N.B.K.R. INSTITUTE OF SCIENCE & TECHNOLOGY
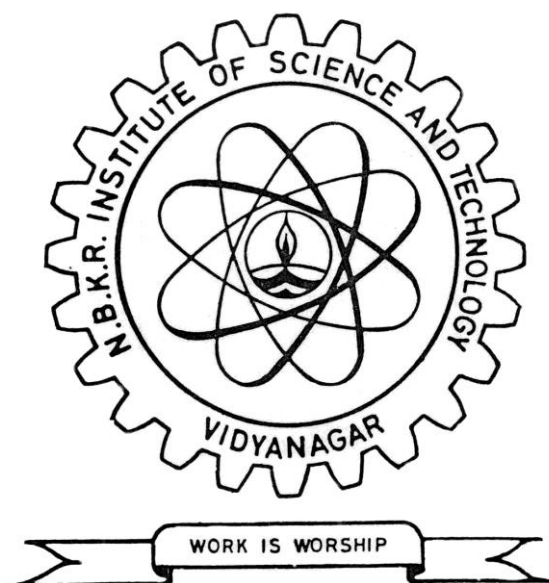
(AUTONOMOUS)
COLLEGE WITH POTENTIAL FOR EXCELLENCE (CPE)
Affiliated to JNTUA, Anantapuramu
Re-Accredited by NAAC with 'A' Grade
B.Tech. Courses Accredited by NBA under TIER-I

SYLLABUS

B.TECH.

INFORMATION TECHNOLOGY

(With effect from the batch admitted in the academic year 2017-2018)

VIDYANAGAR - 524413
SPSR Nellore-Dist. Andhra Pradesh

www.nbkrist.org

Vision and Mission of the INSTITUTE

Vision:

> To emerge as a comprehensive Institute that provides quality technical education and research thereby building up a precious human resource for the industry and society.

Mission:

- To provide a learner-centered environment that challenges individuals to actively participate in the education process.
- To empower the faculty to excel in teaching while engaging in research, creativity and public service.
- To develop effective learning skills enabling students to pick up critical thinking thus crafting them professionally fit and ethically strong.
- To reach out industries, schools and public agencies to partner and share human and academic resources.

Vision and Mission of the Department

Vision:

> The department is committed to continually improve its educational environment in order to develop graduates with the strong academic and technical backgrounds needed to get distinction in the discipline globally and to achieve academic excellence by imparting in-depth knowledge to the students, facilitating research activities and cater to the ever changing industrial demands and societal needs.

Mission:

M1: To encourage students to become self-motivated, problem solving individuals who can find and understand of the knowledge needed to be successful in their profession.

M2: To provide intellectual inputs to knowledge-based industries in the form of qualified and trained manpower.

M3: To attain self-sustainability and overall development through Research and Consultancy.

M4: To produce best quality Computer Science Professionals by imparting quality training, hands on experience and value education.

M5: Providing an environment in which students are given the essential resources to address and solve real-world problems, participating in interdisciplinary and multidisciplinary research and its applications.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOS)

PEO1: To produce graduates having strong fundamental knowledge in basic sciences and engineering, along with sound principles of computer programming with exposure to Computer Science and Engineering concepts that lead to problem solving techniques.

PEO2: To produce employable graduates who will be placed in various engineering positions in the computational world in firms of international repute.

PEO3: To produce graduates with strong communication skills and work effectively on team-based software development projects and will practice the ethics of their profession consistent with a sense of social responsibility.

PEO4: To pursuit of advanced degrees in engineering at different levels of research and consultancy. They get exposed to several other domains resulting in lifelong learning to broaden their professional knowledge.

PROGRAMME OUTCOMES (POS)

An Engineering Graduate will be able to:

PO1: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

NBKR INSTITUTE OF SCIENCE & TECHNOLOGY: VIDYANAGAR (AUTONOMOUS)
AFFILIATED TO JNTUA, ANANTAPURAMU
I YEAR OF FOUR YEAR B.TECH DEGREE COURSE – I SEMESTER
INFORMATION TECHNOLOGY
SCHEME OF INSTRUCTION AND EVALUATION

(With effect from the batch admitted in the academic year 2017-2018)

S.No	Course Code	Course Title	Instruction Hours/Week			Credits	Evaluation				Total Sessional Marks (Max. 40)	End Semester Examination		Max. Total Marks
							Sessional Test-I		Sessional Test-II					
		THEORY	L	T	D/P		Duration In Hours	Max. Marks (24+6+10)	Duration In Hours	Max. Marks (24+6+10)		Duration In Hours	Max. Marks	100
1	17SH1101	Functional English**	3	-	-	3	2	40	2	40	0.8*Best of two + 0.2*least of two	3	60	100
2	17SH1102	Engineering Physics @	3	-	-	3	2	40	2	40		3	60	100
3	17SH1104	Numerical Analysis**	3	1	-	3	2	40	2	40		3	60	100
4	17IT1101	Basic Computer Engineering @	3	-	-	3	2	40	2	40		3	60	100
5	17EE1101	Basic Electrical Sciences @	3	2	-	4	2	40	2	40		3	60	100
		PRACTICALS												
6.	17SH11P1	English Language Lab**	-	-	3	2	-	-	-	40	Day to Day Evaluation and a Test (40 Marks)	3	60	100
7.	17SH11P2	Engineering Physics Lab @	-	-	3	2	-	-	-	40		3	60	100
8.	17IT11P1	Basic Computer Engineering Lab @	-	-	2	1	-	-	-	40		3	60	100
9.	17ME11P2	Computer Aided Engineering Drawing @	-	-	6	3	-	-	-	40		3	60	100
		TOTAL	15	3	14	24	-	200	-	360		-	540	900

**Common to ALL   @Common to ECE, EEE, CSE, IT

1

17SH1101 - FUNCTIONAL ENGLISH

(Common to all Branches)

Course Category:	Basic Sciences		Credits:	3
Course Type:	Theory		Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Basic Level of LSRW skills.		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	Students undergoing this course are expected: • To develop their basic communication skills in English. • To achieve specific linguistic and communicative competence. • To acquire relevant skills and function efficiently in a realistic working context. • To inculcate the habit of reading.			

	On successful completion of this course students will be able to:	
Course Outcomes	CO1	Correct the error of the sentence; improve language proficiency and face competitive exams; GATE, GRE, TOEFL, GMAT etc.
	CO2	Comprehend the advanced level of reading comprehensions.
	CO3	Write clear and coherent passages for social and professional contexts.
	CO4	Write proposals, business letters.
	CO5	Acquire considerable flair in using broad range of vocabulary.
	CO6	Drafting Speech-building critical thinking.
Course Content	**UNIT-I** **Grammar:** Parts of Speech & Subject- Verb Agreement. **Writing-Paragraph Writing:** Expressions of ideas, concepts etc., in unambiguous grammatically acceptable and logically coherent manner (in general items); In particular skills in sentence construction emphasizing on function of word and Basic sentence patterns- framing sentences leading to effective paragraph). **UNIT-II** **Grammar:** Pronoun - Agreement & Usage, Articles: Kinds & Omission of Article. **Reading:** Different Reading Strategies: Skimming, Scanning, Inferring, Predicting and Responding to content –Guessing from Context and Vocabulary Extension. **Writing:** Letter writing - Formal and Informal Writing. **UNIT-III** **Grammar:** Tenses, Conditional Sentences, Non-Finite Verbs: Kinds of Non-Finite: Infinitives, Gerund & Participle.	

	Writing: Dialogue writing: Communicating and presenting ideas effectively and coherently, Exchanging conversation in a group or between two persons directed towards a particular subject.
	UNIT-IV
	Grammar: Prepositions: Kinds, Position, Adverb usage, Question tags & Transformation of sentences-Degrees of comparison.
	Writing: Telephonic conversations and Etiquettes.
	UNIT-V
	Grammar: Transformation of sentences- Direct- Indirect Speech, Active- Passive Voice & Modifiers.
	Writing: Story Writing.
	UNIT-VI
	Grammar: Simple, Complex, Compound Sentences – Parallelism.
	Writing: Drafting of Public Speech: Ideas / Content Generation, Structure.
Text Books and References	**Reference Books:** 1. Essential English Grammar: Raymond Murphy, Cambridge University Press. 2. Advanced Grammar in Use: Martin Hewings, Cambridge University Press. 3. High School English Grammar: Wren and Martin, S Chand Publications. 4. Effective Technical Communication: Ashraf Rizvi, Tata Mc-Graw Hill Publication.

17SH1102 - ENGINEERING PHYSICS

(Common for EEE, ECE, CSE & IT Branches)

Course Category:	Basic Sciences		Credits:	3
Course Type:	Theory		**Lecture - Tutorial - Practical:**	3-0-0
Prerequisite:	Fundamental Concepts of Physics		**Sessional Evaluation:** **Univ. Exam Evaluation:** **Total Marks:**	40 60 100
Objectives	Students undergoing this course are expected to • Explain the structure of crystalline solids and their uses in X-ray diffraction techniques. • Basic properties of magnetic materials and the uses in Science & Technology. • Explain and provide the knowledge about semiconductors and their use in electronic devices. • Describe the basic principles of communication system and their uses in communication filed. • Describe the characteristics of lasers and their fibers construction and applications in Science & Technology. • Understand the behavior of these nano materials, quantum phenomena and the limitations of basic physical laws.			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Understand the structure of Crystalline solids and their applications in x-ray diffraction.
	CO2	Understand the concept of magnetization and polarization and applications of magnets and dielectric materials in various disciplines.
	CO3	To know the properties of semiconductor materials by projecting the view of energy bands.
	CO4	Understand the concept of communication system with its applications in the field of Science & Technology.
	CO5	Understand the utilization of laser technology in various disciplines and know the concept of optical fiber and its applications.
	CO6	Basic ideas about superconductors and nano materials with their uses in various fields of Science & Technology
Course Content	**UNIT-I** **Crystallography:** Introduction, Space lattice, Unit cell, Lattice parameters, Bravias lattice, Crystal systems, Packing fractions of SC, BCC and FCC, planes in crystals, Miller indices, Interplanar spacing in cubic crystals. **X-Ray Diffraction:** X-ray diffraction in crystals, Bragg's law of diffraction, X-ray diffraction techniques, Laue method, powder method (Debye-Scherer method). **UNIT-II** **Dielectric Properties:** Basic definitions, Electronic, Ionic (Quantitative) and Orientation polarizations (Qualitative), Internal Fields in Solids, Classius, Mossotti Equation.	

Magnetic Materials: Introduction and basic definitions , Origin of magnetic moments , Classification of magnetic materials into dia, para, ferro, antiferro and ferri magnetic materials , Hysteresis , Soft and Hard magnetic materials , Applications of magnetic materials.

UNIT-III

Semiconductors: Intrinsic and extrinsic semiconductors ,Electrical Conductivity in Semiconductors , Drift and diffusion currents , Einstein relations , Hall Effect and its applications , Direct and indirect band gap semiconductors.

Physics of Semiconductor Devices: Formation of PN Junction, I-V Characteristics of PN Junction Diode, LED, Photo Diode, Solar Cell.

UNIT-IV

Communication System: Principles of Basic Communication System, Digital Communication System, Analog Communication System, Basic Steps for Analog/Digital Conversion, Sampling Theorem. System-Signal Bandwidth of signal, Signal impairment, Modulation, Different Types - Demodulation Process.

UNIT-V

Lasers: Introduction , Characteristics of lasers , Spontaneous and stimulated emission of radiation , Condition for Population inversion , Ruby Laser , He-Ne Laser , Applications of Lasers.

Optical Fibers: Introduction, Construction and working principle of optical fiber, Acceptance angle, Numerical Aperture, Types of optical fibers, Block diagram of optical fiber communication system, Applications of optical fibers.

UNIT-VI

Superconductivity: Introduction, effect of magnetic field, Meissener Effect, Type I and Type II superconductors, Flux quantization, BCS theory (Qualitative treatment), Applications of superconductors.

Physics of Nano Materials: Introduction, Significance of Nano scale and types of Nano materials, Physical properties: Optical, thermal, mechanical and magnetic properties, Synthesis of nano materials by Top down and bottom up approaches: ball mill, chemical vapour deposition and sol gel, Applications of nano materials.

Text Books and References	**Text Books:** 1. Principles of electronics by V.K.Mehtha, Tata Mc Graw Hill. 2. Solid State Physics by S.O.Pillai, New Age Publications (Labs edition). 3. Introduction to Solid State Physics by Charles Kittel, Wiley India Pvt Ltd, 7/e 4. Engineering Physics by R.K.Gaur&S.L.Gupta, Dhanpat Rai Publications.
	Reference Books: 1. Modern Engineering Physics by Dr. K. Vijaya Kumar, Dr. S. Chandralingam, S.CHAND & COMPANY LTD. 2. Applied Physics by P.K. Palanisamy: Scitech Publishers. 3. Engineering Physics by Dr. K.T. Tyagarajan, V.Rajendran, Tata Mc Graw-Hill

17SH1104 - NUMERICAL ANALYSIS

(Common to all Branches)

Course Category:	Basic Sciences		Credits:	3
Course Type:	Theory		**Lecture - Tutorial - Practical:**	3-1-0
Prerequisite:	Intermediate Mathematics		**Sessional Evaluation:** 40 **Univ. Exam Evaluation:** 60 **Total Marks:** 100	
Objectives	To make the students learn about: • The Bisection, False Position, Iteration and Newton-Raphson Methods. • The basic concepts of numerical solutions of simultaneous linear and non-linear algebraic equations. • The concepts of Interpolation. • The concepts of Numerical Differentiation and Integration. • The numerical methods to solve Ordinary Differential Equations by using Taylor's series method, Picard's method, Euler's and Modified Euler's Methods and Runge-Kutta methods of 2nd and 4th order. • The concepts of Curve Fitting and Regression Analysis.			

	After completing the course the student will be able to	
Course Outcomes	CO1	Acquire knowledge in solving algebraic and transcendental equations by using the appropriate numerical methods.
	CO2	Develop skills in analyzing the simultaneous linear and non-linear algebraic equations by various numerical methods.
	CO3	Attains skills in analyzing the methods of interpolating the given data.
	CO4	Acquire knowledge in Numerical Differentiation by Newton's formula and in Numerical Integration by Trapezoidal, Simpson's 1/3 and Simpson's 3/8 rules.
	CO5	Apply appropriate numerical methods to solve Ordinary Differential Equations.
	CO6	Develop skills in designing mathematical models for fitting geometrical curves to the given data and also acquire knowledge in Regression Analysis.
Course Content	**UNIT-I** **Solution of Algebraic and Transcendental Equations:** Bisection, False position, Iteration, Newton, Raphson Methods. **UNIT-II** **Solution of Simultaneous Linear and Non-Linear Algebraic Equations:** Iteration method, Gauss Jordon method, Gauss Elimination with Pivotal condensation method, Triangular Factorization method, Gauss-Seidal method, Newton, Raphson method. **UNIT-III** **Interpolation:** Newton's forward and backward interpolation formula, Lagrange's interpolation, Gauss forward and backward formulae, Stirling's formula.	

	UNIT-IV
	Numerical Differentiation and Integration: First and Second Order Derivatives at given points by Newton's formula. Trapezoidal rule, Simpson's 1/3 rule and Simpson's 3/8 rule.
	UNIT-V
	Numerical Solution of Ordinary Differential Equations: Solution by Taylor's Series, Picard's Method of Successive Approximations, Euler's and Modified Euler's Methods, Runge-Kutta Method of 2nd order and 4th order.
	UNIT-VI
	Curve Fitting: Introduction, Method of least squares, Linear and Non-linear equations. Correlation coefficient, Lines of regression, Rank correlation coefficient (Spearman's Rank-Correlation).
Text Books and References	**Text Books:** 1. Higher Engineering Mathematics-B.S.Grewal, Kanna Publishers, New Delhi. 2. Mathematical Methods - Dr.T.K.V. Iyengar, Dr.B. Krishna Gandhi, S.Ranganatham, Dr.M.V.S.S.N. Prasad, S.Chand Publication, New Delhi. **Reference Books:** 1. Introductory Methods of Numerical Analysis - S.S. Sastry, Prentice Hall India Learning Private Limited, New Delhi. 2. Numerical Methods - E. Balagurusamy, Tata McGraw-Hill Education Pvt. Ltd, New Delhi. 3. Numerical Methods for Scientific and Engineering Computation- S.R.K. Iyengar, R.K. Jain, M.K.Jain, New Age International Publishers, New Delhi.

17IT1101 - BASIC COMPUTER ENGINEERING

(Common to CSE, IT, ECE and EEE)

Course Category:	Program Core		Credits:	3
Course Type:	Theory		Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Basic usage of computer may be required and a few terms must be known in advance.		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	- Understanding the basics of computer fundamentals, identification of various components of computers and their need. - Creating awareness regarding various I/O devices. - Gaining knowledge about the working principle of CPU and its advancements. - Study of different storage media and operating system basics. - Getting fundamental ideas about core concepts of computer domains.			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Identify Physical components of a computer and their functionalities and to learn various interactive mechanisms through different devices.
	CO2	Understand storage media and strengthen the data processing concepts
	CO3	Explore the basic software programming and development concepts.
	CO4	Acquire the knowledge on operating system basics.
	CO5	Understand the essential networking concepts.
	CO6	Gain the basic knowledge in core concepts of computers such as Databases and Security issues.
Course Content	**PREREQUISITE:** Computers for individual users – Desktop, Workstations, Notebook computers, Tablet and Handheld computers, Smart phones, Computers for organizations – Network servers, mainframes, mini and super computers, Computers in society – why are so important, home, Education, Small Business, Industry, Government, Healthcare, Banking and Communication. **UNIT-I** **Inside the Computer:** Various parts of a Computer System - Software, Hardware, Data and Users, Information processing cycle, Essential Computer hardware - processor, Memory, I/O and Storage, Software and major categories- system software and application software. **I/O Devices:** The Keyboard – Layout, types of keys, input from keyboard, The Mouse – Usage, Variants of mouse, Devices for Hand – Pens, Touch Screens, Game controllers, Optical devices – Bar Code readers, Image scanners and OCR, Monitors – Types, CRT monitors, Flat panel Monitors. **UNIT-II** **Data Storage:** Categories of storage devices, Magnetic – How data is stored and organized on disk, How OS access the data, Diskettes, Hard disks, Removable High-Capacity Magnetic disks, Tape Drives, Optical Storage devices – CD-ROM, DVD-ROM,

Recordable Optical Technologies, Solid-state storage devices – Flash Memory, Smart Cards, Solid State Disks.

