to projection planes by visual ray and vanishing point method.

TOTAL: 75 PERIODS

OUTCOMES:

On Completion of the course the student will be able to

- Perform free hand sketching of basic geometrical constructions and multiple views of objects.
- Do orthographic projection of lines and plane surfaces.
- Draw projections and solids and development of surfaces.
- Prepare isometric and perspective sections of simple solids.
- Demonstrate computer aided drafting.

TEXT BOOKS:

1. Bhatt N.D, Panchal Pramod V.M and Ingle R, "Engineering Drawing", Charotar Publishing House, 2014.

REFERENCES:

1. Venugopal K and Prabhu Raja V, "Engineering Graphics", New Age International (P) Limited, 2009.
2. Shah M.B and Rana B.C, "Engineering Drawing", Pearson Education, 2009.
3. **Gopalakrishna K.R, "Engineering Drawing" (Vol. I & II), Subhas Publications, 2010.**
4. Natrajan K.V, "A Textbook of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2006.
5. Gowri S and Jeyapoovan T, "Engineering Graphics", Vikas Publishing House Pvt. Ltd., 2011.

GE18251	ENVIRONMENTAL SCIENCE AND ENGINEERING	L	T	P	C
	(Common To All Branches)	3	0	0	3

OBJECTIVES:

- To study the nature and facts about environment.
- To study the interrelationship between living organism and environment.
- To implement scientific, technological, economic and political solutions to environmental problems.
- To study the integrated themes and biodiversity, natural resources, pollution control and waste management.

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY 12

Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the forest ecosystem, grassland ecosystem, desert ecosystem, aquatic ecosystems, Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity - Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity - man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.

UNIT II NATURAL RESOURCES 10

Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people - Water resources: Use and over - utilization of surface and ground water, floods, drought, conflicts over water, dams - benefits and problems - Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer - pesticide problems, water logging, salinity, 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 - role of an individual in conservation of natural resources - Equitable use of resources for sustainable lifestyles.

UNIT III ENVIRONMENTAL POLLUTION AND DISASTER MANAGEMENT 10

Definition - causes, effects and control measures Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards - solid waste management: causes, effects and control measures of municipal solid wastes, e-Waste, risk related to e-Waste - role of an individual in prevention of pollution - pollution case studies - disaster management: floods, earthquake, cyclone and landslides, land degradation, man induced landslides, soil erosion and desertification.

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, case studies – role of non-governmental organization- Environmental ethics: Issues and possible solutions – Principles of green chemistry, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – wasteland reclamation – consumerism and waste products – 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 - Public awareness.

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, Swine flu, Dengue fever – women and child welfare – role of information technology in environment and human health management – case studies.

TOTAL : 45 PERIODS

OUTCOMES:

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

- Solve problems that cannot be solved by mere environmental laws.
- Acquire awareness on environmental issues at their infant stage.
- Integrate facts, concepts and methods for multiple disciplines and apply them to solve environmental and social problems.
- Analyse the connectivity between manmade activities – pollution – environmental issues – social problem and provide eco-friendly solutions.

TEXT BOOKS:

1. Benny Joseph, "Environmental Science and Engineering", Tata McGraw-Hill, New Delhi, 2012.
2. Gilbert M.Masters, "Introduction to Environmental Engineering and Science", 2nd edition, Pearson Education, 2010.

REFERENCES:

1 Dharmendra S. Sengar, "Environmental law", Prentice hall of India PVT LTD, New Delhi, 2012.
2 Erach Bharucha, "Textbook of Environmental Studies", Universities Press(I) PVT, LTD, Hydrabad, 2015.
3 Rajagopalan, R, "Environmental Studies-From Crisis to Cure", Oxford University Press, 2011.
4 Tyler Miller. G and Scott E. Spoolman, "Environmental Science", Cengage Learning India PVT, LTD, Delhi, 2013.

CS18201	DIGITAL PRINCIPLES & SYSTEM DESIGN	L	T	P	C
	(Common To CS & IT)	3	0	0	3

OBJECTIVES

- To understand various number systems, different methods used for the simplification of Boolean functions
- To design and implement a system that uses combinational logic for the given specification; Simulate combinational logic systems using verilog or VHDL
- To design and implement synchronous sequential system for the given specification; Simulate sequential logic systems using verilog or VHDL.
- To design and implement Asynchronous sequential system for the given specification.
- To design and implement memory accessing systems and systems using PLA, PAL.

UNIT I BOOLEAN ALGEBRA AND LOGIC GATES 9

Review of Number Systems – Arithmetic Operations – Binary Codes – Boolean algebra and Theorems – Boolean Functions - Logic Gates – Simplification of Boolean Functions using Karnaugh Map and Tabulation Methods-NAND & NOR Implementation

UNIT II COMBINATIONAL CIRCUITS 9

Combinational Circuits – Analysis and Design Procedures – Circuits for Arithmetic Operations, Code Conversion – Decoders and Encoders – Multiplexers and De-multiplexers – Tri-State Gates– Introduction to HDL programs

UNIT III SYNCHRONOUS SEQUENTIAL LOGIC 9

Latches and Flip Flops – Analysis and Design Procedures –Shift Registers – Counters –State Diagram, State Table, State Assignment & Minimization

UNIT IV ASYNCHRONOUS SEQUENTIAL LOGIC 9

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

UNIT V MEMORY AND PROGRAMMABLE LOGIC 9

RAM - Memory Decoding – Error Detection and Correction- ROM–Programmable Logic Array – Programmable Array Logic

TOTAL : 45 PERIODS

OUTCOMES:

- Perform arithmetic operations in any number system & to simplify the Boolean expression using K –Map and Tabulation techniques
- Use Boolean Simplification techniques to design a combinational hardware circuit & Design and analysis of a given digital Combinational circuit
- Design and analysis of a given digital Sequential hardware circuit
- Design and analysis of a given digital asynchronous sequential circuits
- Design using PLD

TEXT BOOKS:

1. Morris Mano M and Michael D. Ciletti, "Digital Design with An Introduction to Verilog HDL", 5th Edition, Pearson Education India, 2013.