Data Processing: How Computers represent data – Number systems, Bits and Bytes, Text Codes, How Computers process data – the CPU, Machine cycles, Memory, Factors affecting processing speed – Registers, Memory and Computing power, The Computer's Internal Clock, The Bus, Cache Memory.

UNIT-III

Software Programming and Development: Definition of a computer program, Hardware/Software Interaction, Planning a computer program, How programs solve problems-Program control flow, Algorithms, Structured and object oriented programming.

Programming Languages and the Programming Process: The evolution of programming languages, Categories- Machine, Assembly and Higher level languages, Systems development life cycle for programming.

UNIT-IV

OS Basics: types of Operating Systems – Real Time Operating Systems, Single-user/Single-Tasking OS, Single user/Multitasking OS, Multi-user/Multitasking OS, User interfaces – Graphical User Interfaces, Command-Line Interfaces, Running Programs – Sharing information.

UNIT-V

Networking Basics: The usage of Network – Simultaneous access, Shared peripheral devices, Personal Communications and Easier data backup, Common types of networks – LANs, WANs, Hybrid Networks – CANs, MANs, HANs, Intranets and Extranets, Network topologies – Bus, Ring, Star, Mesh, Tree and Hybrid Topologies.

UNIT-VI

Database Management Systems: Databases and Database management systems, The database, The DBMS, Working with database, Creating database tables.

Computer Security: Basic Security Concepts – Threats, Degrees of Harm, Countermeasures, and Threats to Users – Identify theft, Loss of Privacy, Online Spying tools, Spam, Computer related injuries, Hardware threats – Power related threats, Theft and Vandalism, Natural Disasters.

Text Books and References	**Text Books:** 1. Peter Norton "Introduction to Computers", McGraw Hill Publishers, 7/e 2011.
	Reference Books: 1. Alex Leon and Mathews Leon "Fundamentals of Information Technology", Vikas Publishers, 2nd Edition 1999. 2. David Cyganski & John A. Orr "Information Technology-Inside and Outside", Pearson Education, 2002. 3. Marilyn Wolf "Computers as Components", MK publications, 3rd Edition, 2014.
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17EE1101 - BASIC ELECTRICAL SCIENCES

(Common for EEE, ECE, CSE & IT)

Course Category:	Professional Core		Credits:	4
Course Type:	Theory		**Lecture - Tutorial - Practical:**	3-2-0
Prerequisite:	Fundamental concepts of Electricity and electromagnetic induction.		**Sessional Evaluation:** **Univ. Exam Evaluation:** **Total Marks:**	40 60 100
Objectives	Students undergoing this course are expected to understand: • Basic characteristics of R, L, C parameters and Network Reduction techniques. • The concept of form factor, Crest factor and j notation. • The concept of power triangle, series and parallel connection of R, L & C elements with sinusoidal Excitation. • Application of Graph theory to Electrical circuits. • Application of K.C.L and K.V.L • Concept of inductance & mutual inductance, Dot convention and coefficient of coupling. • Concept of Series and parallel resonance and current locus diagrams			

	After completing the course the student will be able to	
	CO1	Given an Electrical network, find the equivalent resistance by using network reduction Techniques.
	CO2	Given a periodic waveform, finding the average, rms, form factor &crest factor.
Course Outcomes	CO3	For a given circuit and the Excitation, determine the real power, reactive power, power factor and response of the circuit.
	CO4	For a given electrical network, able to apply nodal and mesh analysis.
	CO5	For a given magnetic circuits, finding the coefficient of coupling (K), and finding the equivalent inductance.
	CO6	For a given electrical circuit, finding Quality factor, band width and drawing current locus diagrams.
Course Content	**UNIT-I** **Concept of Electric Circuits:** Introduction, Active and passive elements, V-I Characteristics of R, L and C elements, Ideal & Practical Sources, Source Transformation, Kirchhoff's laws, Network reduction techniques, Star-Delta transformation. **UNIT-II** **Fundamentals of AC Circuits:** R.M.S, Average valves , form factor and crest factor for different periodic wave forms, Sinusoidal Alternating Quantities - Phase and Phase Difference, Complex and Polar Forms Of Representations, j-Notation. Concept of Reactance, Impedance, Susceptance and Admittance.	

Single Phase AC Circuits: Concept of Active and reactive power, power factor –power triangle Examples Steady state Analysis of R, L and C elements(in series, parallel and series parallel combinations) –with sinusoidal Excitation - Phasor diagrams-Examples

UNIT-IV

Graph Theory: Network topology, Cut set and Tie set matrices – Incident matrices application to circuit analysis- Problems - Duality & Dual circuits – Problems

Analysis of Electrical Circuits: Mesh and Nodal analysis of DC and AC circuits concept of super mesh and Super node.

UNIT-V

Magnetic Circuits: Faraday's Laws of Electromagnetic Induction, Concept of Self and Mutual Inductance, Dot Convention in coupled coils, Coefficient of Coupling, Analysis of Series and Parallel Magnetic Circuits, MMF Calculations- Composite Magnetic Circuit.

UNIT-VI

Resonance: Series and parallel Resonance, Half power frequencies, Bandwidth and Q factor, Relation between half power frequencies- Bandwidth – Quality factor.

Locus Diagrams: Series and parallel combinations of R-L, R-C, and R-L-C with variation of parameters.

Text Books and References	**Text Books:** 1. "Engineering Circuit Analysis" by Hayt & Kemmerly, TMH publishers 2. "Network Analysis" by M.E Van Valkenburg,Third edition ,PHI learning private limited 3. "Fundamentals of Electric circuits" by Charles k Alexander,Mathew N O Sadiku,Tata McGraw Hill Education private Limited **Reference Books:** 1. "Circuits & Networks" by A.Sudhakar and Shyam Mohan - TMH 2. "Circuit Theory" by A.Chakarabarti - Dhanpat Rai publishers 3. "Circuits & Systems" by K.M.Soni – Kataria Publishers
E-Resources	1. https://nptel.ac.in/courses 2. http://iete-elan.ac.in 3. https://freevideolectures.com/university/iitm

17SH11P1 - ENGLISH LANGUAGE LABORATORY

(Common to all Branches)

Course Category:	Basic Sciences	**Credits:**	2
Course Type:	Practical	**Lecture - Tutorial - Practical:**	0-0-3
Prerequisite:	Basic Level of LSRW Skills	**Sessional Evaluation:** 40 **Univ. Exam Evaluation:** 60 **Total Marks:** 100	
Objectives	• The main objective is to develop students' basic skills of communication viz. LSRW in English through which communicative competence can be enhanced and can communicate efficiently in a realistic professional ambience.		

Course Outcomes	These are also helpful in enhancing the language competency and communicative level of confidence. These activities practiced in the laboratory are helpful in comprehending the important language aspects which are useful for the real life situations.

Course Content	**LIST OF EXPERIMENTS**
	
	 I. Listening Skills:
	      a. Listening for Pleasure,
	      b. Listening for Details and Listening for Information
	
	 II. Speaking Skills:
	      a. Jam,
	      b. Extempore
	      c. Presentations
	      d. Seminars
	
	 III. Reading Skills:
	      a. News Paper Reading
	
	 IV. Writing Skills:
	      a. Story Writing
	      b. Description
	          i. Object
	          ii. Place
	          iii. Person
	          iv. Situation
	      c. Giving Directions & Instructions

References	1. A Manual for English Language Laboratories: Dr. D. Sudha Rani, Pearson Publications 2. Pronunciation Dictionary: Daniel Jones 3. Techniques of Teaching English: A.L. Kohli 4. A Textbook of English Phonetics: For Indian Students: T Balasubramanian, Macmillan India Limited.

17SH11P2 - ENGINEERING PHYSICS LABORATORY

(Common to EEE, ECE, CSE & IT Branches)

Course Category:	Basic Sciences		Credits:	2
Course Type:	Practical		Lecture - Tutorial - Practical:	0-0-3
Prerequisite:	Engineering Physics		Sessional Evaluation:	40
			Univ. Exam Evaluation:	60
			Total Marks:	100
Objectives	• The main objective is to provide students to learn about some important experimental techniques in physics with knowledge in theoretical aspects so that they can excel in that particular field.			

Course Outcomes	1. These experiments in the laboratory are helpful in understanding important concepts of physics through involvement in the experiments by applying theoretical knowledge. 2. It helps to recognize where the ideas of the students agree with those accepted by physics and where they do not.
Course Content	Minimum of 8 experiments to be completed out of the following: **LIST OF EXPERIEMENTS** 1. Determination of Rigidity modulus of a material – Torsional pendulum 2. Melde's Experiment – Transverse and Longitudinal modes 3. Time constant of RC circuit 4. Resonance in LCR circuit 5. Magnetic field along the axis of a coil (Stewart-Gees Method) 6. Study of characteristics of LED and LASER Sources 7. Evaluation of Numerical Aperture of a given fiber 8. Energy Gap of a material of p-n junction 9. Diode Characteristics 10. Transistor Characteristics 11. Characteristics of Solar cell 12. Logic Gates 13. Hall Effect

17IT11P1 - BASIC COMPUTER ENGINEERING LABORATORY

(Common to CSE, IT, ECE and EEE)

Course Category:	Program Core		Credits:	1
Course Type:	Practical		Lecture - Tutorial - Practical:	0-0-2
Prerequisite:	Basic knowledge about Computer fundamentals and various hardware components.		Sessional Evaluation: 40 Univ. Exam Evaluation: 60 Total Marks: 100	

Course Outcomes	Upon successful completion of the course, the students will be able to:	
	CO1	Identify the physical components of a computer system, integration and study various application soft wares.
Course Content	1. To identify the computer hardware parts. (2 Labs) 2. Assembling and disassembling the system hardware components of a personal Computer.(2 Labs) 3. Installation Steps for Windows Operating System.(1 Lab) 4. To Practice on basics of Networking (Wired and Wireless network connections) (1 Lab) 5. To Practice Basic commands of LINUX.(2 Labs) 6. To Practice Basic MS-Word features (like Formatting, Tables, Sorting, Sections etc.,) (1 Lab) 7. Create envelope labels using mail merge.(1 Lab) 8. Spread sheet experiments using EXCEL. (1 Lab) 9. To Practice on MS-Power Point.(1 Lab) 10. To Practice on MS-Access. (1 Lab)	
Text Books and References	**Text Books:** 1. Peter Norton "Introduction to Computers", McGraw Hill Publishers, 7th Edition 2011.	
	Reference Books: 1. Alex Leon and Mathews Leon "Fundamentals of Information Technology", Vikas Publishers, 2nd Edition 1999. 2. David Cyganski & John A.Orr "Information Technology-Inside and Outside", Pearson Education, 2002. 3. Marilyn Wolf "Computers as Components", MK publications, 3rd Edition, 2014.	
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm	

17ME11P2 - COMPUTER AIDED ENGINEERING DRAWING

(Common to EEE, ECE, CSE and IT)

Course Category:	Professional Core		Credits:	3
Course Type:	Theory		Lecture - Tutorial - Practical:	0-0-6
Prerequisite:	Knowledge of basic math concepts and different types of shapes, angles, symmetry, scaling and unit measurement systems		**Sessional Evaluation:** **Univ. Exam Evaluation:** **Total Marks:**	40 60 100
Objectives	Students undergoing this course are expected to understand: • To enable the students with various concepts like dimensioning, construction of conic sections, polygons, cycloids and involutes. • To impart and inculcate proper understanding of AutoCAD fundamentals. • To apply the knowledge of AutoCAD for the projections of points, lines and solids. • To know about sections and development of solids. • To improve the visualization skills with isometric projections.			

	After completing the course the student will be able to	
Course Outcomes	CO1	Apply the conventions and the methods of engineering drawing.
	CO2	Create geometric constructions, conics with hand tools to draw lines, polygons, circle, tangencies, conic sections and irregular arcs.
	CO3	Sketch the solutions to the problems on projection
	CO4	Use the sectioning and developments concepts of solids in actual applications.
	CO5	Visualize the objects that they can apply these skills in developing new products.
Course Content		**UNIT-I** **Introduction:** Importance of Drawing, Drawing Instruments, Sheet layout, BIS Conventions, Types of lines, Lettering, and dimensioning methods. **Geometrical Constructions:** Regular Polygons (Triangle, Square, Pentagon, Hexagon) **Conic Sections:** Introduction, Construction of Ellipse, Parabola and Hyperbola using Eccentricity method and Rectangular/ Oblong methods. **Special Curves:** Introduction, Construction of Cycloids and Involute curves. **UNIT-II** **Introduction:** Importance of Computer Aided Drawing, software tool environment, drawing size and scale, main menu, tool bar and menus, co-ordinate system, drafting settings. **Creation and Editing:** Points, Lines, Poly lines, Polygons, Splines, circle, ellipse, text, move, copy, off-set, pan, mirror, rotate, trim, extend, break, chamfer, fillet, curves, block, layers, line representations, dimensioning and hatching.

	UNIT-III **Projections of Points:** Principles of projections, Planes of projection, Points in four quadrants. **Projections of Lines:** Line inclined to both the principal planes (first angle projection only). **UNIT-IV** **Projections of Planes:** Plane (triangle, square, rectangle, pentagon, hexagon and circular) inclined to both the principal planes. **Projections of Solids:** Solids such as Prisms, Pyramids, Cylinders and Cones. **UNIT-V** **Sections of Solids:** Solids such as Prisms, Pyramids, Cylinders and Cones resting on their bases on HP. **Development of Surfaces:** Lateral surfaces of solids such as Prisms, Pyramids, Cylinders and Cones (cut by a plane inclined to HP). **UNIT-VI** **Orthographic Projections:** Conversion of Pictorial views into Orthographic Views, Isometric Projections of simple objects.
Text Books and References	**Text Books:** 1. Engineering Drawing, N.D. Bhat / Charotar Publishing House, Gujarat, 51st edition, 2013. 2. Sham Tickoo, AutoCAD 2 0 13 For Engineers and Designers, Dream tech Press, 2013. **Reference Books:** 1. Engineering Drawing and Graphics, Venugopal K, New Age International Pvt. Ltd.New Delhi, 2001. 2. D.M. Kulkarni, A.P. Rastogi and A.K. Sarkar, Engineering Graphics with Auto CAD, PHI Learning Private Limited, Revised Edition, August 2010. 3. T Jeyapoovan, Engineering Drawing and Graphics UsingAutocad, Vikas Publishing House, 3rdEdition, 2010. 4. A Textbook on Engineering Drawing, P.Kannaiah, K.L.Narayana, K.Venkata Reddy, Radiant Publishing House, 2012.6.Jolhe, Engineering Drawing, Tata McGraw Hill Education Private Limited, 1st Edition, 2007.