REFERENCES:

1. John F. Wakerly, "Digital Design Principles and Practices", Fourth Edition, Pearson Education, 2007.
2. Charles H. Roth Jr, "Fundamentals of Logic Design", Fifth Edition, Jaico Publishing House, Mumbai, 2003.
3. Donald D. Givone, "Digital Principles and Design", Tata McGraw Hill, 2003.
4. Kharate G. K., "Digital Electronics", Oxford University Press, 2010.
5. Morris Mano, "Computer System Architecture", Third Edition, Pearson Education India, 2007.
6. https://www.cs.tcd.ie/John.Waldron/CS1026/lec9adder.pdf
7. http://digitalbyte.weebly.com/code-converters.html
8. http://www.learnabout-electronics.org/Digital/dig44.php
9. http://ece.gmu.edu/~clorie/Spring11/ECE-301/Lectures/Lecture_16.pdf
10. https://www.iitg.ernet.in/asahu/cs221/Lects/Lec11.pdf.

IT18201	OOPS USING C++ AND PYTHON	L	T	P	C
		3	0	0	3

OBJECTIVES

- Be familiar with the C++ concepts of abstraction, encapsulation, constructor, polymorphism, overloading and Inheritance.
- Be familiar with objects in python.
  Be familiar with python data structures and design patterns.

UNIT I OBJECT ORIENTED PROGRAMMING FUNDAMENTALS 9

C++ Programming features - Data Abstraction - Encapsulation - Class -Object - Constructors – Static members – Constant members – Member functions – Pointers – References - Role of this pointer – String Handling.

UNIT II OBJECT ORIENTED PROGRAMMING CONCEPTS 9

Dynamic memory allocation - Nested classes - Polymorphism – Compile time and Run time polymorphisms – Function overloading – Operator overloading - Inheritance – Virtual Functions - Abstract class.

UNIT III C++ PROGRAMMING ADVANCED FEATURES 9

Generic Programming - Function template - Class template - Exception handling - Standard template libraries – containers – iterators – function adaptors – allocators - File handling concepts.

UNIT IV OBJECTS IN PYTHON 9

Creating python classes, modules and packages, basic inheritance and multiple inheritance, Managing objects

UNIT V PYTHON DATA STRUCTURES AND DESIGN CONCEPTS 9

Tuples, Dictionaries, List, Sets, Built-in functions, Design patterns-Decorator, Observer, Strategy, State, Singleton, Template.

TOTAL : 45 PERIODS

OUTCOMES:

- Apply the concepts of data abstraction, encapsulation and inheritance to solve problems.
- Use the features of C++ appropriately.
- Apply the design patterns of python for solving real time problems.

TEXT BOOKS:

1. Bjarne Stroustrup, “The C++ Programming Language”, 4th Edition, Addison-Wesley Professional, 2013.
2. Dusty Philips Python 3 Object-oriented Programming - Second Edition 2015, packt publishers.

REFERENCES:

1. KR.Venugopal & Rajkumar Buyya “ Mastering C++”, second edition 2013.
2. Reema Thareja "PYTHON PROGRAMMING Using Problem Solving Approach", Oxford University Press, 2017.

CS18211	DIGITAL PRINCIPLES & SYSTEM DESIGN LABORATORY	L	T	P	C
		0	0	3	1.5

(Common To CS & IT)

OBJECTIVES

- To be an adjunct to the "Digital Principles and System design" Course through hands-on experience with design, construction, and implementation of digital circuits like combinational /sequential
- To provide the capability to understand and to simulate digital circuits through Xilinx

LIST OF EXPERIMENTS

1. Study of logic gates
2. Verification of Boolean theorems.
3. Combinational circuits-Implementation of arbitrary functions and code converters.
4. Design and implementation of Binary adder/subtractor.
5. Design and implementation of Parity generator/checker.
6. Design and implementation of magnitude comparator.
7. Design and implementation of applications using multiplexers.
8. Study and Implementation of Flip-Flops.
9. Design and implementation of shift registers.
10. Design and implementation of synchronous and asynchronous counters
11. Coding combinational circuits using hardware description language. (HDL s/w required)
12. Coding sequential circuits using HDL. (HDL s/w required)
13. Design and implementation of simple digital System(Mini Project)

TOTAL: 45 PERIODS

OUTCOMES:

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

- Use Boolean simplification techniques to design a combinational hardware circuit
- Design and Implement combinational and sequential circuits.
- Analyze a given digital circuit – combinational and sequential
- Design the different functional units in a digital computer system
- Design and Implement a simple digital system.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

1. Digital Trainer Kits
2. Bread board and components
3. PC s – with Xilinx for HDL
4. IC tester-1

IT18211	OOPS USING C++ AND PYTHON LABORATORY	L	T	P	C
		0	0	3	1.5

OBJECTIVES

The students should be made to:

- To understand the concepts of Object Oriented Programming
- To understand the features of C++ constructs.
- To understand python data structures and design patterns

List of Exercises

Creating simple applications using C++ by implementing the following concepts

1. Constructors and Destructor.
2. Friend Function and Friend Class.
3. Polymorphism and Function Overloading.
4. Overload Unary and Binary Operators Both as Member Function and Non Member Function.
5. Inheritance.
6. Virtual Functions.
7. Class Templates and Function Templates.
8. Exception Handling Mechanism.
9. Standard Template Library concept

Creating simple applications using Python by implementing the following concepts

1. Classes, Modules and Packages
2. Basic Inheritance and Multiple Inheritance
3. Tuples, Dictionaries, List, Sets
4. Built-in functions
5. Design patterns.

TOTAL: 45 PERIODS

OUTCOMES:

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

- Apply oops concepts to real time applications.
- Able to develop applications using c++ and python.