NBKR INSTITUTE OF SCIENCE & TECHNOLOGY: VIDYANAGAR (AUTONOMOUS)
AFFILIATED TO JNTUA, ANANTAPURAMU
I YEAR OF FOUR YEAR B.TECH DEGREE COURSE – II SEMESTER
INFORMATION TECHNOLOGY
SCHEME OF INSTRUCTION AND EVALUATION

(With effect from the batch admitted in the academic year 2017-2018)

S.No	Course Code	Course Title	Instruction Hours/Week			Credits	Evaluation							
							Sessional Test-I		Sessional Test-II		Total Sessional Marks (Max. 40)	End Semester Examination		Max. Total Marks
		THEORY	L	T	D/P		Duration In Hours	Max. Marks (24+6+10)	Duration In Hours	Max. Marks (24+6+10)		Duration In Hours	Max. Marks	100
1	17SH1201	Professional English**	3	-	-	3	2	40	2	40	0.8*Best of two + 0.2*least of two	3	60	100
2	17SH1202	Engineering Chemistry @	3	-	-	3	2	40	2	40		3	60	100
3	17SH1204	Engineering Mathematics-I **	3	1	-	3	2	40	2	40		3	60	100
4	17IT1201	C Programming @	3	2	-	4	2	40	2	40		3	60	100
5	17IT1202	Data Structures $	2	2	-	3	2	40	2	40		3	60	100
6	17EC1201	Electronic Devices @	3	-	-	3	2	40	2	40		3	60	100
		PRACTICALS												
7.	17SH12P2	Engineering Chemistry Lab @	-	-	3	2	-	-	-	40	Day to Day Evaluation and a test (40 Marks)	3	60	100
8.	17IT12P1	C Programming Lab @	-	-	3	2	-	-	-	40		3	60	100
9.	17ME12P1	Engineering Workshop @	-	-	2	1	-	-	-	40		3	60	100
		TOTAL	17	05	08	24	-	240	-	360		-	540	900

**Common to ALL   @Common to ECE, EEE, CSE, IT $ Common to CSE, IT

17SH1201 - PROFESSIONAL ENGLISH

(Common to all Branches)

Course Category:	Basic Sciences		Credits:	3
Course Type:	Theory		Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Basic Level of LSRW skills		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	Students undergoing this course are expected to understand: • To develop their basic professional writing skills in English • To achieve specific linguistic and verbal competence • To acquire relevant skills and function efficiently in a realistic professional working environment • To inculcate the habit of reading &writing			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Equip verbal proficiency and face competitive exams; GATE, GRE, TOEFL, GMAT etc.
	CO2	Draft professional writings: email drafting, professional Letters, etc. for social and professional contexts.
	CO3	Write effective book reviews and make effective notes in professional environment
	CO4	Procure considerable knack in using wide range of vocabulary.
	CO5	Write proposals, business letters, project reports, writing proposals
	CO6	Acquire skills : Prepare Speeches in analytical and critical procedures
Course Content	**UNIT-I** **Data Interpretation:** Interpretation and analysis of the data based on text, tables, graphs (linear), charts- bar, pie etc. **Verbal:** Verbal reasoning- Analogies, Homophones & Homonyms **UNIT-II** **Writing:** Email Communication- Writing Effective Business Email **Verbal:** Idioms and Phrases, One word substitutes **UNIT-III** **Analytical Writing:** Presenting perspective of an issue- Compare & Contrast, Cause and Effect, Analyze an argument **Verbal:** Affixes-prefix and suffix, root words, derivatives	

	UNIT-IV
	Technical Writing: Writing Proposals: Significance; Structure, Style and Writing of Project Reports.
	Verbal: Synonyms and Antonyms
	UNIT-V
	Writing: Introduction to different kinds of materials: Technical & Non-technical- Note Taking and Note Making- identification of important points and precise the content
	Verbal: Words often confused
	UNIT-VI
	Book Reviews: Review of a Technical and Non-Technical - a brief written analysis including summary and appreciation
	Verbal: Sentence Completion
Text Books and References	**Reference Books:** 1. A Textbook of English for Engineers and Technologists (combined edition, Vol. 1 & 2); Orient Black Swan 2010. 2. Word Power Made Easy by Norman Lewis A Communicative Grammar of English By: Geoffrey Leech

17SH1202 - ENGINEERING CHEMISTRY

(Common for EEE, ECE, CSE & IT Branches)

Course Category:	Basic Sciences		Credits:	3
Course Type:	Theory		Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Fundamental concepts of Chemistry		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	Students undergoing this course are expected to understand: • To strengthen the fundamentals of Chemistry and then build an interface of theoretical and experimental concepts with their industrial/ engineering applications. • The extension of fundamentals of Electrochemistry to energy storage devices such as batteries and fuel cells is one such example. • To know the factors effecting the rate of corrosion and its prevention. • To design engineering materials and solve problems related to them. • To understand various water softening methods. • To understand preparation of polymers and their applications.			

	On successful completion of this course students will be able to:	
	CO1	Understand the electrochemical sources of energy
	CO2	Identify and investigate means of protecting metal against corrosion.
Course Outcomes	CO3	Understand industrially based engineering materials
	CO4	Understand the classification of fuels and their analysis
	CO5	Know the disadvantages of hard water and ability to remove hardness by using various methods
	CO6	Understand the basics of polymers and their preparation and uses in engineering field

Course Content	**UNIT-I** **Electro Chemistry:** Single electrode potential-explanation and measurement Reference electrodes-hydrogen gas electrode-calomel electrode-glass electrode **Electrochemical cells:** Lead-Acid storage cells **Batteries:** Li-ion Batteries **Fuel Cells:** Hydrogen - Oxygen fuel cell Conductometric titration of strong acid and strong base **UNIT-II** **Corrosion:** Definition-classification- theories of corrosion-factors affecting the corrosion-Prevention methods of corrosion-metallic coatings (Electroplating, cementation) and cathodic protection.

<div align="center">

UNIT-III

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Chemistry of Engineering Materials: Electrical insulators: Definition-classification-Characteristics- Application of electrical insulating materials (solid, liquid and gaseous insulators).

Refractories: Classification- properties and applications of refractories.

Lubricants: Lubricant-Lubrication-classification of lubricants-Properties and applications of lubricating oils.

<div align="center">

UNIT-IV

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Fuel Technology: Classifications of Fuels - Characteristics of fuels - Calorific value – determination – Bomb calorimeter – Boy's gas calorimeter - Theoretical calculation of calorific value.

Solid Fuels: coal-analysis of coal.

Liquid Fuels: Petroleum-refining of petroleum - Synthetic petrol – Fischer Tropch's synthesis

Gaseous Fuel: Flue gas analysis by Orsat's apparatus.

<div align="center">

UNIT-V

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Water Treatment: Impurities in water-Hardness of water-Estimation of hardness by EDTA method-Estimation of dissolved oxygen-alkalinity-chlorides in water

Industrial Use of Water: For steam generation-troubles in boilers-scale and sludge-priming and foaming-caustic embrittlement-boiler corrosion

Softening Methods of Hard Water: Lime-soda process- Zeolite process-Ion exchange method.

<div align="center">

UNIT-VI

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Polymers: Introduction to polymers- Polymerization process-types of polymerization.

Elastomers: natural rubber – vulcanization of rubber – compounding of rubber- Synthetic rubbers: preparation, properties and engineering applications of Buna – N, Neoprene, Thiokol and silicon rubbers

Plastomers: Thermosetting and thermoplastics- Preparation, properties and engineering applications of PVC, Bakelite, Nylons and Urea-Formaldehyde

Text Books and References	**Text Books:** 1. Engineering Chemistry, First Edition, Jayaveera KN, Subba Reddy GV and Ramachandraiah C, McGraw Hill Higher Education, New Delhi, 2013. 2. A Text Book of Engineering Chemistry, 15th Edition, Jain and Jain, Dhanapathi Rai Publications, New Delhi, 2013.REFERENCES

Reference Books:

1. A Text book of Engineering Chemistry, 12th Edition, SS Dhara, Uma, S. Chand Publications, New Delhi, 2010.

2. Engineering Chemistry, First edition, K.B. Chandra Sekhar, UN.Das and Sujatha Mishra, SCITECH Publications India Pvt Limited, 2010.

3. Engineering Chemistry, First edition, Seshamaheswaramma K and Mridula Chugh, Pearson Education, 2013.

17SH1204 - ENGINEERING MATHEMATICS - I

(Common to all Branches)

Course Category:	Basic Sciences		Credits:	3
Course Type:	Theory		Lecture - Tutorial - Practical:	3-1-0
Prerequisite:	Intermediate Mathematics		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	Students undergoing this course are expected to understand: • The basic concepts of Matrices. • Solving Higher Order Differential Equations with RHS of different types by using analytical techniques. • Taylor's and Maclaurin's series, Maxima and Minima of the functions of two and three variables. • The concepts of Double and Tripple integrals, Areas and Volumes. • The Gradient, Divergence and Curl operators, Solenoidal and Irrotational vectors. • The basic concepts of Vector Integration.			

	After completing the course the student will be able to	
Course Outcomes	CO1	Understand effectively the analyzation of the Rank of the matrix, Consistency of system of linear equations, Eigen values and Eigen vectors.
	CO2	Acquire knowledge in solving higher order differential equations by using various types.
	CO3	Attains skills in analyzing the Taylor's and Maclaurin's series and Maxima and Minima of the functions of two and three variables.
	CO4	Apply Double and Tripple integrals to find Areas and Volumes.
	CO5	Understand effectively Curl, Divergence and Gradient operators, Solenoidal and Irrotational vectors with their applications.
	CO6	Acquire knowledge in analyzing the applications of Green's, Stoke's and Gauss-divergence theorems.
Course Content	**UNIT-I** **Matrices:** Rank of Matrix - Echelon Form and Normal Form - Consistency of system of linear equations- Eigen values and Eigen vectors. **UNIT-II** **Higher Order Differential Equations:** Homogeneous linear differential equations of second and higher order with constant coefficients with R.H.S. of the type e^{ax}, $\sin ax$ or $\cos ax$, x^n, e^{ax} V and $x^n v(x)$. **UNIT-III** **Differential Calculus:** Taylor's and Maclaurin's series - Maxima and Minima of function of two variables - Lagrangian method of multipliers with three variables only.	

	UNIT-IV **Multiple Integrals:** Double and Triple integrals - Change of order of integration - Change to polar coordinates - Area and Volumes by Double integration - Volume by Triple integration. **UNIT-V** **Vector Differentiation:** Gradient, Divergence, and Curl - Solenoidal and Irrotational vectors. **UNIT-VI** **Vector Integration:** Line, Surface and Volume integrals - Green's, Stoke's and Gauss-divergence theorem (without proof), Applications to theorems.
Text Books and References	**Text Books:** 1. Higher Engineering Mathematics-B.S. Grewal, Khanna Publishers, New Delhi. 2. Engineering Mathematics – B.V. Ramana, Tata McGraw-Hill Education Pvt. Ltd, New Delhi.
	Reference Books: 1. Higher Engineering Mathematics - H.K. Dass, Er. Rajnish Verma, S. Chand Publication, New Delhi. 2. Advanced Engineering Mathematics - N.P. Bali & M. Goyal, Lakshmi Publishers, New Delhi. 3. Engineering Mathematics-I& II - Dr.T.K.V. Iyengar, Dr.B. Krishna Gandhi, S. Ranganatham, Dr.M.V.S.S.N. Prasad, S. Chand Publication, New Delhi. 4. Advanced Engineering Mathematics - Erwin Kreyszig, Wiley, India.

17IT1201 - C-PROGRAMMING

(Common to CSE, IT, ECE & EEE)

Course Category:	Program Core		Credits:	4
Course Type:	Theory		Lecture - Tutorial - Practical:	3-2-0
Prerequisite:	Basic mathematical knowledge to solve problems in analytical manner and idea on programming Methodologies.		Sessional Evaluation:	40
			Univ. Exam Evaluation:	60
			Total Marks:	100
Objectives	Students undergoing this course are expected to understand: • Gaining insights of building blocks of C language. • Getting fundamental ideas about core concepts of C Programming. • Understanding the procedural approach to solve simple problems.			

	Upon the successful completion of the course, the students will be able to:	
	CO1	Learn the fundamental structure of C program and basic data types
	CO2	Find the usage of operators in expression evaluation and I/O Statements.
Course Outcomes	CO3	Acquire information on various control structures
	CO4	Study the concept of arrays and strings
	CO5	Understand the features of Pointers and Functions
	CO6	Explore the basics of Data Storage on Files and Derived data types
Course Content	**UNIT-I** **Introduction:** Algorithms, Flow charts, Program development steps. **Fundamentals of C:** History, Structure of a C program, Programming rules and execution. Character set, Delimiters, C keywords, Identifiers, Constants, Variables, Rules for defining Variables, Data types, Declaration and Initialization of Variables. **UNIT-II** **Operators and Expressions:** Introduction, Operator Precedence and Associativity, Operator Types **Input and Output in C:** Formatted and Unformatted functions, Commonly used library functions. **UNIT-III** **Decision Statements:** Introduction, Types of IF statements, switch statement, break, continue, goto. **Iterative Statements:** while, do-while and for loops. **UNIT-IV** **Arrays:** Definitions, Initialization, Characteristics of an array, Array Categories. **Strings:** Declaration and Initialization of strings, String handling functions.	

	Storage Classes: Automatic, External, Static and Register Variables.
	UNIT-V
	Pointers: Fundamentals, Declaration and initialization of Pointers, Arithmetic Operations, Pointers and Arrays.
	Functions: Definition, Function Prototypes, Types of functions, Call by Value and Call by Reference, Recursion.
	UNIT-VI
	Structures: Definition, Declaration and Initialization of Structures.
	Unions: Definition, Declaration and Initialization of Union.
	Files: Introduction, File Types, Basic operations on Files, File I/O, Command Line Arguments.
Text Books and References	**Text Books:** 1. Programming with ANSI & TURBO C by Ashok N.Kamthane, Pearson Education 2007 **Reference Books:** 1. A Book on C by Al Kelley/Ira Pohl, Fourth Edition, Addison-Wesley.1999 2. Let Us C by Yashavant Kanetkar, BPB Publications. 3. Programming in ANSI C by Balaguruswamy 6th Edition, Tata McGraw Hill Education, 2012.
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT1202 - DATA STRUCTURES

(Common to CSE and IT)

Course Category:	Program Core		Credits:	3
Course Type:	Theory		Lecture - Tutorial - Practical:	2-2-0
Prerequisite:	Basic Mathematics and Fundamentals of Algorithms		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	- To learn the basics of algorithms and data structures. - To acquire knowledge in different types of linear and Nonlinear Data Structures. - To gain knowledge in sorting, searching and hashing techniques			

	Upon the successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Understand the Analysis of algorithmic notations and basics of data Structures
	CO2	Know the concepts and applications of stacks and queues
	CO3	Understand the concept of Linked Lists and its applications
	CO4	Be familiar with the concepts of Trees
	CO5	Identify the importance of Graph Traversing techniques
	CO6	Summarize different types of Sorting and Hashing Techniques
Course Content	**UNIT-I** **Introduction to Algorithm Analysis for Time and Space Requirements**: Rate of Growth, Basic Time Analysis of an Algorithm, Order Notation, More Timing Analysis, Space Analysis of an Algorithm. **Linear Data Structures:** Concepts and Terminology for Non primitive Data Structures, Storage Structures for Arrays. **UNIT-II** **Stacks:** Definition, Concepts, Operations on Stacks, Applications of Stacks – Recursion, Polish Notation, and Conversion of Infix Expressions to Polish Notation. **Queues:** Definition, Concepts, Operations on Queues, Simulation, Priority Queues. **UNIT-III** **Linked Lists:** Pointers and Linked Allocation, Linked Linear Lists, Operations on Linear Lists Using Singly Linked Storage Structures, Circularly Linked Linear Lists, Doubly Linked Linear Lists. **UNIT-IV** **Trees:** Definitions and Concepts, Operations on Binary Trees, Representation of Binary Trees, Sequential and linked Representations of Binary Trees, The manipulation of Arithmetic Expressions. **Search Trees:** Height-Balanced Trees, Weight-Balanced Trees.	

	UNIT-V
	Graphs: Definition, Representation of Graphs, Breadth first Search, Depth First Search, Spanning Trees.
	Searching: Sequential Search, Binary Search.
	UNIT-VI
	Sorting: Selection Sort, Bubble Sort, Merge Sort, Quick Sort, Comparison of Sorting Methods.
	Hash-Table Methods: Introduction, Hashing Functions, Collision-Resolution techniques – Open addressing and Chaining.
Text Books and References	**Text Books:** 1. An Introduction to Data Structures With Applications – John-Paul Tremblay and Paul G. Sorenson, 2/e, Tata McGraw-Hill.
	Reference Books: 1. Classic Data Structures, D. Samantha, Prentice Hall India. 2. Data Structures Using C, Aaron M. Tenenebaum, Y. Langsam, Moshe J. Augenstein, Pearson Education 3. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning. 4. Fundamentals of Data Structures in C, Horowitz, Sahni, Anderson-Freed, 2/e, Universities Press. 5. Data Structures and Algorithms- Concepts, Techniques and Applications, GAV PAI, Tata McGrawHill.
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17EC1201 - ELECTRONIC DEVICES

(Common to CSE, IT, ECE & EEE)

Course Category:	Program Core		Credits:	3
Course Type:	Theory		Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	To provide students with the fundamentals of Electronics		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	Students undergoing this course are expected to understand : • The concepts of Solid State Semi-Conductor Theory. • The operation of a PN Junction Diode. • The Ideal, Practical and Electrical Characteristics of Zener, Varactor, Tunnel and Avalanche Photo Diode. • The need for biasing of Transistor. • The working of FET and MOSFET. • The operation of Thyristors.			

	Upon the successful completion of the course, the students will be able to:	
	CO1	Understand the Semiconductor Physics for Intrinsic and Extrinsic materials and theory of operation of Solid State devices.
	CO2	Apply how the properties of semiconductor materials are used for the formation of PN diode.
Course Outcomes	CO3	Explain the functioning of various solid-state devices, including several types of diodes including conventional, Zener, Varactor, Tunnel and Avalanche Photo Diode.
	CO4	Design the various Bi-polar Junction Transistor biasing circuits and its usage in applications of amplifiers.
	CO5	Distinguish the constructional features and operation of FET and MOSFET and their applications.
	CO6	Understand the operation with sketch the transfer characteristics of Thyristors.
Course Content	**UNIT-I** **Semiconductor Diodes:** Introduction, Classification of Semiconductors, Conductivity of Semiconductor, Energy Distribution of Electrons, Carrier Concentration in Intrinsic Semiconductor, Mass-Action Law, Properties of Intrinsic Semiconductors, Variation in Semiconductor Parameters with Temperature, Drift and Diffusion currents, Carrier Life Time, Continuity Equation. **UNIT-II** **PN Junction Diode:** Introduction, Energy Band Structure of Open Circuited Diode, Quantitative Theory of Diode Currents, Diode Current Equation, Ideal vs Practical Resistance Levels, Transition Capacitance, Diffusion Capacitance, Temperature Dependence of V-I characteristics, Breakdown in Diodes, Diode as a Circuit Element, Piecewise Linear Diode Model, Applications.	