REFERENCES:

1. Bjarne Stroustrup, "The C++ Programming Language", 4th Edition, Addison-Wesley Professional, 2013.
2. Dusty Philips Python 3 Object-oriented Programming - Second Edition 2015, packt publishers.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

1. Computers installed with Linux OS/Windows OS and Python Compiler - 30 No.s

MA18352	DISCRETE MATHEMATICS (Common to CS and IT)	L	T	P	C
		3	1	0	4

OBJECTIVES:

- To extend student's Logical and Mathematical maturity and ability to deal with abstraction and to introduce most of the basic terminologies used in computer science courses and application of ideas to solve practical problems.
- To understand the fundamental concepts of the Graph theory and Network connectivity.

UNIT I PROPOSITIONAL LOGIC AND PROOFS 9+3

Propositional Logic – Propositional equivalences – Predicates and Quantifiers – Nested Quantifiers – Rules of inference.

UNIT II COMBINATORICS 9+3

Mathematical induction- 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 III GRAPH THEORY 9+3

Graphs and Graph models- Graph terminology and special types of Graphs – Matrix representation of Graphs and Graph isomorphism – connectivity – Eulerian and Hamiltonian Graphs.

UNIT IV ALGEBRAIC STRUCTURES 9+3

Algebraic systems – Semi groups and monoids - Groups – Subgroups – Homomorphism's – Normal subgroup and cosets – Lagrange's theorem – Definitions and examples of Rings and Fields.

UNIT V LATTICES AND BOOLEAN ALGEBRA 9+3

Partial ordering – Posets – Lattices as posets – Properties of lattices - Lattices as algebraic systems – Sub lattices – Direct product and homomorphism – Some special lattices – Boolean algebra.

TOTAL (L:45+T:15): 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.

TEXT BOOKS:

1. Tremblay J.P. and Manohar R, "Discrete Mathematical Structures with Applications to ComputerScience", Tata Mc Graw Hill Pub. Co. Ltd, New Delhi, 30th Reprint, 2011.
2. Kenneth H.Rosen, "Discrete Mathematics and its Applications", 7th Edition, Tata McGraw Hill Pub. Co. Ltd., New Delhi, Special Indian Edition, 2011.
3. Bondy J A and Murthy U S R , Graph Theory with Applications, Elsevier Science Publishing Co. Inc. New York, 1982.

REFERENCES:

1. Ralph P.Grimaldi., "Discrete and Combinatorial Mathematics: An Applied Introduction", 4th Edition, Pearson Education Asia, Delhi, 2007.
2. Thomas Koshy., "Discrete Mathematics with Applications", Elsevier Publications, 2006.
3. Seymour Lipschutz and Mark Lipson., "Discrete Mathematics", Schaum's Outlines, Tata McGraw Hill Pub. Co. Ltd., New Delhi, 3rd Edition, 2010.

IT18301	IT ESSENTIALS	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To know the difference between data and information
- To introduce the concept of Internet, Networks and its working principles.
- To know scripting languages.
- To understand various applications related to Information Technology.

UNIT I INFORMATION SYSTEMS **9**

Data and Information, Acquisition of Data – Text – Image – Audio - Video, Internet Application, E-commerce, Business Information Systems, Social Impact of Information Technology.

UNIT II 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 III SCRIPTING ESSENTIALS **9**

Need for Scripting languages - Types of scripting languages - Client side scripting - Server side scripting - PHP - Working principle of PHP - PHP Variables - Constants - Operators – Flow Control and Looping - Arrays - Strings - Functions - File Handling - PHP and MySQL - PHP and HTML - Cookies - Simple PHP scripts.

UNIT IV NETWORKING ESSENTIALS **9**

Fundamental computer network concepts - Types of computer networks - - Network layers - TCP/IP model - Wireless Local Area Network - Ethernet - WiFi - Network Routing - Switching - Network components.

UNIT V MOBILE COMMUNICATION ESSENTIALS **9**

Cell phone working fundamentals - Cell phone frequencies & channels - Digital cell phone components - Generations of cellular networks - Cell phone network technologies / architecture - Voice calls & SMS.

TOTAL: 45 PERIODS

OUTCOMES:

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

- Design and deploy web-sites, simple web-applications
- Describe the basics of networking and mobile communications

TEXT BOOKS:

1. V. Rajaraman, "Introduction to Information Technology", PHI Learning , Second Edition, 2013
2. Robin Nixon, "Learning PHP, MySQL, JavaScript, CSS & HTML5" Third Edition, O'REILLY, 2014.
3. James F. Kurose, ―Computer Networking: A Top-Down Approach‖, Sixth Edition, Pearson, 2012.

REFERENCES:

1. Gottapu Sasibhushana Rao, "Mobile Cellular Communication", Pearson, 2012.
2. R. Kelly Rainer , Casey G. Cegielski , Brad Prince, Introduction to Information Systems, Fifth Edition, Wiley Publication, 2014.

IT18302	COMPUTER ORGANIZATION AND ARCHITECTURE	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To make students understand the basic structure and operation of digital computer
- To understand the hardware-software interface
- To familiarize the student with arithmetic and logic unit and implementation of fixed point and floating point arithmetic operations.
- To expose the students to the concept of pipelining
- To familiarize the students with hierarchical memory system including cache memory and virtual memory
- To expose the students with different ways of communicating with I/O devices and standard I/O interfaces.

UNIT I BASIC COMPUTER ORGANIZATION AND DESIGN 9

Instruction codes, Computer registers, computer instructions, Timing and Control, Instruction cycle, Memory-Reference Instructions,Input-output and interrupt, Complete computer description, Design of Basic computer, design of Accumulator Unit.

UNIT II ALU AND CU 9

ALU - Addition and subtraction – Multiplication – Division – Floating Point operations –Subword parallelism. CPU- General Register Organization, Stack Organization, Instruction format, Addressing Modes, data transfer and manipulation, Program Control, Reduced Instruction Set Computer (RISC).

UNIT III PIPELINING AND HAZARDS 9

Basic MIPS implementation – Building datapath – Control Implementation scheme – Pipelining – Pipelined datapath and control – Handling Data hazards & Control hazards – Exceptions, The ARM Cortex-A8 and Intel Core i7 Pipelines.