	UNIT-III **Special Diodes:** Introduction, Zener Diode, Varactor Diode, Tunnel Diode, Avalanche Photo Diode. **UNIT-IV** **Bipolar Junction Transistor:** Introduction, Construction, Transistor Biasing, Operation of NPN Transistor, Operation of PNP Transistor, Types of Configuration. **UNIT-V** **Field Effect Transistor:** Introduction, Construction & Operation of N-Channel JFET, Characteristic Parameters, Saturation Drain Current, Slope of the Transfer Characteristic at IDSS, Comparison of JFET and BJT, Applications, MOSFET, Enhancement MOSFET, Depletion MOSFET, Comparison of MOSFET and JFET. **UNIT-VI** **Thyristors:** Introduction, PNPN Diode, SCR, Thyristor Ratings, Rectifier Circuits using SCR, LASER(Light Activated SER), TRIAC(Triode A.C. Switch), DIAC(Diode A.C. Switch).
Text Books and References	**Text Books:** 1. Electronic Devices & Circuits by Jacob Millman&Christos C. Halkias, McGraw-Hilll 2. Mottershed, "Electronic devices and circuits", PHI.
	Reference Books: 1. Electronic Devices and circuits by S. Salivahanan, N. Suresh Kumar, McGraw-Hill 2. Boylestad, Louis Nashelsky "Electronic devices and circuits" 9ed.., 2008 PE.
E-Resources	1. https://nptel.ac.in/courses 2. https://iete-elan.ac.in 3. https://freevideolectures.com/university/iitm

17SH12P2 - ENGINEERING CHEMISTRY LABORATORY

(Common for ECE, EEE, CSE&IT Branches)

Course Category:	Basic Sciences		Credits:	2
Course Type:	Practical		Lecture - Tutorial - Practical:	0-0-3
Prerequisite:	Fundamental concepts of Chemistry		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	• The main objective is to provide students to learn about experimental techniques in chemistry with knowledge in theoretical aspects so that they can excel in that particular field.			

Course Outcomes	1. These experiments in the laboratory are helpful in understanding key concepts of chemistry through involvement in the experiments by applying theoretical knowledge. 2. It helps to recognize where the ideas of the student agree with those accepted by chemistry and where they do not.
Course Content	Minimum of 8 experiments to be completed out of the following: **LIST OF EXPERIMENTS** 1. Determination of total hardness of water by EDTA method 2. Determination of Copper by EDTA method 3. Estimation of dissolved oxygen by Winkler's method 4. Determination of Acidity of water 5. Determination of total alkalinity of water. 6. Estimation of chlorides using potassium chromate indicator 7. Conductometric titration of strong acid Vs strong base. 8. Determination of pH of unknown solution 9. Preparation of Bakelite 10. Determination of viscosity of oils with Redwood viscometer
Text Books	**Text Books:** 1. Vogel's text books of quantitative chemical analysis, Mendham et all, person publications. 2. Chemistry lab manual – KN Jayaveera, Subbareddy & Chandrasekher. 3. Instrumental methods of chemical analysis – Chatwal & Anand Himalaya publications.

17IT12P1 - C-PROGRAMMING LABORATORY

(Common to CSE, IT, ECE and EEE)

Course Category:	Program Core	Credits:	2
Course Type:	Practical	Lecture - Tutorial - Practical:	0-0-3
Prerequisite:	Basic mathematical knowledge to solve problems in analytical manner and idea on programming Methodologies.	Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100

Course Outcomes	Upon successful completion of the course, the students will be able to:	
	CO1	Solve problems using C programming concepts
Course Content	1. To evaluate expressions. 2. To implement if constructs. 3. To implement Switch statement. 4. To implement all iterative statements. 5. To implement Arrays. 6. To implement operations on Strings without using Library functions. 7. To implement arithmetic operations using pointers. 8. Implement both recursive and non-recursive functions. 9. To implement parameter passing techniques. 10. To implement Structures. 11. To implement basic File operations.	
Text Books and References	**Text Books:** 1. Programming with ANSI & TURBO C by Ashok N.Kamthane, Pearson Education 2007	
	Reference Books: 1. A Book on C by Al Kelley/Ira Pohl, Fourth Edition, Addison-Wesley.1999 2. Let Us C by Yashavant Kanetkar, BPB Publications. 3. Programming in ANSI C by Balaguruswamy 6th Edition, Tata McGraw Hill Education, 2012.	
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm	

17ME12P1 - ENGINEERING WORKSHOP

(Common to EEE, ECE, CSE and IT)

Course Category:	Program Core		Credits:	1
Course Type:	Practical		Lecture - Tutorial - Practical:	0-0-2
Prerequisite:	Engineering Physics and Basics Electrical Sciences		**Sessional Evaluation:** 40 **Univ. Exam Evaluation:** 60 **Total Marks:** 100	

Course Outcomes	Upon successful completion of the course, the students will be able to:	
	CO1	To know the trades and do carpentry, fitting, tin-smithy, house wiring and foundry.
Course Content	**LIST OF EXPERIMENTS** **TRADES FOR EXERCISES:** At least two exercises from each trade: 1. **Carpentry:** Lap joint, Mortise and Tenon joint, Bridle joint. 2. **Fitting:** Square, V, half round and dovetail fittings 3. **Tin-Smithy:** Tray, cylinder, hopper, cone 4. **House-wiring:** One lamp controlled by one switch, Two lamps (bulbs) controlled by two switches, Stair- case connection, Water pump connected with single phase starter. 5. **Foundry:** single-piece pattern, Two- piece pattern **TRADES FOR DEMONSTRATION:** 1. Machine Tools 2. Welding 3. Black Smithy	
Text Books and References	**Reference Books:** 1. Engineering Work shop practice for JNTU, V. Ramesh Babu, VRB Publishers Pvt. Ltd. 2. Work shop Manual / P.Kannaiah/ K.L.Narayana/ SciTech Publishers. 3. Engineering Practices Lab Manual, Jeyapoovan, SaravanaPandian, Vikas publishers.	

NBKR INSTITUTE OF SCIENCE & TECHNOLOGY: VIDYANAGAR (AUTONOMOUS)
AFFILIATED TO JNTUA, ANANTAPURAMU
II YEAR OF FOUR YEAR B.TECH DEGREE COURSE – I SEMESTER
INFORMATION TECHNOLOGY
SCHEME OF INSTRUCTION AND EVALUATION
(With effect from the batch admitted in the academic year 2017-2018)

S.No	Course Code	Course Title	Instruction Hours/Week			Credits	Evaluation								
							Sessional Test-I		Sessional Test-II		Total Sessional Marks (Max. 40)	End Semester Examination		Max. Total Marks
		THEORY	L	T	D/P		Duration In Hours	Max. Marks (24+6+10)	Duration In Hours	Max. Marks (24+6+10)		Duration In Hours	Max. Marks	100
1	17IT2101	Mathematical Foundations of Computer Science	2	2	-	3	2	40	2	40	0.8*Best of two + 0.2*least of two	3	60	100
2	17IT2102	Java Programming	2	2	-	3	2	40	2	40		3	60	100
3	17IT2103	Operating Systems	3	-	-	3	2	40	2	40		3	60	100
4	17IT2104	Basic Computer Organization	3	2	-	4	2	40	2	40		3	60	100
5	17IT2105	Software Engineering	3	2	-	4	2	40	2	40		3	60	100
6	17SH2106	Probability & Statistics	2	2	-	3	2	40	2	40		3	60	100
7.	17SH2107	MC: Environmental Studies	3	-	-	-	2	40	2	40		3	60	100
		PRACTICALS												
8.	17IT21P1	Java Programming Lab	-	-	3	2	-	-	-	40	Day to Day Evaluation and a test (40 Marks)	3	60	100
9.	17IT21P2	Operating Systems Lab	-	-	3	2	-	-	-	40		3	60	100
		TOTAL	18	10	6	24	-	280	-	360		-	540	900

MC: Mandatory Course

17IT2101 - MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Course Category:	Program Core		Credits:	3
Course Type:	Theory		Lecture - Tutorial - Practical:	2-2-0
Prerequisite:	Basic mathematical structures and Identification of simple notations.		**Sessional Evaluation:** 40 **Univ. Exam Evaluation:** 60 **Total Marks:** 100	
Objectives	- To understand the concepts of predicates, proofs and program correctness. - To get the basic view on mathematical structures. - To provide generic view on counting techniques. - To explore the fundamental concepts of graphs trees and algebraic systems.			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Learn the basics of logical connectives, rules of inference and normal forms.
	CO2	Review the basic mathematical topics useful to provide base for other areas.
	CO3	Study various algorithms based on integers and division.
	CO4	Identify different recurrence relations and their usage.
	CO5	Provide a generic view on the fundamentals of graphs and trees.
	CO6	Understand the basic structure of algebras and a specific view on coding theory.
Course Content	**UNIT-I** **Logic and Proofs:** Propositional logic and equivalences, Predicates and Quantifiers, Nested quantifiers, Rules of Inference, Introduction to proofs, Normal forms, Proof methods and strategy, Program correctness. **UNIT-II** **Basic Structures:** Sets and operations, Functions, Recursive functions, Sequences and summations. **UNIT-III** **Algorithms and Integers:** Introduction to Algorithms, The growth of functions, Complexity of algorithms, The integer and division, Integers and Algorithms. **Counting Principles**: Basics of counting, Permutations and Combinations, Binomial Coefficients, Generalized permutations and combinations. **UNIT-IV** **Recurrence Relations:** Introduction and Definitions, Solving Linear recurrence relations, Generating functions, Inclusion - Exclusion. **Relations:** Relations and their properties, n-ary Relations and their applications, Representation and closures of relations, Equivalence relations and partial orderings.	

	UNIT-V
	Graphs: Introduction, graph models, Graph terminology and special types of graphs, Representing graphs and graph isomorphism, Graph connectivity, Euler and Hamilton paths, Planar graphs and Graph coloring. **Trees:** Introduction, Applications, Tree traversals.
	UNIT-VI
	Algebraic Structures and Coding Theory: Introduction, Structure of algebras, Semi groups, Monoids, Groups, Homomorphisms, Normal sub-groups and Congruence relations, Rings, Integral domains and fields, Coding theory, Polynomial rings and polynomial codes.
Text Books and References:	**Text Books:** 1. Discrete mathematics and its applications with combinatorics and graph theory, Kenneth H.Rosen, 7th Edition, TMH. **Reference Books:** 1. Discrete mathematics for computer scientists and mathematicians, Joe L Mott., Abraham Kandel, Theodore P Baker, 2nd Edition PHI, 2012. 2. An Introduction to data structures and applications, Trembley and Sorenson, PHI 3. Discrete mathematical structures with applications to computer science, J.P. Tremblay R. Manohar McGraw-Hill.
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT2102 - JAVA PROGRAMMING

Course Category:	Program Core		Credits:	3
Course Type:	Theory		Lecture - Tutorial - Practical:	2-2-0
Prerequisite:	Basic knowledge of programming.		Sessional Evaluation:	40
			Univ. Exam Evaluation:	60
			Total Marks:	100
Objectives	• Acquire knowledge on preliminaries of Java. • Understanding the knowledge of exception handling and Event handling. • To obtain knowledge of advanced java concepts.			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Understand the basic concepts of Java Building Blocks.
	CO2	Acquire the knowledge of Arrays and Strings.
	CO3	Conceptualize the techniques of inheritance and polymorphism to develop packages and interfaces.
	CO4	Understand exception handling and usage of multi-threading in java
	CO5	Create applets and learn the procedure to handle events.
	CO6	Understand the concept of database connectivity and advanced topics.
Course Content	**UNIT-I** **Introduction to Programming:** Overview of Programming, programming paradigms, Basics of OOP. **Basics of JAVA:** History, Java Buzz words, Data types, Variables, Scope and Life time of variables, Operators, Expressions, Control statements, Type conversion and casting. **UNIT-II** **Arrays:** Declaration, Initialization and accessing values, Multidimensional arrays. **Strings:** String, StringBuffer and StringTokenizer classes. **UNIT-III** **Inheritance:** Types of inheritance, Benefits, Member access rules, Constructor and calling sequence. **Polymorphism:** Method overriding and Method overloading. **Packages and Interfaces:** Defining Package, Creating and accessing a package, Defining an interface, Implementing interface, Extending interfaces. **UNIT-IV** **Exception Handling:** Concepts, Benefits, Exception handling mechanism, Built-in Exceptions.	

	Multi-Threading: Processes and threads, Life cycle of a thread, Thread methods, Creating and naming a thread, Priority threads, Daemon threads, Thread groups.
	UNIT-V
	Applets: Concepts, Life cycle, Creating an applet, Passing parameters to applets.
	Event Handling: Events, Event classes, Event Listeners, Delegation Event Model, Handling mouse Events, Adapter classes, Inner classes.
	UNIT-VI
	Software Development: Introduction to Java Bean, Advantages, Swings and its features, Servlet and its life cycle.
	Talking to Databases: JDBC Concepts and Terminology, Introducing SQL, JDBC Package, JDBC Basics, Driver Manager.
Text Books and References:	**Text Books:** 1. Java: The Complete Reference, 7th Edition, Herbert Schildt TMH. 2. Beginning Java 2, JDK 5 Edition, Ivor Horton,Wileydreamtech. **Reference Books:** 1. An introduction to java programming and object oriented application development, RAJohson-Thomson. 2. Introduction to java programming 6th Edition, Y Daniel liang, Pearson Education. 3. Java programming: A practical approach, C.Xavier, TMH, First edition,2011.
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm 3. www.javatpoint.com

17IT2103 - OPERATING SYSTEMS

Course Category:	Program Core		Credits:	3
Course Type:	Theory		Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Knowledge about fundamentals of computer basics		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	- Learn OS operations and supporting structures. - Knowledge about the different scheduling algorithms and their evaluation. - Obtain exposure on deadlock handling, protection and security mechanisms.			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Learn the Basics of Operating Systems and structures.
	CO2	Acquire knowledge about Inter process communication and Scheduling algorithms.
	CO3	Study Deadlock handling mechanisms.
	CO4	Understand various Memory management techniques.
	CO5	Gain insights of File system operations and implementation methods.
	CO6	Identify Disk Structures and various goals and principles of protection.
Course Content	**UNIT-I** **Introduction:** Role of OS, Operations, Process Management, Memory and Storage Management, Protection and Security, Computing Environment. **OS Structures:** Services, User Interfaces, System calls and types, Design and Implementation, Various structures of OS, System Boot. **UNIT-II** **Process Management:** Introduction, Process Control Block, Scheduling, Operations on Processes, Interprocess Communication, Examples of IPC systems. **CPU Scheduling:** Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiprocessor Scheduling, Algorithm Evaluation. **UNIT-III** **Process Synchronization:** The Critical-Section Problem, Semaphores, Monitors, Classic Problems of Synchronization-Reader/Writers Problem, Dining – Philosophers Problem. **Deadlocks:** System model and Characterization, Conditions for resource deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection and recovery. **UNIT-IV** **Memory Management:** Hardware and Address Binding, Swapping, Contiguous Memory Allocation, Paging and Segmentation.	

	Virtual Memory: Introduction, Demand Paging, Copy on write, Page replacement, Frame allocation, Thrashing, Kernel Memory allocation.
	UNIT-V
	File System Basics: Introduction, Access Methods, Directory structures, File Sharing and Protection.
	File System Implementation: Structure, File System Implementation, Directory Implementation, Recovery, Overview on NFS.
	UNIT-VI
	Mass Storage Management: Overview, Disk Structure, Disk Attachment, Disk Scheduling Algorithms, Disk Management, RAID Levels.
	Protection and Security: Goals , Principles and Domain of protection, Access Matrix and Implementation, Security Problem, Program Threats, System and Network Threats.
Text Books and References:	**Text Books:** 1. Silberschatz A, Galvin P B , Gagne G, Operating System Principles, 7th Edition **Reference Books:** 1. Tanenbaum AS, Modern Operating Systems, 3rd Edition, Pearson Education 2008 2. Stallings W, Operating Systems – Internals and Design Principles, 5th Edition, Prentice Hall of India 2005 3. Operating System: A Design-oriented Approach by Charles Crowley
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT2104 - BASIC COMPUTER ORGANIZATION

Course Category:	Program Core		Credits:	4
Course Type:	Theory		Lecture - Tutorial - Practical:	3-2-0
Prerequisite:	Basic Knowledge in identifying components, structure and internals of a computer.		Sessional Evaluation: 40 Univ. Exam Evaluation: 60 Total Marks: 100	
Objectives	- To learn about the number systems, gates to design digital circuits. - To optimize circuits using gate level minimization. - To design sequential and combinational logic systems. - To understand the design of control unit, memory unit, I/O and Pipelining			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Represent numbers in number systems and to perform primitive Boolean algebraic operations.
	CO2	Describe digital circuits and design Combinational circuits.
	CO3	Understand the Sequential Digital Systems and RTL concepts.
	CO4	Design a Basic Computer and know about different addressing modes.
	CO5	Understand the Control Mechanisms and Memory hierarchies.
	CO6	Acquire knowledge in I/O Organization and Parallel processing.
Course Content	## UNIT-I **Digital Systems:** Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Complements, Signed Binary Numbers. **Boolean Algebra And Logic Gates:** Basic Definitions, Axiomatic definition of Boolean Algebra, Basic theorems and properties of Boolean algebra, Boolean functions - canonical and standard forms, Digital logic gates. ## UNIT-II **Gate - Level Minimization:** The map method, Four-variable map, Product of sums simplification, Don't-care conditions. **Combinational Logic:** Analysis Procedure, Design Procedure, Binary adder - subtractor, Decimal Adder, Binary Multiplier, Decoder, Encoder, Multiplexer. ## UNIT-III **Synchronous Sequential Logic:** Sequential circuits, latches, Flip-Flops, Analysis of clocked sequential circuits, Registers, Shift Registers, Counters. ## UNIT-IV **Basic Computer Organization and Design:** Review of Basic Structure of Computers, Digital Computers, Review of Data Representation, Instruction Codes, Computer Instructions, Instruction Cycle.	

	Central Processing Unit: Instruction Formats, Addressing Modes, RISC, CISC
	UNIT-V
	Micro programmed Control: Control Memory, Address Sequencing, Design of Control Unit and Hardwired Control.
	Memory System: Memory Hierarchy, Basic Concepts, Semiconductor RAM Memories, Read Only Memories, Cache Memories-Mapping Functions.
	UNIT-VI
	Input-Output Organization: Peripheral Devices, Input-Output Interface, Direct Memory Access.
	Pipeline Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline.
Text Books and References:	**Text Books:** 1. Digital Design –Fourth Edition, M.Morris Mano, Pearson Education/PHI. 2. Computer Systems Architecture – M.Moris Mano, 3rd Edition, Pearson, PHI 3. Computer Organization – Carl Hamacher, Zvonko G. Vranesic, Safwat G. Zaky **Reference Books:** 1. Switching and Finite Automata Theory by Zvi. Kohavi, Tata McGraw Hill. 2. Switching and Logic Design, C.V.S. Rao, Pearson Education. 3. Digital Principles and Design – Donald D.Givone, Tata McGraw Hill, Edition. 4. Fundamentals of Digital Logic & Micro Computer Design , 5TH Edition, M. Rafiquzzaman John Wiley 5. Computer Organization and Architecture– William Stallings, 7th Edition. 6. Computer Organization and Design– P Paul Chowdary, 2nd Edition. 7. Computer Systems Design and Architecture – Vincent P and Harry F Jordan, 2nd Edition.
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT2105 - SOFTWARE ENGINEERING

Course Category:	Program Core		Credits:	4
Course Type:	Theory		Lecture - Tutorial - Practical:	3-2-0
Prerequisite:	Require the fundamental concepts of computers and basic analytical capabilities.		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	- To define various software engineering phases. - Explore the concepts of software products and processes. - To facilitate the environment of software development in the outside world. - To expose the importance of risk management and strive for quality assurance.			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Understand the basics of software engineering layers.
	CO2	Learn the engineering principles, planning and construction of analysis models.
	CO3	Study the data modeling concepts to create a behavioral model and exposure on design concepts.
	CO4	Identify various architectural styles to get the support for designing conventional components.
	CO5	Examine different Testing Strategies for conventional software and a few tactics to give better exposure.
	CO6	Study various risk strategies and improve software quality assurance.
Course Content	**UNIT-I** **Introduction to Software Engineering:** Software evolution, Software and its nature, Legacy software, Software myths. **A Generic View of Process:** Software engineering layers, Process frame work, Capability Maturity Model Integration (CMMI), Personal and team process models. **Process Models:** Prescriptive models, Waterfall model, Incremental process models, Evolutionary process models and Unified process. **UNIT-II** **Software Engineering Practice:** Engineering Principles, Communication, Planning, Modeling and Construction practices, Deployment. **Requirements Engineering:** Requirements engineering tasks, Initiation, Eliciting requirements, developing use-cases, Building the analysis model, Negotiating and validating requirements. **UNIT-III** **Building the Analysis Model:** Analysis model, Analysis modeling approaches, Data modeling concepts, Object-oriented analysis, Scenario based modeling, Flow-oriented modeling, Class-based modeling, Creating a behavioral model.	

	Design Engineering: Design process, Design quality, Design concepts, and Design model.
	 UNIT-IV **Creating an Architectural Design:** Software architecture, Data design, Architectural styles and patterns, Architectural design, Mapping data flow into software architecture. **Modeling Component-level Design:** Nature of component, Designing class-based components, Conducting component level design, Object constraint language, Designing conventional components. **UNIT-V** **Testing strategies:** A strategic approach to software testing, Test strategies for conventional software, Test strategies for object-oriented software, Validation testing, System testing, Art of debugging. **Testing Tactics:** Software testing fundamentals, Black-box and white-box testing, Basis path testing, Control structure testing, Object-oriented testing methods. **UNIT-VI** **Risk management:** Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM plan. **Quality Management:** Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability.
Text Books and References:	**Text Books:** 1. Pressman R S, Software Engineering-A Practitioner's Approach, 6th edition, McGrawHill **Reference Books:** 1. Sommerville I, Software Engineering, 5th edition, Pearson Education, 1996. 2. Jawadekar W S, Software Engineering – Principles and Practice, Tata McGraw-Hill, 2004.Hill, 2005. 3. Carlo gezzi, Fundamentals of Software Engineering ,Second edition, Prentice Hall
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17SH2106 - PROBABILITY AND STATISTICS

Course Category:	Basic Sciences		Credits:	3
Course Type:	Theory		Lecture - Tutorial - Practical:	2-2-0
Prerequisite:	Intermediate Mathematics		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	- The concept of probability, Conditional Probability and Bayes theorem. - Explain various descriptive statistics including the mean, variance and standard deviation for a given data set. - Binomial, Poisson and Normal distributions. - The basic concepts of Sampling Distribution. - Test of Hypothesis concerning one mean and two means. - Student-t-test, F-test and Chi-square [$\chi 2$] test.			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Have a fundamental knowledge of the basic probability concepts.
	CO2	Understand effectively the basic concepts of discrete, continuous random variables and statistical parameters of distribution functions.
	CO3	Have a well-founded knowledge of standard distributions (Binomial, Poisson and Normal distributions) which can describe real life phenomena.
	CO4	Have a good grasp of Sampling distribution of the mean proportions, Sums and differences, Point Estimation and Interval Estimation.
	CO5	Attains skills in analysing the Test of hypothesis and Test of significance
	CO6	Have a good grasp of Student-t-test, F-test and Chi-square [$\chi 2$] test.
Course Content	**UNIT-I** **Probability:** Sample Space and Events - Axioms of Probability - Some Elementary theorems - Conditional Probability - Bayes theorem. **UNIT-II** **Random variables:** Discrete and continuous random variables - probability functions - Statistical Parameters (Mean, Variance and Standard Deviation) of distribution functions **UNIT-III** **Probability Distributions:** Binomial distribution - Poisson distribution - Normal distribution. **UNIT-IV** **Sampling Distributions:** Population and Samples - Sampling distribution of the mean proportions, Sums and differences. Estimation: Point Estimation - Interval Estimation and Bayesian Estimation.	

	UNIT-V **Test of Hypothesis:** Test of hypothesis and Test of significance - Hypothesis concerning one mean and two means - Type – I and Type – II errors - One tail and two tail tests. **UNIT-VI** **Testing of Significance (Small Samples):** Student-t-test - F-test - Chi-square [$\chi 2$] test - $\chi 2$ test of goodness of fit.
Text Books and References:	**Text Books:** 1. Probability and Statistics for Engineers - G. S. S. BhishmaRao, Scitech Publications (India) Pvt Ltd, New Delhi. 2. Probability and statistics - Dr.T.K.V. Iyengar, Dr.B. Krishna Gandhi, S.Ranganatham, Dr.M.V.S.S.N. Prasad, S. Chand Publication, New Delhi. 3. Probability and Statistics for Engineers and Scientists – Ronald E. Walpole, Sharon L.Myers and Keying Ye, Pearson 8th edition. **Reference Books:** 1. Probability & Statistics - E. Rukmangadachari, E. Keshava Reddy, Pearson Publisher, New Delhi. 2. Probability & Statistics for Engineers- Miller and John Freund. E, Pearson Education, New Delhi. 3. Higher Engineering Mathematics - B. S. Grewal, Khanna Publications, New Delhi
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17SH2107 - ENVIRONMENTAL STUDIES

Course Category:	Professional Core		Credits:	0
Course Type:	Theory		Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Basic idea on environment, environmental pollution causes, effects, and control measures.		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	- To know the importance of Environmental studies and understand the various components of environment components - To know the value of natural resources and need to protect them. - To know the value of biodiversity and it conservation methods. - To design engineering methods and solve problems related to environmental pollution. - To understand the social issues and provide plans to minimize the problems. - To understand need to protect various environmental acts.			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	To know the importance of Environmental studies and understand the various components of environment.
	CO2	Understand the value of natural resources
	CO3	Understand the value of biodiversity and need to protect.
	CO4	Understand how the environment is polluted and suggest some control measures.
	CO5	Understands the several environmental problems in India and way to minimize the effects.
	CO6	Knowing the environmental protection laws in our country and understand the need to respect those laws.

Course Content	**UNIT-I**
	
	Introduction: Definition, Scope and Importance of Environmental studies, Environmental Components.
	
	UNIT-II
	
	Environment and Natural Resources Management:
	   a) **Land resources:** Importance, Land degradation, Soil erosion and desertification, Effects of modern agriculture (fertilizer and pesticide problems).
	
	   b) **Forest Resources:** Use and over-exploitation-Mining and Dams-their effects on forest and tribal people.
	
	   c) **Water Resources:** Use and over-utilization of surface and ground water, Floods and droughts, Rain water harvesting, clouds seeding and watershed management.
	
	   d) **Energy resources:** Energy needs - Renewable and non-renewable energy, need to use of alternate energy sources, Impact of energy use on environment.	

UNIT-III

Ecosystem: Introduction, types, characteristics and functions of Ecosystems

Bio-diversity and its conservation: Value of bio-diversity- consumptive and productive use, social, ethical, aesthetic and option values - Threats to biodiversity- conservation of biodiversity.

UNIT-IV

Environmental Pollution: Causes, Effects and control measures of Air pollution, Water Pollution, Soil pollution, Marine Pollution, Noise pollution, Nature of Thermal pollution and nuclear hazards, Global warming, Acid rain, Ozone depletion.

Solid Waste Management: Composting, Vermiculture - Urban and industrial wastes, recycling and reuse.

UNIT-V

Environmental Problems in India: Drinking water, Sanitation and public health -Effects of urbanization, Transportation, Industrialization on the quality of environment-Social Issues.

Economy and Environment: The economy and environment interaction, Sustainability, Environment Impact Assessment,

UNIT-VI

Environmental Acts: Water (Prevention and control of pollution) Act-Air (Prevention and control of pollution) Act – Environment protection Act, Wildlife protection Act, Forest conservation Act.

Case Studies: Silent valley project, Madhura Refinery and TajMahal, Tehri Dam, Kolleru Lake Aquaculture, Fluorosis in Andhra Pradesh.

Field Work: Visit to Local Area having river/Forest/grass land/hill/mountain to document and environmental assets.

Text Books and References:	**Text Books:** 1. "Environmental science" by AnubhaKaushik and C.P.Kaushik. 2. "Environmental science and Engineering" by P.Anandan and R.K.Kumaravelan.
	Reference Books: 1. "Introduction to Environmental science" by Y.Anjaneyulu. 2. "Environmental studies" byDrB.S.Chauhan. 3. "Environmental science" by M.Chandrasekhar
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT21P1 - JAVA PROGRAMMING LABORATORY

Course Category:	Program Core	Credits:	2
Course Type:	Practical	Lecture - Tutorial - Practical:	0-0-3
Prerequisite:	Basic knowledge of programming fundamentals.	Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	• To strengthen the ability to identify and apply the suitable object oriented concept for the given real world problems. • To develop skills to design the applications in java.		

Course Outcomes	At the end of this lab session, the students will be able to learn to develop various applications using core concepts of Java.
Course Content	1. a). Write a Java program to display the default value of all primitive data types in Java. b). Write a Java program to sort given list of numbers. 2. Write a java program to implement two dimensional arrays. 3. a). Write a java program to sort a given list of names. b). Write a java program that checks whether a given string is a palindrome or not 4. a). Write a java program that gives an example for this operator. b). Write a java program that gives an example for super keyword. 5. Write a java program that gives demonstration of static variables and methods. 6. Write a java program that implements different types of inheritance. 7. Write a java program that demonstrates the difference between method overloading and method overriding. 8. Write a java program that describes the exception handling mechanism. 9. Write a java program that illustrates the creation of threads by extending Thread class, a constructor that calls the base class constructor, using super and starts the thread. Run method of the class starts after this. It can be observed by both main thread and created child thread is executed concurrently. 10. Write a java program to create a package named mypack and import it in circle class. 11. Write a java program that implements mouse handling events. 12. Write a java program that establishes JDBC Connection with any database to retrieve the data.

Text Books and References:	**Reference Books:** 1. An introduction to java programming and object oriented application development, R A Johson-Thomson. 2. Java: The Complete Reference, 7th Edition, Herbert Schildt TMH.
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm 3. www.javatpoint.com

17IT21P2 - OPERATING SYSTEMS LABORATORY

Course Category:	Program Core	Credits:	2
Course Type:	Practical	Lecture - Tutorial - Practical:	0-0-3
Prerequisite:	Knowledge on basic operating system concepts and programming fundamentals	Sessional Evaluation:	40
		Univ. Exam Evaluation:	60
		Total Marks:	100
Objectives	• Use various OS concepts to implement some of the real world issues practically and to give better exposure regarding its functionality.		

Course Outcomes	Upon successful completion of the course, the students will be able to acquire knowledge on Scheduling strategies, Memory and File Allocation Techniques and Deadlock concepts
Course Content	1. Simulate CPU scheduling algorithms like FCFS,SJF , Priority and Round Robin.[3 lab sessions] 2. Simulate file allocation strategies like Sequential, Indexed and Linked.[2 lab sessions] 3. Simulate Multiprogramming with variable number of tasks (MVT) and Multiprogramming with fixed tasks (MFT). 4. Simulate the implementation of Dead Lock Avoidance. 5. Simulate the implementation of Dead Lock Prevention. 6. Simulate page replacement algorithms like FIFO, LRU, Optimal and LFU.[2 lab sessions]
Text Books and References:	**Reference Books:** 1. Silberschatz A, Galvin P B, Gagne G, Operating System Principles, 7th Edition. 2. Tanenbaum AS, Modern Operating Systems, 3rd Edition, Pearson Education 2008. 3. Stallings W, Operating Systems – Internals and Design Principles, 5th Edition, Prentice Hall of India 2005.
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

NBKR INSTITUTE OF SCIENCE & TECHNOLOGY: VIDYANAGAR (AUTONOMOUS)

AFFILIATED TO JNTUA, ANANTAPURAMU
II YEAR OF FOUR YEAR B.TECH DEGREE COURSE – II SEMESTER
INFORMATION TECHNOLOGY
SCHEME OF INSTRUCTION AND EVALUATION
(With effect from the batch admitted in the academic year 2017-2018)

S.No	Course Code	Course Title	Instruction Hours/Week			Credits	Evaluation							Max. Total Marks
							Sessional Test-I		Sessional Test-II		Total Sessional Marks (Max. 40)	End Semester Examination		
		THEORY	L	T	D/P		Duration In Hours	Max. Marks (24+6+10)	Duration In Hours	Max. Marks (24+6+10)		Duration In Hours	Max. Marks	100
1	17IT2201	Database Management Systems	2	2	-	3	2	40	2	40	0.8*Best of two + 0.2*least of two	3	60	100
2	17IT2202	Formal Languages and Automata Theory	3	2	-	4	2	40	2	40		3	60	100
3	17IT2203	Design and Analysis of Algorithms	3	-	-	3	2	40	2	40		3	60	100
4	17IT2204	Software Project Management	3	-	-	3	2	40	2	40		3	60	100
5	17IT2205	Computer Networks	2	2	-	3	2	40	2	40		3	60	100
6	17IT2206	Principles of Programming Languages	3	2	-	4	2	40	2	40		3	60	100
7.	17MS2201	MC: Technical English & Soft Skills	2	-	2	-	2	40	2	40		3	60	100
		PRACTICALS												
8.	17IT22P1	Database Management Systems Lab	-	-	3	2	-	-	-	40	Day to Day Evaluation and a test (40 Marks)	3	60	100
9.	17IT22P2	Computer Networks Lab	-	-	3	2	-	-	-	40		3	60	100
		TOTAL	18	08	08	24	-	280	-	360		-	540	900

MC: Mandatory Course

17IT2201 - DATABASE MANAGEMENT SYSTEMS

Course Category:	Program Core	Credits:	3
Course Type:	Theory	Lecture - Tutorial - Practical:	2-2-0
Prerequisite:	Basic foundations in mathematics and preliminary fundamentals of data sets	Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	• Understand the areas of databases and composition of queries using Structured Query Language • To study various database design models for building applications • Evaluate a business situation while designing a database system		

	Upon successful completion of the course, the students will be able to:		
Course Outcomes	CO1	Master the basic concepts and explore the applications of database systems.	
	CO2	Understand Relational Model and the Relational Algebraic operations.	
	CO3	Learn OODB Concepts and basic SQL primitives.	
	CO4	Familiar with query Processing techniques and Normal forms.	
	CO5	Identify the basic issues of transaction processing, concurrency control and methods for recovery.	
	CO6	Expose in Advanced Data Models and Security issues.	

Course Content	**UNIT-I** **Introduction to Databases:** Characteristics of a Database, Advantages, A brief history of database applications, When not to use DBMS. **Overview of Database Languages and Architectures:** Data models, Schemas and Instances, Three-schema architecture, Data independence, Centralized and Client/Server Architecture for DBMS, Classification of DBMS. **Conceptual Data Models using Entities and Relationships:** High level conceptual data models, Entity types, Entity sets, Attributes, Keys, Relationship types, Weak entity types, ER diagrams, Naming conventions and Design Issues. **UNIT-II** **Basic Relational Model:** Relational model concepts, Constraints and Relational Database Schemas, Update Operations, Transactions and Dealing with Constraint Violations. **Formal Relational Languages:** Unary relational operations, relational algebra operations, binary relational operations, Tuple relational calculus, Domain relational calculus. **UNIT-III** **Object Relational Databases:** Object Database Concepts, Object Database Extension to SQL, The ODMG object Model and the Object Definition Language, Object Database Conceptual Design.