UNIT IV MEMORY AND I/O SYSTEMS 9

Memory hierarchy - Memory technologies – Cache basics – Measuring and improving cache performance -- Input/output system, programmed I/O, DMA and interrupts, I/O processors.

UNIT V MULTICORES, MULTIPROCESSORS, AND CLUSTERS 9

Shared Memory Multiprocessors, Clusters and Other Message-Passing Multiprocessors Hardware Multithreading, SISD, MIMD, SIMD, SPMD, and Vector, Introduction to Graphics Processing Units, Clusters, Warehouse Scale Computers, and Other Message-Passing Multiprocessors.

TOTAL: 45 PERIODS

OUTCOMES:

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

- Design arithmetic and logic unit.
- Design and analyze pipelined control units
- Evaluate performance of memory systems.
- Understand parallel processing architectures.

TEXT BOOKS:

1. David A. Patterson and John L. Hennessey, "Computer organization and design", Morgan kauffman / elsevier, Fifth edition, 2014.

REFERENCES:

1. V. Carl Hamacher, Zvonko G. Varanesic and Safat G. Zaky, "Computer Organisation", VI edition, McGraw-Hill Inc, 2012.
2. William Stallings "Computer Organization and Architecture", Seventh Edition, Pearson Education, 2006.
3. Vincent P. Heuring, Harry F. Jordan, "Computer System Architecture", Second Edition, Pearson Education, 2005.
4. Govindarajalu, "Computer Architecture and Organization, Design Principles and Applications", first edition, Tata McGraw Hill, New Delhi, 2005.
5. John P. Hayes, "Computer Architecture and Organization", Third Edition, Tata McGraw Hill, 1998.
6. http://nptel.ac.in/.

IT18303	INFORMATION AND CODING THEORY	L	T	P	C
		3	0	0	3

OBJECTIVES:

To understand encoding and decoding of digital data streams.
To have a complete understanding of error–control coding.
To have a detailed knowledge of compression and decompression techniques.

UNIT I INFORMATION ENTROPY FUNDAMENTALS 9

Uncertainty, Information and Entropy – Source coding Theorem – Huffman coding –Shannon Fano coding – Discrete Memory less channels – channel capacity – channel coding Theorem – Channel capacity Theorem.

UNIT II DATA AND VOICE CODING 9

Pulse Amplitude Modulation, Pulse Code Modulation, Time Division Multiplexer, Digital Multiplexers,Differential Pulse code Modulation – Adaptive Differential Pulse Code Modulation – Adaptive subband coding – Delta Modulation – Adaptive Delta Modulation – Coding of speech signal at low bit rates (Vocoders, LPC).

UNIT III ERROR CONTROL CODING 9

Linear Block codes – Syndrome Decoding – Minimum distance consideration – cyclic codes – Generator Polynomial – Parity check polynomial – Encoder for cyclic codes – calculation of syndrome – Convolutional codes-Code tree, Trellis Diagram, Viterbi decoding.

UNIT IV COMPRESSION TECHNIQUES 9

Principles – Text compression – Static Huffman Coding – Dynamic Huffman coding – Arithmetic coding – Image Compression – Graphics Interchange format – Tagged Image File Format – Digitized documents – Introduction to JPEG standards.

UNIT V AUDIO AND VIDEO CODING 9

Linear Predictive coding – code excited LPC – Perceptual coding, MPEG audio coders – Dolby audio coders – Video compression – Principles – Introduction to H.261 & MPEG Video standards.

TOTAL : 45 PERIODS

OUTCOMES:

At the end of course the students will able

- To generate code words for different media elements.
- To derive entropy, mutual information and channel capacity for all types of channels.
- To analyse the performance of digital communication system by evaluating the probability of error for different error correcting codes.

TEXT BOOKS:

1. Simon Haykin, “Communication Systems”, John Wiley and Sons, 4th Edition, 2004.
2. Khalid Sayood, “Introduction to Data Compression”, Fifth Edition,E lsevier, 2017

REFERENCES:

IT18304	DATA STRUCTURES AND ALGORITHMS	L	T	P	C
		3	0	0	3

OBJECTIVES:

UNIT I LINEAR DATA STRUCTURES - I 9

Arrays – ADT - Linked Lists – Singly Linked List – Doubly Linked List – Circular Linked List – Applications of Linked Lists – Polynomial Manipulation – Problems on Linked Lists

UNIT II LINEAR DATA STRUCTURES – II 9

Stack ADT – Applications – Expression Conversion – Expression Evaluation – Problems on Stacks - Queue ADT – Linear Queue - Circular Queue – Problems on Queues

UNIT III NON LINEAR DATA STRUCTURES – I 9

Trees – Binary Trees – Expression Trees - Binary Search Trees – Operations - AVL Trees – Operations – Binary Heaps – Min Heap – Max Heap

UNIT IV NON LINEAR DATA STRUCTURES – II 9

Graphs – Applications - Representation – Topological Sort – Single Source Shortest Path Algorithm – All Pair Shortest Path Algorithm – Minimal Spanning Trees - Problems on Graph algorithms

UNIT V SORTING AND SEARCHING 9

Need for Sorting– Classification of Sorting algorithms – Bubble Sort – Selection Sort – Insertion Sort – Heap Sort – Linear Search – Binary Search – Hashing

TOTAL: 45 PERIODS

OUTCOMES:

TEXT BOOKS:

1. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C”, 2e Pearson Education, 1997.

REFERENCES:

1. Aho, Hopcroft and Ullman, “Data Structures and Algorithms”, Pearson Education,1983
2. Narasimha Karumanchi, “Data Structures and Algorithms Made Easy”, CareerMonk, 2016.
3. Narasimha Karumanchi, “Data Structures and Algorithmic Thinking with Python”, CareerMonk, 2015.
4. Thomas H Cormen at el, “Introduction to Algorithms”, 3e The MIT Press, 2009.