	SQL: Data definition and types, constraints, Basic Retrieval Queries, complex SQL Queries, INSERT,UPDATE, DELTE, Assertions, Triggers and Views.
	UNIT-IV
	Introduction to Query Processing and Query Optimization Techniques: Translating SQL Queries into Relational Algebra, Algorithms for SELECT, JOIN, PROJECT and Set Operations.
	Functional Dependencies and Normalization: Functional dependencies, First,2nd and 3rd normal forms, Boyce-Codd normal form, Multivalued dependencies, 4th normal form, Join dependencies, 5th normal form.
	UNIT-V
	Concurrency Control: Two phase locking techniques, Time stamp ordering, Multi version concurrency control techniques, Validation concurrency control.
	Database Recovery Protocols: Recovery Concepts, No Undo/Redo Recovery based on differed Update, Recovery Techniques based on Immediate Update, Shadow paging.
	UNIT-VI
	Advanced Database Models: Temporal, Spatial and Multimedia Database Concepts.
	Database Security: Security Issues, Discretionary Access Control based on Granting and Revoking Privileges, Mandatory Access Control and Role Based Access Control for Multilevel Security.
Text Books and References:	**Text Books:** 1. RamezElmasri, and Shamkant B Navathe, Database Systems, 6th edition, Pearson Education
	Reference Books: 1. Silberschatz A, Korth H F, and Sudarshan S, Database System Concepts, 5th edition, McGraw-Hill, 2006. 2. Ramakrishnan R, and Gehrke J, Database Management Systems, 3rd edition, McGraw-Hill, 2003. 3. Date C J, An Introduction to Database Systems, 7th edition, Pearson Education, 2000.Rob P, Database Systems – Design, Implementation, and Management, 7th edition, Thomson, 2007.
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT2202 - FORMAL LANGUAGES AND AUTOMATA THEORY

Course Category:	Program Core		Credits:	4
Course Type:	Theory		Lecture - Tutorial - Practical:	3-2-0
Prerequisite:	Knowledge in Discrete Mathematics and logical reasoning		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	- Basic mathematical foundations of computation and various other notions. - Understand and conduct mathematical proofs for computation and algorithms. - Familiarity with thinking intuitively for problem solving in related areas of theory in computer science - Develop a view on the importance of computational theory concepts.			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Demonstrate abstract models of computing like DFA and NFA.
	CO2	Learn regular languages and are exposed to an overview of the theoretical foundations of computer science.
	CO3	Design grammars and recognizers for different formal languages and to prove or disprove theorems in automata theory using its properties.
	CO4	Apply Mathematical and formal techniques for solving real time applications using PDA.
	CO5	Perceive the power and limitations of a Turing machine.
	CO6	Determine the decidability and intractability of computational problems.
Course Content	**UNIT-I** **Automata:** Introduction to Finite Automata, Structural Representations, Automata and Complexity, The Central concepts of Automata Theory-Alphabets, Strings and Languages, Deterministic Finite Automata, Nondeterministic Finite Automata, Finite Automata with Epsilon-Transitions. **Mealy and Moore Models:** Finite Automata With outputs, Procedure for Transforming a Mealy Machine into Moore Machine and Moore Machine to Corresponding Mealy Machine. **UNIT-II** **Regular Expressions and Languages:** Regular expressions, Finite Automata and Regular Expressions, Algebraic Laws for Regular Expressions. **Properties of Regular Languages:** Proving languages not to be regular, closure properties of regular languages, Decision properties of Regular Languages, Equivalence and Minimization of Automata. **UNIT-III** **Context Free Grammars and Languages:** Context free grammars, Parse trees, Ambiguity in Grammars and languages.	

Properties of Context Free Languages: Normal Forms for context free grammars, Pumping lemma for context free languages, Closure properties of context free languages.

UNIT-IV

Push Down Automata: Definition of Push down automaton, The languages of PDA-Acceptance by final state, Acceptance by empty stack, from empty stack to final state, from final state to empty stack, Equivalence of PDA's and CFG's, Deterministic PDA.

UNIT-V

Introduction to Turing Machine: Problems that Computers cannot solve, The Turing Machine, Programming Techniques for Turing Machines, Extensions to the Basic Turing Machine, Restricted Turing machines

UNIT-VI

Undecidability: A Language that is not Recursively Enumerable, an Undecidable problem that is RE, Undecidable problems about Turing Machine, Post's Correspondence problem.

Intractable Problems: The classes of P and NP.

Text Books and References:	**Text Books:** 1. Hopcroft J E, Motwani R And Ullman J D An Introduction To Automata Theory, Languages And Computation , pearson education 2. Theory of Computer Science ByK.L.P.Mishra,N.Chandrasekaran (2.8 for Mealy and Moore Models).
	Reference Books: 1. Azad S K, Theory of Computation – An Introduction To Automata, Formal Languages And Computability, DhanpatRai& co. 2. Cohen D I, An Introduction To Computer Theory, 2nd edition, John Wiley 3. LINZ P, An Introduction to Formal Languages and Automata 2nd edition. 4. Martin J C Introduction to languages and the theory of computation 3rd edition, Tata Mcgraw Hill
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT2203 - DESIGN AND ANALYSIS OF ALGORITHMS

Course Category:	Program Core	Credits:	3
Course Type:	Theory	Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Knowledge on concept of preparing algorithms for basic problems, elementary data structures and their associated operations.	Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100

Objectives	- To understand the design and performance issues of an algorithm. - To be familiar with the kinds of design techniques. - To compare the design methods for producing optimal solution for real world problems. - To understand the various computational models for an effective design. - To learn to design the solutions for NP hard and NP complete problems.

Course Outcomes	Upon successful completion of the course, the students will be able to:	
	CO1	Analyze the time and space complexity of an algorithms
	CO2	Design and analysis of algorithms using greedy strategy
	CO3	Identify dynamic programming design methodology to solve problems involving principle of optimality.
	CO4	Perform operations on sets and tree structures and also to understand their applications.
	CO5	Solve problems by constructing a state space tree with branch and bound and backtracking
	CO6	Analyze the classes P, N and NP Complete and be able to prove that a certain problem is NP complete

Course Content	**UNIT-I** **Introduction:** Algorithm analysis, Performance analysis, Space complexity and time complexity, Big 'O' notation, Omega notation, Theta notation, Different mathematical approach's for solving Time complexity of Algorithms. **Divide and Conquer:** General method, Binary search, Merge sort, Quick sort, Strassen's matrix multiplication. **UNIT-II** **Greedy Method:** General method, Knapsack problem, Job sequencing with deadlines, Minimum cost spanning trees, Optimal storage on tapes, Single source shortest paths. **UNIT-III** **Dynamic Programming:** General method, Multistage graphs, All pairs shortest paths, Single source shortest paths. 0/1 Knapsack problem, Reliability design problem, Travelling sales person problem.

Basic Traversal & Search Techniques: Techniques for Binary Trees and Graphs, Connected Components and Spanning Tress, Bi-Connected Components and DFS.

Sets and Disjoint set Union: Introduction, Union and Find operations.

UNIT-V

Back Tracking: General method, N-Queens problem, Sum of subsets, Graph coloring problem.

Branch and Bound: General method, Least cost (LC) search, Control abstractions for LC search, 0/1 Knapsack problem, Travelling salesperson problem.

UNIT-VI

NP Hard and NP Complete Problems: Basic concepts - Nondeterministic algorithms, The classes NP hard and NP complete; NP hard graph problems - Clique decision problem, Node cover decision problem.

PRAM Algorithms: Introduction, Computational Model, Fundamental Techniques and Algorithms.

Text Books and References:	**Text Books:** 1. E.Horowitz, S.Sahni, S.Rajasekaran,"Fundamentals of Computer Algorithms", 2ndEdition, Universities Press, ISBN: 978-8173716126, 2008.
	Reference Books: 1. Thomas H.Cormen, Charles E.Leiserson, Ronald L.Rivest, Cliford Stein, 2. "Introduction to Algorithms", 3rd Edition, Prentice-Hall of India, ISBN: 978-81-203-4007-7, 2010 3. 2. S.Sridhar, "Design and Analysis of Algorithms", Oxford University Press, India, ISBN - 13: 978-0-19-809369-5, ISBN-10: 0-19-809369-1, 2015
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT2204 - SOFTWARE PROJECT MANAGEMENT

Course Category:	Program Core		Credits:	3
Course Type:	Theory		Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Student need to have knowledge in software engineering		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	• Understand basic software requirements. • About estimation and project schedules • About design and programming • Understand management and leadership • Understand process improvement			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Learn the basics of Software Project Management and Project Planning
	CO2	Learn the concepts of Estimation and Project Schedules
	CO3	Overview on Reviews and Software Requirements
	CO4	Learn Design and Programming , Software Testing
	CO5	Briefing on change and management and leadership
	CO6	Learn the concepts of outsourced projects, Process Improvement
Course Content	**UNIT-I** **Introduction:** Tell Everyone the Truth All the Time, Trust Your Team, Review Everything, Test Everything, All Software Engineers Are Created Equal, Doing the Project Right Is Most Efficient. **Software Project Planning:** Understand the Project Needs; Create the Project Plan, Diagnosing Project Planning Problems. **UNIT-II** **Estimation:** Elements of a Successful Estimate, Wideband Delphi Estimation, Other Estimation Techniques, Diagnosing Estimation Problems **Project Schedules:** Building the Project Schedule, Managing Multiple Projects, Use the Schedule to Manage Commitments, Diagnosing Scheduling Problems. **UNIT-III** **Reviews:** Inspections, Desk checks, Walkthroughs, Code Reviews, Pair Programming, Use Inspections to Manage Commitments, Diagnosing Review Problems. **Software Requirements:** Requirements Elicitation, Use Cases, Software Requirements Specification, Change Control, Introduce Software Requirements Carefully, Diagnosing Software Requirements Problems.	

	UNIT-IV
	Design and Programming: Review the Design, Version Control with Subversion, Refactoring, Unit Testing, Use Automation, Be Careful with Existing Projects, Diagnosing Design and Programming Problems. **Software Testing:** Test Plans and Test Cases, Test Execution, Defect Tracking and Triage, Test Environment and Performance Testing, Smoke Tests, Test Automation, Postmortem Reports, Using Software Testing Effectively, Diagnosing Software Testing Problems **UNIT-V** **Understanding Change:** Why Change Fails, How to Make Change Succeed. **Management and Leadership:** Take Responsibility, Do Everything Out in the Open, Manage the Organization, Manage Your Team. **UNIT-VI** **Managing an Outsourced Project:** Prevent Major Sources of Project Failure, Management Issues in Outsourced Projects, Collaborate with the Vendor. **Process Improvement:** Life Without a Software Process, Software Process Improvement, Moving Forward.
Text Books and References:	**Text Books:** 1. Applied Software Project Management by Andrew Stellman and Jennifer Greene, O'Reilly, 2005.
	Reference Books: 1. Quality Software Project Management By Robert T. Futrell, Donald F. Shafer, Linda I. Safer, PHI, 2002 2. Software Project Management in Practice By Pankaj Jalote, Addison Wesley, 2002
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT2205 - COMPUTER NETWORKS

Course Category:	Program Core	Credits:	3
Course Type:	Theory	Lecture - Tutorial - Practical:	2-2-0
Prerequisite:	Knowledge in computer fundamentals and basic network essentials.	Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	- To learn the essentials of computer network layers and Transmission media - Explore the general issues regarding MAC, Network and Transport layers - Study various protocols in TCP/IP suite - Understand the working principle of DNS and E-mail		

	Upon successful completion of the course, the students will be able to:		
Course Outcomes	CO1	Understand the basics of computer Network layers and overview on transmission	
	CO2	Get the design issues, and Protocols of Data link layer	
	CO3	Study various multiple access Protocols, and internetworking Devices	
	CO4	Explore the Basic Design issues, Study various Routing, and Congestion control Algorithms	
	CO5	Learn the concept of IPv4 issues and overview on Transport Layer issues	
	CO6	Understand the Basic TCP issues and exposure on DNS & E-Mail	
Course Content	**UNIT-I** **Introduction:** Use of Computer Networks, Network Hardware, Network Software. **Reference Models:** TCP/IP Model, The OSI Model, Comparisons of the OSI and TCP/IP reference model. **Physical Layer:** Guided Transmission Media. **UNIT-II** **Data Link Layer:** Design issues, Error Detection and Correction, Elementary Data Link Layer Protocols, Sliding window protocol, Examples Data link Protocols **UNIT-III** **Multiple Access Protocols:** the Channel allocation Problem, ALOHA, CSMA, Collision free protocols **Data Link Layer Switching:** Bridges from 802.x to 802.y, local internetworking, spanning tree bridges, repeaters, hubs, bridges, switches, routers and gateways. **UNIT-IV** **Network Layer:** Design issues: store and forward packet switching, Services Provided to the Transport Layer, Implementation of connection less and connection oriented		

	Routing Algorithms: optimality principle, shortest path, flooding, Distance Vector Routing, the Count-to-Infinity Problem, Link State Routing, Hierarchical Routing, Congestion Control Algorithms.
	UNIT-V
	Internetworking: Connectionless Internetworking, Tunnelling, Internetwork Routing, fragmentation, IPv4, IP addresses.
	Transport Layer: The transport Service: Services provided to the upper layers, Transport Service Primitives, Connection Release, Flow Control and Buffering, Multiplexing, Crash Recovery.
	The Internet Transport Protocols UDP: Introduction to UDP, RPC.
	UNIT-VI
	The Internet Transport Protocols TCP: Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP Connection Release, The TCP Connection Management Modelling.
	Application Layer: Introduction, DNS, Electronic mail.
Text Books and References:	**Text Books:** 1. Computer Networks - Andrew S Tanenbaum, 4th Edition, Pearson Education
	Reference Books: 1. Data Communications and Networking - Behrouz A. Forouzan, Fifth Edition TMH, 2013 2. An Engineering Approach to Computer Networks - S. Keshav, 2nd Edition, Pearson Education. 3. Computer Networks, L. L. Peterson and B. S. Davie, 4th edition, ELSEVIER. 4. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K. W. Ross, 3rd Edition, Pearson Education
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT2206 - PRINCIPLES OF PROGRAMMING LANGUAGES

Course Category:	Program Core		Credits:	4
Course Type:	Theory		Lecture - Tutorial - Practical:	3-2-0
Prerequisite:	A few basics regarding syntax and semantics of programming languages		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	- To understand various basic Programming language preliminaries - To describe a common syntax and semantics among languages - To explore the basic features of Object Orientation and a few merits from functional programming languages - To get better exposure regarding the comparative study of various languages			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Identify the basic language evaluation criteria among multiple Programming Domains.
	CO2	Study various simple building blocks to construct different statements.
	CO3	Come across local referencing environments and parameter passing mechanisms.
	CO4	Learn the concept of abstraction and encapsulation properties.
	CO5	Acquire the list of essential elements of object oriented programming languages.
	CO6	Identify various Exception Handling mechanisms and exploring Functional programming features.
Course Content	**UNIT-I** **Preliminaries:** Programming Domains, Language Evaluation Criteria, Influences on Language Design, Language Categories, Language Design Tradeoffs, Implementation methods and programming environments. **Describing Syntax and Semantics:** Formal methods of describing Syntax, Attribute Grammars and Dynamic Semantics. **UNIT-II** **Data Types:** Primitive data types, Character string types, User-defined ordinal types, Arrays, Associative arrays, Record and Union types, Pointer and reference types. **Expression Statements and Assignment Statements:** Introduction, Arithmetic expressions, Overloaded operators, Type conversions, Relational and Boolean expressions, Short-Circuit evaluation, Assignment and Mixed mode statements. **UNIT-III** **Subprograms:** Fundamentals, Design issues, Local referencing environments, Parameter passing methods, Parameters that are subprogram names, Overloaded and Generic subprograms, Design issues for functions, User-defined Overloaded Operators, Co routines.	