IT18305	DATABASE SYSTEMS	L	T	P	C
		3	0	0	3

UNIT I RELATIONAL DATABASES 9

Purpose of Database System – Levels of Data Abstraction – Data Models– Database System Architecture, – Introduction to relational databases - Relational Model - Keys -- Relational Algebra – Relational Calculus - SQL fundamentals - Advanced SQL features- Triggers- Embedded SQL– Dynamic SQL - Database connectivity.

UNIT II DATABASE DESIGN 9

Entity-Relationship Model – E-R Diagrams – Motivation for normal forms, dependency theory - functional dependencies, Armstrong's axioms for FD's–, Non-loss Decomposition– First, Second, Third Normal Forms, Dependency Preservation – Boyce/Codd Normal Form - Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form.

UNIT III TRANSACTION MANAGEMENT 9

Transaction Concepts - Transaction Recovery – ACID Properties – System Recovery – Media Recovery – Two Phase Commit -- Save Points – Concurrency – Need for Concurrency – Locking Protocols – Two Phase Locking – Deadlock – Recovery Isolation Levels.

UNIT IV IMPLEMENTATION TECHNIQUES 9

Overview of Physical Storage Media – 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 – Evaluation of relational algebra expressions, query equivalence, join strategies, query optimization algorithms.

UNIT V ADVANCED TOPICS 9

NoSQL databases - Hbase,MongoDB, Cassandra, CouchDB, Neo4J,In-memory Database - Redis, Object Relation Map - Alkami, Distributed databases, Spatial Databases, Temporal Databases, XML Databases, Multimedia Databases.

TOTAL: 45 PERIODS

OUTCOMES:

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

- To design database using E-R modeling and apply normalization techniques over it.
- To manage the transactions that happens in a database.
- To analyze the recent advancements in databases.
- To design and implement database for real world applications

TEXT BOOKS:

1. Ramez Elmasri, Shamkant B. Navathe, Fundamentals o f Database Systems , Seventh Edition, Pearson Education, 2016.

REFERENCES:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, Database System Concepts, Sixth Edition, Tata McGraw Hill, 2010.
2. Raghu Ramakrishnan, Johannes Gehrke Database ManagementSystems, Fourth Edition, Tata Mc Graw Hill, 2010.
3. G.K.Gupta, TDatabase Management Systems, Tata McGraw Hill, 2011.

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

5 Bipin Desai, An Introduction to Database Systems, Galgotia .

6 Pang, N. T., Steinbach, M. and Kumar,V., "Introduction to Data Mining", Pearson Education.

IT18311	IT ESSENTIALS LABORATORY	L	T	P	C
		0	0	3	1.5

OBJECTIVES:

To develop simple websites and mobile applications.
To incorporate multimedia elements in websites.
To gain knowledge about how to set up simple network.

List of Exercises

1. Develop static web pages - using HTML and Authoring Tools
2. Develop interactive web pages using HTML and Authoring Tools
3. Incorporate dynamism in websites - PHP scripts
4. Incorporating images in web pages.
5. Incorporating audio elements in web pages.
6. Develop simple mobile applications.
7. Develop Personal information system
8. Study of networking components
9. Set up a simple network

TOTAL: 45 PERIODS

OUTCOMES:

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

- To develop IT enabled applications.
- To set up a simple network.

TEACHING METHODS:

Demonstrations.
Discussions.

EVALUATION PATTERN:

Continuous performance of the students are to be evaluated based on their understanding ability to solve problems for each and every exercise.

These continuous performance assessments are cumulated and considered as internal marks.
At the end of the course, a model exam will be conducted to test the skills of students.

IT18312	DATA STRUCTURES AND ALGORITHMS LABORATORY	L	T	P	C
		0	0	3	1.5

OBJECTIVES:

The student should be made to:

Explore digital communications with a software radio to understand how each component works together.

Know details about analog to digital conversion, modulation, pulse shaping, and noise analysis.

LIST OF EXPERIMENTS:

1. Implementation of problems on Array of structures
2. Implementation of Singly Linked List operations
3. Implementation of Doubly Linked List operations
4. Implementation of Circular Linked List operations
5. (a)Implementation of Stack operations
   (b) Application of Stack – Expression conversion
   (c) Application of Stack – Expression evaluation
6. (a) Implementation of Linear Queue operations on an application
   (b) Implementation of Circular Queue operations on an application
7. Implementation of Binary search Tree operations on an application
8. Implementation of AVL Tree operations on an application
9. (a) Implementation of Min Heap operations on an application
   (b) Implementation of Max Heap operations on an application
10. Implementation of Dijkstra's algorithm for Single Source Shortest Path problem
11. Implementation of Warshall algorithm for All Pair Shortest Path problem
12. (a) Implementation of Bubble Sort on an application
    (b) Implementation of Insertion Sort on an application
    (c) Implementation of Selection Sort on an application
13. Implementation of Hash Table on an application
14. (a) Implementation of Linear Search on an application
    (b) Implementation of Binary Search on an application

TOTAL: 45 PERIODS

OUTCOMES:

To develop necessary skill in designing, analyzing and constructing digital electronic circuits.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

i) Kits for Signal Sampling, TDM, AM, FM, PCM, DM and Line Coding Schemes.
ii) Software Defined Radio platform for link simulation studies
iii) MATLAB / SCILAB for simulation experiments.
iv) PCs - 10 Nos.
v) Signal generator / Function generators / Power Supply / CRO / Bread Board each -15 nos.
vi) IC 555, Resistors, Capacitors, BC107.

IT18313	DATABASE SYSTEMS LABORATORY	L	T	P	C
		0	0	3	1.5

OBJECTIVES:

The student should be made to:

- To understand data definitions and data manipulation commands
- To learn the use of nested and join queries
- To understand functions, procedures and procedural extensions of data bases
- To be familiar with the use of a front end tool

- To understand design and implementation of typical database applications

LIST OF 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 an application
9. Database Connectivity with Front End Tools
10. Case Study using real life database applications

TOTAL: 45 PERIODS

OUTCOMES:

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

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
- Implement applications that require a Front-end Tool
- Critically analyze the use of Tables, Views, Functions and Procedures

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

HARDWARE:

Standalone desktops 30 Nos. (or)
Server supporting 30 terminals or more.

SOFTWARE:

Front end: VB/VC ++/JAVA or Equivalent
Back end: Oracle / SQL / MySQL/ PostGress / DB2 or Equivalent

MA18453 PROBABILITY AND QUEUEING THEORY L T P C
(Common to CS and IT)
3 1 0 4

OBJECTIVES:
To provide the required mathematical support in real life problems and develop probabilistic models which can be used in several areas of science and engineering.

UNIT I RANDOM VARIABLES 12+3
Discrete and continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential, Gamma and Normal distributions.

UNIT II TWO - DIMENSIONAL RANDOM VARIABLES 8+3
Joint distributions – Marginal and conditional distributions – Covariance – Correlation and Linear regression for two variables– Transformation of random variables.

UNIT III RANDOM PROCESSES 9+3
Classification – Stationary process – Markov process - Poisson process – Discrete parameter Markov chain – Chapman Kolmogorov equations – Limiting distributions.

UNIT IV QUEUEING MODELS 8+3
Markovian queues – Birth and Death processes – Single and multiple server queueing models – Little's formula - Queues with finite waiting rooms - Finite source models

UNIT V ADVANCED QUEUEING MODELS 8+3
M/G/1 queue – Pollaczek Khinchin formula - M/D/1 and M/EK/1 as special cases – Series queues – Open Jackson networks.

TOTAL (L:45+T:15): 60 PERIODS

OUTCOMES:
The students will have a fundamental knowledge of the probability concepts.
Acquire skills in analyzing queueing models.
It also helps to understand and characterize phenomenon which evolve with respect to time in a probabilistic manner.

TEXT BOOKS:

1. Ibe. O.C., "Fundamentals of Applied Probability and Random Processes", Elsevier, 1st Indian Reprint, 2007.
2. Gross. D. and Harris. C.M., "Fundamentals of Queueing Theory", Wiley Student edition, 2004.

REFERENCES:

1. Robertazzi, "Computer Networks and Systems: Queueing Theory and performance evaluation",Springer, 3rd Edition, 2006.
2. Taha H.A., "Operations Research", Pearson Education, Asia, 8th Edition, 2007.
3. Veerarajan. T, "Probability, statistics and random processes", McGraw Hill Publishers, 3rd edition, 2011.
4. Hwei Hsu, "Schaum's Outline of Theory and Problems of Probability, Random Variables and Random Processes", Tata McGraw Hill Edition, New Delhi, 2004.
5. Yates R.D. and Goodman. D. J., "Probability and Stochastic Processes", Wiley India Pvt. Ltd., Bangalore, 2nd Edition, 2012.

IT18401 PARADIGMS OF ALGORITHM DESIGN

L	T	P	C
3	1	0	4

OBJECTIVES:

- To provide foundation on designing algorithms, complexity analysis of algorithms, and computational complexity.
- To learn the basics of Parallel algorithm and genetic algorithm.

UNIT I FUNDAMENTALS **9**

Algorithms - The Importance of Developing Efficient Algorithms - Analysis of Algorithms Order - Computational Complexity-sorting , searching, hashing, selection problem.

UNIT II ALGORITHMIC STRATEGY **9**

Divide-and-Conquer - Sorting -Searching- Strassen's Matrix Multiplication Algorithm Arithmetic with Large Integers. Dynamic Programming - Binomial co-efficient - Floyd's Algorithm for Shortest Paths - Chained Matrix Multiplication - Dynamic Programming and Optimization Problems- Optimal Binary Search Trees - The Traveling Salesperson Problem.

UNIT III DESIGN TECHNIQUES **9**

Greedy Approach - Minimum Spanning Trees-scheduling - The Greedy Approach versus Dynamic Programming: The Knapsack Problem – Backtracking - Using a Monte Carlo Algorithm - The Sum-of-Subsets Problem - Graph Coloring - The Hamiltonian Circuits Problem - Branch-and-Bound - Best-First Search.

UNIT IV NP-COMPLETENESS **9**

NP-completeness – Polynomial Time - Polynomial Time Verification - Reducibility - NP-completeness proofs - Approximation Algorithms - Vertex-Cover problem – Travelling-Salesman problem.

UNIT V PARALLEL ALGORITHMS **9**

Parallel Architectures - The PRAM Model - Designing Algorithms for the CREW PRAM Model - Designing Algorithms for the CRCW PRAM Model.

TOTAL (L:45+T:15): 60 PERIODS

OUTCOMES:

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

- Analyze algorithms to determine the computational complexity
- Solve problems using different algorithm strategies

TEXT BOOKS:

1. Foundations of Algorithms,Richard E Neapolitan, 5th Edition,Jones &Bartlett Learning, 2014.

REFERENCES:

1. S.Sridhar, "Design and Analysis of Algorithms", Oxford University Press, First Edition, 2015.
2. T. H. Cormen, C. E. Leiserson, R. L. Rivest and C. Stein, “Introduction to

Algorithms", PHI Learning Private Limited, 2012.

IT18402	MICROPROCESSORS AND MICROCONTROLLER INTERFACING	L	T	P	C
		3	0	0	3

OBJECTIVES:

- Study the Architecture of 8086 microprocessor.
- Learn the design aspects of I/O and Memory Interfacing circuits.
- Study about communication and bus interfacing
- Study the Architecture of 8051 microcontroller.

UNIT I THE 8086 MICROPROCESSOR 9

Introduction to 8086 – Microprocessor architecture – Addressing modes - Instruction set and assembler directives – Assembly language programming – Modular Programming - Linking and Relocation - Stacks - Procedures – Macros – Interrupts and interrupt service routines – Byte and String Manipulation.

UNIT II 8086 SYSTEM BUS STRUCTURE 9

8086 signals – Basic configurations – Pins in 8086-–System Bus architecture using 8086 — Introduction to Multiprogramming – System Bus Structure – Multiprocessor configurations

UNIT III 8086 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.