	Implementing Subprograms: General semantics of calls and returns, Implementing simple subprograms, Subprogram implementation with stack dynamic local variables. **UNIT-IV** **Abstract Data Types:** Concepts of abstraction, Data Abstraction, Design issues, Language Examples, Parameterized Abstract data types. **Encapsulation Constructs:** Introduction, Encapsulation Constructs, Naming Encapsulations. **UNIT-V** **OOP Features:** Introduction, Object oriented programming concepts, Design Issues. **OOP Languages:** Support for OOP in Smalltalk, C++, Java, C#, Ada95, Ruby and Object model of JavaScript, Implementation of Object Oriented constructs. **UNIT-VI** **Exception Handling:** Introduction, Exception handling in Ada, C++ and Java. **Functional Programming Languages:** Overview, Fundamentals of Mathematical functions, introduction to LISP and Scheme. Applications, Comparison of functional and imperative languages.
Text Books and References:	**Text Books:** 1. Sebesta RW, Concepts of programming languages, 7th edition, Pearson Education 2008
	Reference Books: 1. Louden KC, Programming Languages - Principles and Practice, 2nd edition, Cenage Learning 2003. 2. Tucker AB,Noonan RE, Programming Languages- Principle and Practices, 2nd Edition 3. Pratt TW, Zelkowitz MV and Gopal TV, Programming Languages - Design and Implementation, 4th Edition, Pearson Education 2006. 4. Ghezzi C. Jazayeri M, Programming Language Concepts, 3rd Edition, Wiley -India 1998.
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17MS2201 - TECHNICAL ENGLISH AND SOFT SKILLS

Course Category:	Basic Sciences		Credits:	0
Course Type:	Theory		**Lecture - Tutorial - Practical:**	2-0-2
Prerequisite:	Basic Level of LSRW skills		**Sessional Evaluation:** **Univ. Exam Evaluation:** **Total Marks:**	40 60 100
Objectives	Students undergoing this course are expected: • To develop their basic technical writing skills in English. • To learn specific technical verbal competence. • To acquire soft skills and work efficiently in a realistic professional working environment. • To develop soft skills including problem solving skills, working in groups and leadership skills.			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Present technical papers and equip technical verbal proficiency.
	CO2	Develop group discussion skills and summarizing skills.
	CO3	Write effective resumes and job applications.
	CO4	Develop soft skills and effective nonverbal communication skills.
	CO5	Develop motivational skills and problem solving skills.
	CO6	Develop professionals with idealistic, practical and moral values.
Course Content	**UNIT-I** **Introduction to Technical English:** Writing simple descriptions and explanations on scientific/technical nature - Technical presentations - Communicating technical topics- Jargon **UNIT-II** **Group Discussion:** Dynamics of Group Discussion – Intervention- Summarizing- Modulation of voice - Body Language – Relevance - Fluency and Coherence **UNIT-III** **Resumes and Job Applications:** Writing resumes – Resume design – Parts of a resume – Resume styles – Cover letter **UNIT-IV** **Introduction to Soft Skills & Hard Skills:** Non Verbal communication- Haptics – Proxemics - kinesics - Chronemics – Oculesics -Vocalics **UNIT-V** **Personality Development Skills:** Assertiveness - Positive Attitude - Self Confidence- Problem Solving Skills- Leadership Skills	

	UNIT-VI
	Etiquette & Manners: Corporate etiquette-Dinning etiquette - Goal Setting- Career Planning -Time Management
Text Books and References:	**Reference Books:** 1. A Textbook of English for Engineers and Technologists (combined edition, Vol. 1 &; Orient Black Swan 2010. 2. Effective Technical Communication, M. Ashraf Rizvi, Tata McGraw- Hill, 2011 3. Soft Skills, Dr K. Alex, S. Chand Publications, New Delhi
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT22P1 - DATABASE MANAGEMENT SYSTEMS LABORATORY

Course Category:	Program Core	Credits:	2
Course Type:	Practical	Lecture - Tutorial - Practical:	0-0-3
Prerequisite:	Basic knowledge in mathematical formulae and preliminary fundamentals of databases.	Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	• To study various database design models for building applications.		

Course Outcomes	At the end of this lab session, the students will be able to identify various Database concepts to develop applications using SQL

Course Content	1. Creation, altering and dropping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.
	
	2. Queries along with sub Queries using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSECT Constraints.
	
	3. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN) GROUP BY, HAVING,Creation and dropping of Views.
	
	4. Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date).
	
	5. Implement the following
	
	    a. Creation of simple PL/SQL program which includes declaration section, executable section and exception –Handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found).
	
	    b. Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block
	
	6. Develop a program that includes the features NESTED IF, CASE and CASE expression.
	
	7. Develop a program using WHILE LOOP, numeric FOR LOOPS, nested loops using BUILT–IN Exceptions
	
	8. Develop a program using creation of procedures, passing parameters IN and OUT of procedures.
	
	9. Develop a program using creation of stored functions, invoke functions in SQL Statements and write complex functions.
	
	10. Develop programs using feature parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.
	
	11. Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers.

	Reference Books:
Text Books and References:	1. ORACLE DATA BASE LOG PL/SQL Programming SCOTT URMAN, Tata Mc-Graw Hill.
	2. Oracle Database 12C Hands-on SQL and PL/SQL Paperback – Import, 29 Feb 2016 by SatishAsnani.
	3. Oracle Pl/Sql Programming:A Developer's Workbook, Steven Feuerstein , Andrew Odewahn.
E-Resources	1. https://nptel.ac.in/courses
	2. https://freevideolectures.com/university/iitm

17IT22P2 - COMPUTER NETWORKS LAB

Course Category:	Program Core	Credits:	2
Course Type:	Practical	Lecture - Tutorial - Practical:	0-0-3
Prerequisite:	Knowledge in computer fundamentals and basic network essentials.	Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	• To learn and practice the essentials of computer network layers, protocols and supporting applications.		

Course Outcomes	At the end of this lab session, the students will be able to understand the basics of computer Network layers and simulate some of the protocols & application
Course Content	1. Create Sample Wired Network Using NS-2 Simulator 2. Create Routing Algorithms and Analyze them by using NS-2 Simulator 3. Create TCP Connection Between two Nodes and find Through put of it using NS-2 Simulator 4. Create UDP Connection Between two Nodes and find Through put of it using NS-2 Simulator 5. Create Web Pages 6. Write a java Program for Framing techniques 7. Write a java Program for Error Detection Mechanism 8. Write a java Program for Error Correction Mechanism
Text Books and References:	**Reference Books:** 1. Computer Networks - Andrew S Tanenbaum, 4th Edition, Pearson Education 2. Introduction to Network Simulator NS2 by Teerawat Issariyakul, Ekram Hossain, 2nd Edition, Springer 3. Java™ : The Complete Reference by Herbert Schildt, Seventh Edition 4. HTML, XHTML and CSS Bible by Steven M. Schafer, 5th Edition, Wiley Publications
E-Resources	1. https://google.com 2. http://iiti.ac.in/people/~tanimad/JavaTheCompleteReference.pdf 3. https://bayanbox.ir/view/3697480237749666667/Introduction-to-Network-Simulator-NS2-2012.pdf 4. ftp://ftp.micronet-rostov.ru/linux-support/books/programming/HTML-CSS/[Wiley]%20%20HTML,%20XHTML,%20and%20CSS%20Bible,%205th%20ed.%20-%20[Steven%20M.%20Schafer].pdf

NBKR INSTITUTE OF SCIENCE & TECHNOLOGY: VIDYANAGAR (AUTONOMOUS)

AFFILIATED TO JNTUA, ANANTAPURAMU
III YEAR OF FOUR YEAR B.TECH DEGREE COURSE – I SEMESTER
INFORMATION TECHNOLOGY
SCHEME OF INSTRUCTION AND EVALUATION
(With effect from the batch admitted in the academic year 2017-2018)

S.No	Course Code	Course Title	Instruction Hours/Week			Credits	Evaluation						Total Sessional Marks (Max. 40)	End Semester Examination		Max. Total Marks
							Sessional Test-I		Sessional Test-II							
		THEORY	L	T	D/P		Duration In Hours	Max. Marks (24+6+10)	Duration In Hours	Max. Marks (24+6+10)				Duration In Hours	Max. Marks	100
1	17IT3101	Image Processing and Visualization	3	-	-	3	2	40	2	40			0.8*Best of two + 0.2*least of two	3	60	100
2	17IT3102	Artificial Intelligence	3	2	-	4	2	40	2	40				3	60	100
3	17IT3103	Distributed Systems	3	-	-	3	2	40	2	40				3	60	100
4	17IT3104	Compiler Design	3	2	-	4	2	40	2	40				3	60	100
5	17IT3105	Web Application Development using Python	3	-	-	3	2	40	2	40				3	60	100
6	17IT31E1	Professional Elective-1	3	-	-	3	2	40	2	40				3	60	100
		PRACTICALS														
7.	17IT31MP	Mini Project	-	-	3	2	-	-	-	-		40	Day to Day Evaluation and a test (40 Marks)	-	60	100
8.	17IT31P1	IPV Lab	-	-	3	2	-	-	-	-		40		3	60	100
9.	17IT31P2	WADP Lab	-	-	3	2	-	-	-	-		40		3	60	100
		TOTAL	18	4	9	26	-	240	-	360				-	540	900

17IT3101 - IMAGE PROCESSING AND VISUALIZATION

Course Category:	Program Core		Credits:	3
Course Type:	Theory		Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Knowledge in computer systems, matrix algebra, calculus in three dimensions and coordinate transformations.		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	• To get familiar with digital image fundamentals • To get exposed with simple image enhancement, compression, segmentation and restoration techniques in spatial and frequency domain			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Learn the fundamental elements of image processing and its applications.
	CO2	Understand the basic image transformations and image enhancement.
	CO3	Demonstrate concepts of various filtering techniques for image representation.
	CO4	Represent various colour models used in wavelet coding techniques.
	CO5	Analyze the concept of mathematical techniques for image compression and segmentation.
	CO6	Describe fundamental mathematical concepts used for representing and visualizing 3D objects.
Course Content	**UNIT-I** **Introduction:** Origin, Steps in Digital Image Processing, Components, Elements of Visual Perception, Image Sensing and Acquisition, Image Sampling and Quantization, Relationships between pixels. **UNIT-II** **Spatial Domain:** Gray Level Transformations, Histogram Processing, Basics of Spatial Filtering–Smoothing and Sharpening Spatial Filtering. **Frequency Domain:** Introduction to Fourier Transform, Smoothing and Sharpening Frequency Domain Filters, Ideal, Butterworth and Gaussian Filters. **UNIT-III** **Noise Models:** Mean Filters, Order Statistics, Adaptive Filters, Band Reject Filters, Band Pass Filters, Notch Filters, Optimum Notch Filtering, Inverse Filtering, Wiener filtering, Minimum Mean Square Error Filtering, Constrained Squares Least Filtering, and Geometric Mean Filter. **UNIT-IV** **Color Models:** The RGB Color Model, The CMK and CMYK Color Model. **Wavelets:** SubBand Coding, The Haar Transform-Multiresolution Expansions, Wavelet Transforms in One Dimension.	

	UNIT-V
	Compression: Fundamentals, Image Compression models, Error Free Compression, Variable Length Coding, Bit-Plane Coding, Lossless Predictive Coding, Lossy Compression, Lossy Predictive Coding, Compression Standards. **Segmentation:** Detection of Discontinuities, Edge Linking and Boundary detection, Region based segmentation, Morphological watersheds.
	UNIT-VI
	Boundary Representation: Chain Code, Polygonal approximation, Signature, Boundary Segments, Boundary Descriptors, Shape Number, Fourier Descriptor, Moments, Regional Descriptors, Topological Feature, Texture, Moments of Two Dimensional Functions, Relational Descriptors.
Text Books and References:	**Text Books:** 1. Rafael C. Gonzales, Richard E. Woods, "Digital Image Processing", Second Edition, Pearson Education. **Reference Books:** 1. Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins, "Digital Image Processing Using MATLAB", Third Edition Tata McGraw Hill Pvt. Ltd., 2011. 2. Anil Jain K. "Fundamentals of Digital Image Processing", PHI Learning Pvt. Ltd., 2011. 3. Willliam K Pratt, "Digital Image Processing", John Willey, 2002. 4. Malay K. Pakhira, "Digital Image Processing and Pattern Recognition", First Edition, PHI Learning Pvt. Ltd., 2011.
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT3102 - ARTIFICIAL INTELLIGENCE

Course Category:	Program Core		Credits:	4
Course Type:	Theory		Lecture - Tutorial - Practical:	3-2-0
Prerequisite:	Fundamentals of networking, analytical capabilities and logic orientations are required		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	- To apply knowledge of computing and mathematics appropriate to the discipline. - To analyze a problem, and identify and define the computing requirements appropriate to its solution. - To design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.			

	Upon the successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Understand the basics of AI and study different types of supporting agent characteristics
	CO2	Know various Problem solving agents and their behavior in real-world environment
	CO3	Understand and apply the fundamentals of AI search algorithms
	CO4	Know various knowledge representation techniques and its applicability
	CO5	Observe different Learning techniques for future implementation
	CO6	Know the concepts of Knowledge in explanation based learning and utilization
Course Content	**UNIT-I** **Introduction:** Overview on AI, History , The state of the Art, Intelligent Agents, Agents and Environments, Good behavior, The nature of Environments, the Structure of Agents. **UNIT-II** **Problem Solving:** Problem solving agents, toy problems, Real-world problems, searching for solutions. **Uninformed Search Strategies:** BFS, DFS, Depth-limited search. **UNIT-III** **Informed Search Strategies:** GBFS, A* search, Local search algorithms: Hill-climbing. **Constraint Satisfaction Problems:** Constraint Satisfaction Problems, Backtracking Search for CSPs, Local search for CSPs. **UNIT-IV** **Adversarial Search:** Games, optimal decision in games, Alpha-Beta pruning, Imperfect, Real-Time Decisions.	

	Knowledge and Reasoning: Logical Agents: Knowledge-based Agents, The WUMPUS world, Logic, Propositional Logic, Reasoning Patterns in Propositional logic, Resolution, Forward and Backward chaining. First-order Logic: Syntax and Semantics of First-Order Logic.
	UNIT-V
	Learning: Learning from Observations- Forms of Learning, Inductive Learning, Learning Decision Trees, and Ensemble Learning.
	UNIT-VI
	Knowledge in Learning: A Logical formulation of learning, knowledge in learning, Explanation-Based Learning, Learning using Relevance Information.
Text Books and References:	**Text Books:** 1. Artificial Intelligence a Modern Approach, Stuart Russell, Peter Norvig (Person Education), 2nd edition. **Reference Books:** 1. Artificial Intelligence- Rich E & Knight K (TMH), 4th edition. 2. Artificial Intelligence Structures and Strategies complex problem Solving – George F. Lugar Pearson Education. 3. D.W. Patterson, "Introduction to AI and Expert Systems", PHI, 1992. 4. R.J. Schalkoff, "Artificial Intelligence - an Engineering Approach", McGraw Hill Int. Ed., Singapore, 1992.
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT3103 - DISTRIBUTED SYSTEMS

Course Category:	Program Core		Credits:	3
Course Type:	Theory		Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Student needs to have basic knowledge of any operating systems and networking.		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	• Understand foundations of Distributed Systems. • Ability to communicate between distributed objects. • Introduce the idea of peer to peer services and various file systems. • Understand the Security techniques used in distributed systems.			

	Upon the successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Understand the basic characterization of distributed systems.
	CO2	Understand the basics of networking and internetworking with inter process communication.
	CO3	Understand the Communication between distributed objects and Explore the architecture of distributed file systems.
	CO4	Explore the name services and peer to peer systems.
	CO5	Understand the transactions and concurrency control.
	CO6	Explore the concurrency control in distributed transactions and security.
Course Content	**UNIT-I** **Characterization of Distributed Systems:** Introduction, Examples of Distributed systems, Resource sharing and web, challenges, System models: Introduction, Architectural and Fundamental models. **UNIT-II** **Networking and Internetworking:** Types of network, Network principles, Internet protocols, Case studies: Ethernet, WiFi, Bluetooth and ATM. **Interprocess Communication:** The API for the Internet protocols, Client-server communication, Group communication, Case study- interprocess communication in UNIX. **UNIT-III** **Distributed Objects and Remote Invocation:** Communication between distributed objects, Remote procedure call, Events and notifications. Case study- Java RMI. **Distributed File Systems:** Introduction, File Service architecture, case study-SUN network file systems.	

	UNIT-IV
	Name Services: Introduction, Name Services and the Domain Name System, Case study of the Global Name Service.
	Peer to Peer Systems: Introduction, Napster and its legacy, Peer to Peer middleware, Routing overlays.
	UNIT-V
	Transactions and Concurrency Control: Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control.
	UNIT-VI
	Distributed Transactions: Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery.
	Security: Introduction, Overview of Security techniques, Cryptographic algorithms, Digital signatures, Case studies-Kerberos, 802.11 WiFi.
Text Books and References:	**Text Books:** 1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education. 2. Distributed Systems, S.Ghosh, Chapman and Hall/CRC, Taylor & Francis Group, 2010. **Reference Books:** 1. Distributed Computing, S.Mahajan and S.Shah, Oxford University Press. 2. Distributed Operating Systems Concepts and Design, Pradeep K.Sinha, PHI. 3. Advanced Concepts in Operating Systems, M Singhal, N G Shivarathri, Tata McGraw-Hill Edition.
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT3104 - COMPILER DESIGN

Course Category:	Program Core		Credits:	4
Course Type:	Theory		Lecture - Tutorial - Practical:	3-2-0
Prerequisite:	Basics of programming languages and theory of computation.		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	- To make the student to understand the process involved in compilation. - Creating awareness among students on various types of bottom up parsers. - Understand the syntax analysis, intermediate code generation, type checking, and the role of symbol table etc.			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Understand the basics of Compiler Design and the role of Lexical Analyzer
	CO2	Study various Syntax analyzers, grammar rules, LR and CLR parsing techniques
	CO3	Get exposure on syntax translation and type checking mechanisms to be motivated to develop interpreters or compiles.
	CO4	Identify various storage allocation strategies, intermediate code generation and their applicability
	CO5	Acquire knowledge on code generation and Run-time storage Management
	CO6	Explore the principal sources of optimization and code Improving Transformations in a broader perspective.
Course Content	**UNIT-I** **Introduction to Compiling:** Compilers, Analysis of the Source program. Phases of a compiler, Cousins of the Compiler, Grouping of phases, Compiler construction tools. **Lexical Analysis:** Role of the analyzer. Input buffering, Specification of tokens, Recognition of tokens, A language for Specifying Lexical analyzer. **UNIT-II** **Syntax Analysis:** Role of the parser, Context-free grammars, Writing a grammar, Top-down parsing, Bottom-up parsing, Operator-precedence parsing, LR parsers, Using ambiguous grammars, Parser generators. **UNIT-III** **Syntax Directed Translation:** Syntax-directed definitions, Construction of syntax trees, Bottom-up evaluation of S-attributed definitions, L-attributed definitions. Top-down translations, Bottom-up evaluation of inherited attributes. **Type Checking:** Type systems, Specification of simple type checker. Equivalence of type expressions, Type conversions, Overloading of functions and operators, Polymorphic functions	