UNIT IV THE 8051 MICROCONTROLLER 9

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

UNIT V 8051 INTERFACING 9

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

TOTAL : 45 PERIODS

OUTCOMES:

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

- Design and implement programs on 8086 microprocessor.
- Design I/O circuits.
- Design Memory Interfacing circuits.
- Design and implement 8051 microcontroller based systems

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.
2. Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin McKinlay, ―The 8051 Microcontroller and Embedded Systems: Using Assembly and C‖, Second Edition, Pearson Education, 2011

REFERENCES:

1. Doughlas V.Hall, ―Microprocessors and Interfacing, Programming and Hardware:,TMH, 2012

IT18403	OPERATING SYSTEM CONCEPTS	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To understand the basic concepts and functions of operating systems.
- To understand Processes and Threads
- To analyze Scheduling algorithms.
- To understand the concept of Deadlocks.
- To analyze 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.

UNIT I OPERATING SYSTEM CONCEPTS 9

Processes - Address Spaces - Files - Input/Output - Protection - The Shell -SYSTEM CALLS - System Calls for Process Management -System Calls for File Management - System Calls for Directory Management -The Windows Win32 API - OPERATING SYSTEM STRUCTURE - Monolithic Systems -Layered Systems -Microkernels -Client-Server Model - Virtual Machines .

UNIT II PROCESSES AND THREADS 9

PROCESSES -The Process Model -Process Creation -Process Termination -Process Hierarchies - Process States -THREADS -Thread Usage - The Classical Thread Model - POSIX Threads - INTERPROCESS COMMUNICATION - Race Conditions - Critical Regions - Mutual Exclusion with Busy Waiting - Semaphores - Mutexes - Message Passing CPU Scheduling – Scheduling criteria, Scheduling algorithms,- CLASSICAL IPC PROBLEMS - The Dining Philosophers Problem - The Readers and Writers Problem - Deadlock – Prevention,Detection,Avoidance

UNIT III Memory Management 9

ADDRESS SPACES - VIRTUAL MEMORY - Paging - Page Tables - PAGE REPLACEMENT ALGORITHMS - The First-In, First-Out (FIFO) Page Replacement Algorithm - The Least Recently Used (LRU) Page Replacement Algorithm - The Optimal Page Replacement Algorithm ISSUES FOR PAGING SYSTEMS - Local versus Global Allocation Policies - Page Size - Shared Pages - Page Fault Handling - SEGMENTATION -Implementation of Pure Segmentation - Segmentation with Paging: MULTICS .

UNIT IV I/O SYSTEMS 9

Mass Storage Structure- Overview, Disk Scheduling and Management; File System Storage-File Concepts, Directory and Disk Structure, Sharing and Protection; File System Implementation- File System Structure, Directory Structure, Allocation Methods, Free Space Management, I/O Systems.

UNIT V CASE STUDY 9

Unix, Linux, windows 8 – Process Management, memory management , Input –Output management , File System.

TOTAL: 45 PERIODS

OUTCOMES:

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

- 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.

- Compare iOS and Android Operating Systems.

TEXT BOOKS:

1. Andrew S. Tanenbaum, ―Modern Operating Systems‖, Fourth Edition, Pearson Education, 2015.

REFERENCES:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, ―Operating System Concepts‖, 9th Edition, John Wiley and Sons Inc., 2012.
2. Harvey M. Deitel, ―Operating Systems‖, Third Edition, Pearson Education, 2004.
3. Daniel P Bovet and Marco Cesati, ―Understanding the Linux kernel‖, 3rd edition, O‘Reilly, 2005.
4. Neil Smyth, ―iPhone iOS 4 Development Essentials – Xcode‖, Fourth Edition, Payload media, 2011.

5. Achyut S.Godbole, Atul Kahate, ―Operating Systems‖, McGraw Hill Education, 2016.

IT18404	SOFTWARE ENGINEERING METHODOLOGIES	L	T	P	C
		3	0	0	3

OBJECTIVES:

The student should be made to

- Understand the roles of software process
- Understand how an iterative, incremental development process leads to faster delivery of more useful software
- Understand the essence of agile development methods

UNIT I SOFTWARE PROCESS AND SOFTWARE REQUIREMENT ANALYSIS 9

Generic process model, Process Assessment and Improvement, Perscriptive Process models, Specialized Process models, Personal and Team Process models. Software Requirements: Functional and Non-Functional, User requirements, System requirements, Software Requirements Document – Requirement Engineering Process: Feasibility Studies, Requirements elicitation and analysis, requirements validation, requirements management.

UNIT II SOFTWARE DESIGN 9

Classical analysis: Structured system Analysis, Petri Nets- Data Dictionary System Modeling -Context models-Interaction models-Structural models-Behavioral models-Model driven engineering,

UNIT III ARCHITECTURAL DESIGN 9

Introduction - Architectural design decisions-Architectural views-Architectural patterns-Application architecture- User Interface Design: Interface analysis, Interface Design. Introduction to Software Testing.

UNIT IV AGILE PRODUCT MANAGEMENT WITH SCRUM 9

Agile methods - Agile development techniques - Agile project management - Scaling agile methods. Understanding product owner role - Working with product backlog - Planning the release.

UNIT V ADVANCED SOFTWARE ENGINEERING 9

Software Reuse - Component based Software Engineering - Distributed Software Engineering - Service - oriented Software Engineering - Systems Engineering - Systems of Systems.

TOTAL: 45 PERIODS

OUTCOMES:

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

- guide a real-world software development project to successful completion.
- manage software Projects responding to change and involving customer in the development process.
- analyze different software engineering methodologies.

TEXT BOOKS:

1. Ian Sommerville, “Software Engineering”, 10th Edition, Pearson Education Asia, 2016.
2. Roman Pichler,"Agile Product Management with Scrum Creating Products that Customers Love",Pearson Education, 2012

REFERENCES:

1. Roger S. Pressman, “Software Engineering – A Practitioner’s Approach”, Seventh Edition, Mc Graw-Hill International Edition, 2010.
2. Ken Schwaber ,"Agile Project Management with Scrum" , Microsoft Press,2014"
3. Tilak Mitra ," Practical Software Architecture: Moving from System Context to Deployment", IBM press,2016

IT18411	MICROPROCESSORS AND MICROCONTROLLER INTERFACING LABORATORY	L	T	P	C
		0	0	3	1.5

OBJECTIVES:

The student should be made to:

- Introduce ALP concepts and features
- Write ALP for arithmetic and logical operations in 8086 and 8051
- Differentiate Serial and Parallel Interface
- Interface different I/Os with Microprocessors
- Be familiar with MASM

LIST OF EXPERIMENTS:

8086 Programs using kits and MASM

1. Basic arithmetic and Logical operations
2. Move a data block without overlap
3. Code conversion, decimal arithmetic and Matrix operations.
4. Floating point operations, string manipulations, sorting and searching
5. Password checking, Print RAM size and system date
6. Counters and Time Delay

Peripherals and Interfacing Experiments

7. Traffic light control
8. Stepper motor control
9. Digital clock
10. Key board and Display
11. Printer status
12. Serial interface and Parallel interface
13. A/D and D/A interface and Waveform Generation

8051 Experiments using kits and MASM

14. Basic arithmetic and Logical operations
15. Square and Cube program, Find 2's complement of a number
16. Unpacked BCD to ASCII
17. Mini project using modern microcontrollers.

TOTAL: 45 PERIODS

OUTCOMES:

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

- Write ALP Programmes for fixed and Floating Point and Arithmetic
- Interface different I/Os with processor
- Generate waveforms using Microprocessors
- Execute Programs in 8051
- Explain the difference between simulator and Emulator

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

HARDWARE:

- 8086 development kits - 30 nos
- Interfacing Units - Each 10 nos
- Microcontroller - 30 nos

SOFTWARE:

- Intel Desktop Systems with MASM - 30 nos
- 8086 Assembler
- 8051 Cross Assembler

IT18412	OPERATING SYSTEM CONCEPTS LABORATORY	L	T	P	C
		0	0	3	1.5

OBJECTIVES:

The student should be made to:

- Learn shell programming and the use of filters in the UNIX environment.
- Be exposed to programming in C using system calls.
- Learn to use the file system related system calls.
- Be exposed to process creation and inter process communication.
- Be familiar with implementation of CPU Scheduling Algorithms, page replacement algorithms and Deadlock avoidance

LIST OF EXPERIMENTS:

1. Basics of UNIX commands.
2. Shell Programming.
3. Implement the following CPU scheduling algorithms
    a) Round Robin b) SJF c) FCFS d) Priority
4. Implement all file allocation strategies
    a) Sequential b) Indexed c) Linked
5. Implement Semaphores
6. Implement all File Organization Techniques
    a) Single level directory b) Two level c) Hierarchical d) DAG
7. Implement Bankers Algorithm for Dead Lock Avoidance
8. Implement an Algorithm for Dead Lock Detection
9. Implement e all page replacement algorithms
    a) FIFO b) LRU c) LFU
10. Implement Shared memory and IPC
11. Implement Paging Technique of memory management.
12. Implement Threading & Synchronization Applications Development of a reasonably sized dynamically loadable kernel module for Linux kernel

TOTAL: 45 PERIODS

OUTCOMES:

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

- Implement deadlock avoidance, and Detection Algorithms
- Compare the performance of various CPU Scheduling Algorithm
- Critically analyze the performance of the various page replacement algorithms
- Create processes and implement IPC
- Demonstrate individual competence in building medium size operating system components

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

Standalone desktops with C / C++ / Java / Equivalent complier 30 Nos. (or)

Server with C / C++ / Java / Equivalent complier supporting 30 terminals

IT18413	SOFTWARE ENGINEERING METHODOLOGIES LABORATORY	L	T	P	C
		0	0	3	2

OBJECTIVES:

The student should be made to:

- To capture the requirements specification for an intended software system
- To draw the UML diagrams for the given specification
- To map the design properly to code
- To test the software system thoroughly for all scenarios
- To improve the design by applying appropriate design patterns.

LIST OF EXPERIMENTS:

Draw standard UML diagrams using an UML modeling tool for a given case study and map design to code and implement a 3 layered architecture. Test the developed code and validate whether the SRS is satisfied.

1.Identify a software system that needs to be developed.

2.Document the Software Requirements Specification (SRS) for the Identified system.

3. Identify use cases and develop the Use Case model.

4.Identify the conceptual classes and develop a Domain Model and also derive a Class Diagram from that.

5. Using the identified scenarios, find the interaction between objects and represent them using UML Sequence and Collaboration Diagrams

6.Draw relevant State Chart and Activity Diagrams for the same system.

7.Implement the system as per the detailed design

8.Test the software system for all the scenarios identified as per the usecase diagram

9.Improve the reusability and maintainability of the software system by applying appropriate design patterns.

10.Implement the modified system and test it for various scenarios

SUGGESTED DOMAINS FOR MINI PROJECT:

1. Passport automation system.
2. Book bank
3. Exam registration
4. Inventory Management using QR code.
5. Online course reservation system
6. Airline/Railway reservation system
7. Portal for farmers.
8. Credit card processing

9. Criminal Management System
10. Alumni Tracking System.
11. Smart Management for food storage and waste reduction
12. Conference management system
13. Online Complaint portal
14. Library management system
15. Skill based online job portal

TOTAL: 45 PERIODS

OUTCOMES:

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

- Perform OO analysis and design for a given problem specification.
- Identify and map basic software requirements in UML mapping.
- Improve the software quality using design patterns and to explain the rationale behind applying specific design patterns
- Test the compliance of the software with the SRS

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

Standalone desktops with Windows 7 or higher, ArgoUML/ Rational Suite that supports UML 1.4 and higher /Selenium/ JUnit 30 Nos.