	UNIT-IV
	Run-Time Environments: Source Language issues, Storage organization, Storage-allocation strategies. Access to non-local names. Symbol tables, Language facilities for dynamic storage allocation. Dynamic storage allocation techniques.
	Intermediate Code generation: Intermediate languages. Declarations, Assignment statements.
	UNIT-V
	Code Generation: Issues in the Design of a code generator, The target machine, Run-time storage management, Basic blocks and flow graphs, Next-use information, A simple code generator, Register allocation and assignment.
	UNIT-VI
	Code Optimization: Introduction. The principle source of optimization, Optimization of basic blocks, Loops in flow graphs, Introduction to global data-flow analysis, code improving transformations
Text Books and References:	**Text Books:** 1. Alfred V.Aho, Ravi Sethi, and Jeffrey D.Ullman, Compilers-Principles, Techniques and Tools, Pearson Education, 2004. **Reference Books:** 1. Alfred V.Aho, Jeffrey D.Ullman, Principles of Compiler Design, Narosa Publications. 2. J.P.Benne, Introduction to compiling Techniques, 2nd Edition, Tata McGraw Hill
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT3105 - WEB APPLICATION DEVELOPMENT USING PYTHON

Course Category:	Program Core		Credits:	3
Course Type:	Theory		Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Student needs to have basic knowledge of any programming language		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	- Introduce Python programming fundamentals - Learn to apply fundamental problem solving techniques for application development and prototyping using Python. - Incorporate best practices in navigation, usability and written content to design websites that give users easy access to the information. - Provide conceptual and practical knowledge and skills required to develop web applications and web services using Django Framework.			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Understand basic structure and key features of Python
	CO2	Know possibilities with the Django Framework and foundations of developing Web-based applications
	CO3	Understand the Application Programs to build using Django Framework
	CO4	Comprehend the way URLs are processed by Django along with the usage of Django's timesaving generic views. Django's template language and its form-handling mechanisms are also learnt.
	CO5	A first-hand feel of applications
	CO6	Exposure to advanced Django like Extending template system using ORM etc.
Course Content	**UNIT-I** **Practical Python for Django:** Python Skills Are Django Skills, Getting Started: Python's Interactive Interpreter, Python Basics, Python Basics, Python Standard Types, Flow Control, Exception Handling, Files, Functions, Object-Oriented Programming, Regular Expressions, Common Gotchas, Coding Style **UNIT-II** **Django - Building a Blog :** Creating the Project, Creating the Project, Creating the Blog Application, Designing Your Model, Designing Your Model, Setting Up and trying out the Automatic admin Application, Making Your Blog's Public Side, Finishing Touches **Starting Out:** With Web Development Basics, Communication, Data Storage etc., Understanding Models, Views, and Templates, Overall Django Architecture and core philosophies. **UNIT-III** **Django in Depth:** Defining and Using Models	

	Defining Models: Need for Object-Relational Mapper, Django's Rich Field Types, Django's Rich Field Types, Django's Rich Field Types, Model Inheritance, Meta Inner Class, Meta Inner Class, **Using Models:** Creating and Updating Your Database, Using manage.py, Using manage.py, Utilizing SQL Features Django Doesn't Provide. **UNIT-IV** **URLS, HTTP Mechanisms, and Views:** URLs, Modeling HTTP: Requests, Responses and Middleware, Views/Logic. **Templates and Form Processing:** Templates - Understanding Contexts, Template Language Syntax, Forms - Defining Forms, Filling Out Forms, Validation and Cleaning, Form Display, Widgets **UNIT-V** **Django Applications by example:** Photo Gallery – Application of "Don't Repeat Yourself" Convention, Liveblog – Usage of Advanced JavaScript and AJAX Toolkit with Django **UNIT-VI** **Advanced Django Programming:** Customizing the Admin, Using Syndication, Generating Downloadable Files, Enhancing Django's ORM with Custom Managers, Extending the Template System.
Text Books and References:	**Text Books:** 1. Jeff Forcier, Paul Bissex, Wesley Chun, "Python Web Development with Django", Pearson Education, 2009 **Reference Books:** 1. Marty Alchin "Pro Django" ,Apress, 2013 2. Holovaty, Adrian, Kaplan-Moss, Jacob, "The Definitive Guide to Django Web Development Done Right", Apress, 2009. 3. Steve Holden, "Python Web Programming", New Riders, 2002.
E-Resources	1. https://wiki.python.org/moin/WebProgrammingBooks 2. https://realpython.com/tutorials/web-dev/ 3. https://nptel.ac.in/courses 4. https://freevideolectures.com/uiversity/iitm

17IT31E1 - ADVANCED DATABASE MANAGEMENT SYSTEMS

Course Category:	Professional Elective		Credits:	3
Course Type:	Theory		**Lecture - Tutorial - Practical:**	3-0-0
Prerequisite:	Require basics of database management system concepts.		**Sessional Evaluation:** **Univ. Exam Evaluation:** **Total Marks:**	40 60 100
Objectives	- To explain and evaluate the fundamental requirements that influences the design of modern database systems. - To assess and apply database functions and packages suitable for enterprise database development. - To evaluate alternative designs and architectures for databases and data warehouses - To discuss various advanced methods of storing, managing and interrogating complex data			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Study various database systems architectures, merits and demerits
	CO2	Analyze parallel Databases to study various operations
	CO3	Understand Distributed databases types, supporting environment and storage
	CO4	Acquire knowledge on Object Based Databases to develop different applications
	CO5	Know the Enhanced E-R features and Advanced Application Developments in Database
	CO6	Specifies the Temporal and spatial Databases, and various transaction processing methods to apply for various domains
Course Content	UNIT-I **Database-System Architectures:** Centralized and Client–Server Architectures, Server System Architectures, Parallel Systems, Distributed Systems and Network Types. UNIT-II **Parallel Databases:** I/O Parallelism, Interquery Parallelism, Intraquery Parallelism, Intraoperation Parallelism, Interoperation Parallelism and Query Optimization. UNIT-III **Distributed Databases:** Homogeneous and Heterogeneous Databases, Distributed Data Storages, Distributed Transactions, Commit Protocols, Concurrency Control in Distributed Databases, Availability, Distributed Query Processing, Heterogeneous Distribute Databases, Cloud-Based Databases and Directory Systems. UNIT-IV **Object-Based Databases:** Overview, Complex Data Types, Structured Types and Inheritance in SQL, Table Inheritance, Array and Multiset Types in SQL, Object-Identity and Reference Types in SQL, Implementing O-R Features, Persistent Programming Languages, Object-Relational Mapping, Object-Oriented versus Object-Relational.	

	UNIT-V **Database Design and the E-R Model:** Extended E-R Features, Alternative Notations for Modeling Data, Other Aspects of Database Design. **Advanced Application Development:** Performance Tuning, Performance Benchmarks, Other Issues in Application Development Standardization. UNIT-VI **Spatial and Temporal Data and Mobility:** Motivation, Time in Databases, Spatial and Geographic Data, Multimedia Databases, Mobility and Personal Databases. **Advanced Transaction Processing:** Transaction-Processing, Monitors Transactional Workflows, E-Commerce, Main Memory Databases, Real-Time Transaction Systems.
Text Books and References:	**Text Books:** 1. Abraham Silberschatz Henry F.KorthS.Sudarshan "Database System Concepts" Sixth Edition, PHI. **Reference Books:** 1. Raghuram Krishnan and JohnnesGherke "Database Management System" Second Edition. 2. Peter Rob, CarlosCoronel, A.AnandaRao - "Database Management Systems".
E-Resources	1. http://www.nptelvideos.in/2012/11/database-management-system.html 2. http://www.cse.iitb.ac.in/infolab/Data/Courses/CS632/

17IT31E2 - MULTIMEDIA AND APPLICATIONS

Course Category:	Professional Elective		Credits:	3
Course Type:	Theory		Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Required the basics of internet networking and WWW.		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	• Understand and learn the basics of multimedia and applications. • Develop and evaluate multimedia process based on different online applications. • Select and use appropriate architectural styles for various problems. • Specify various influencing factors on multimedia.			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Understand the basics of multimedia application and to explain about the influences of multimedia application development on business and technical activities
	CO2	Analyze the attributes of audio, digital audio and apply the same to prepare the calculation of quantization and transmission
	CO3	Learn the Action Script basics and initiate application development process
	CO4	Study various data compression techniques and its applicability
	CO5	Learn different video compression techniques and supporting formats for comparison of size and quality
	CO6	Study the role of multimedia networks to get the exposure on supporting domains
Course Content	**UNIT-I** **Fundamental concepts in Text and Image:** Multimedia and hypermedia, world wide web, overview of multimedia software tools. Graphics and image data representation graphics/image data types, file formats, Color in image and video: color science, color models in images, color models in video. **UNIT-II** **Fundamental concepts in Video and Digital Audio:** Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio. **Action Script I:** ActionScript Features, Object-Oriented ActionScript, Data types and Type Checking, Classes, Authoring an ActionScript Class. **UNIT-III** **Action Script II:** Inheritance, Authoring an ActionScript 2.0 Subclass, Interfaces, Packages, Exceptions. **Application Development:** An OOP Application Frame work, Using Components with ActionScriptMovieClip Subclasses.	

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UNIT-IV

Multimedia Data Compression: Lossless compression algorithm: Run-Length Coding, Variable Length Coding, Dictionary Based Coding, Arithmetic Coding, Lossless Image Compression, Lossy compression algorithm: Quantization, Transform Coding, Wavelet-Based Coding, EmbeddedZerotree of Wavelet Coefficients Set Partitioning in Hierarchical Trees (SPIHT).

UNIT-V

Basic Video Compression Techniques: Introduction to video compression, video compression based on motion compensation, search for motion vectors, MPEG, Basic Audio Compression Techniques.

UNIT-VI

Multimedia Networks: Basics of Multimedia Networks, Multimedia Network Communications and Applications: Quality of Multimedia Data Transmission, Multimedia over IP, Multimedia over ATM Networks, Transport of MPEG-4, Media-on-Demand (MOD).

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Text Books and References:	**Text Books:** 1. Fundamentals of Multimedia by Ze-Nian Li and Mark S. Drew PHI/Pearson Education. 2. Essentials ActionScript 2.0, Colin Moock, SPD O, REILLY. **Reference Books:** 1. Digital Multimedia, Nigel chapman and jenny chapman, Wiley-Dreamtech. 2. Macromedia Flash MX Professional 2004 Unleashed, Pearson. 3. Multimedia and communications Technology, Steve Heath, Elsevier (Focal Press). 4. Multimedia Applications, Steinmetz, Nahrstedt, Springer.
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT31E3 - SOFTWARE ARCHITECTURE

Course Category:	Professional Elective		Credits:	3
Course Type:	Theory		**Lecture - Tutorial - Practical:**	3-0-0
Prerequisite:	Need to know the fundamentals of software engineering		**Sessional Evaluation:** **Univ. Exam Evaluation:** **Total Marks:**	40 60 100
Objectives	• Understand basic software architecture requirements, views and patterns etc. • Evaluate software architecture and quality attributes • Select and use appropriate architectural styles • Explore appropriate key architectural structures, tactics and methods • Defining guidelines for documenting software Architecture			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Understand the basics of software architectural requirements, views, patterns and influences on business and technical issues
	CO2	Analyze the quality attributes and to apply the same to prepare the documentation based on the suitability of attributes
	CO3	Specify the key structures, tactics and patterns to design and specify the architecture.
	CO4	Study different methods of agility and understand the business goals using other methods including various design strategies
	CO5	Prepare a document for a given architecture using views
	CO6	Identify the factors that influence the management and governance
Course Content	**UNIT-I** **Introduction to Software Architecture:** Definitions, Architectural Structures and Views, Patterns, What Makes a "Good" Architecture. **Importance of Software Architecture:** System's Quality Attributes, change and prediction, communication enhancement, Design Decisions, Constraints, Influences, Evolutionary Prototyping, Improving Cost and Schedule Estimates, Transferable, Reusable Model, Independently Developed Components, Vocabulary of Design Alternatives and Training. **UNIT-II** **Context of Software Architecture:** Technical Context, Project Life-Cycle, Business, Professional, Stakeholders and influences **Quality Attributes:** Architecture and Requirements, Functionality ,Considerations, Requirements, Achieving Quality Attributes through Tactics, Guiding Design Decisions, Other Quality Attributes	

	UNIT-III
	Architectural Tactics and Patterns: Architectural Patterns, Overview, Relationships between Tactics and Patterns.
	Quality Attribute Modeling and Analysis: Modeling Architectures, Attribute Analysis and Checklists, Experiments, Simulations, and Prototypes, Different Stages of the Life
	UNIT-IV
	Architecture in Agile Projects: Overview, Agility and Architecture Methods, examples, Guidelines for the Agile.
	Architecture and Requirements: Gathering ASRs from Requirements Documents, Stakeholders, Understanding the Business Goals, Utility Tree and Methods.
	Designing an Architecture: Design Strategy, The Attribute-Driven Design Method and supporting steps
	UNIT-V
	Documenting Software Architectures: Uses and Audiences for Architecture Documentation, Notations, and Views, Choosing and Combining Views, Building the Documentation Package, Documenting Behavior, Architecture Documentation and Quality Attributes.
	Architecture, Implementation, and Testing: Architecture and Implementation, Architecture and Testing.
	Architecture Reconstruction and Conformance: Architecture Reconstruction Process, View Extraction, Database Construction, View Fusion, Finding Violations and Guidelines.
	UNIT-VI
	Architecture Evaluation: Evaluation Factors, Architecture Tradeoff Analysis Method and Evaluation.
	Management and Governance: Planning, Organizing, Implementing, Measuring and Governance.
	Architecture and Software Product Lines: Example of Product Line Variability, What Makes a Software Product Line Work, Scope, The Role of a Product Line Architecture, Variation Mechanisms, Evaluation and Key Issues.
Text Books and References:	**Text Books:** 1. Len Bass, Paul Clements, Rick Kazman "Software Architecture in Practice", Third Edition, Addison Wesley Publishers, 2013. **Reference Books:** 1. Mary Show, David Garlan, "S/W Arch. Perspective: on an Emerging Discipline", 1996, PHI. 2. Jeff Garland, Richard Anthony, "Large-Scale Software Architecture A Practical Guide using UML", John Wiley and Sons Ltd, 2003.

	3. Oliver Vogel, Ingo Arnold, ArifChughtai, TimoKehrer "Software Architecture A Comprehensive Framework and Guide for Practitioners", Springer Publishers, 2009. 4. Ian Gorton, "Essential Software Architecture", Second Edition, Springer Publishers, 2011.
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT31E4 - GENETIC ALGORITHMS AND APPLICATIONS

Course Category:	Professional Elective		Credits:	3
Course Type:	Theory		Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Basic knowledge on design and analysis of algorithms and mathematical computing techniques.		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	• Understanding the types of Genetic Operators and their usage • Learning various methods and their applicability • Gaining knowledge from genetic modeling and machine learning to develop various applications			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Familiar with the basics of Genetic Algorithms and machine learning
	CO2	Compare traditional methods and study various learning techniques
	CO3	Learn and analyze the mathematical foundations for GA
	CO4	Studyvarious GA operators and their utilization for application development
	CO5	Study and solve various problems in different domains
	CO6	Understand the genetic based machine learning and supporting development of applications
Course Content	**UNIT-I** **Introduction to Genetic Algorithms:** History, Basic concepts, Creation of Off-springs, Working principle, Encoding, Binary Encoding, Octal Encoding, Hexadecimal Encoding, Permutation Encoding, Value Encoding, Tree Encoding, Fitness Function. **UNIT-II** **GA Traditional methods:** Robustness of Traditional Optimization and Search Methods, Goals of Optimization, GA vs. Traditional Methods, Simple GA, Machine Learning Explanation, ML vs. AI, Supervised and Unsupervised Machine Learning, Examples of Machine Learning. **UNIT-III** **Genetic Operators:** Reproduction, Roulette-Wheel Selection, Boltzmann Selection, Tournament Selection, Rank Selection, Steady-State Selection, Elitism, Generation Gap and Steady-State Selection, Inheritance Operators, Crossover, Single-Point Crossover, Two-Point Cross Over, Multi-Point Cross Over, Uniform Cross Over, Matrix Cross Over, Cross Over Rate, Mutation Operators, Mutation, Mutation Rate. **UNIT-IV** **Genetic Modeling:** Inversion and Deletion: Inversion, Deletion and Duplication, Deletion and Regeneration, Segregation, Cross Over and Inversion, Bit-Wise Operators, One's Complement Operator, Logical Bit-Wise Operators, Shift Operators, Bit-Wise Operators	

used in GA, Generational Cycle, Convergence of GA, Differences and Similarities Between GA and Other Traditional Methods.

UNIT-V

Applications of GA: The Rise of GA, GA Application of Historical Interaction, Dejung & Function Optimization, Current Applications of GA.

Techniques in Genetic Search: Dominance, Diploidy & abeyance, Niche & Speciation, Multi Objective Optimization, Knowledge-Based Techniques, GA & Parallel Processes, Real Life Problem.

UNIT-VI

Genetic-Based Machine Learning: Genetics-Based Machine learning, Classifier System, Rule & Message System.

Apportionment of credit: The Bucket Brigade-Genetic Algorithm, A Simple Classifier System in Pascal, Results using the Simple Classifier System, The Rise of GBMC, Development of CS-1, The First Classifier System, Smith's Poker Player, Current Applications.

Text Books and References:	**Text Books:** 1. David E. Gold berg, "GeneticAlgorithms in Search, Optimization &Machinelearning",PearsonEducation, 2001. 2. S.Rajasekaran, G.A.VijayalakshmiPai,"Neural Networks, Fuzzy Logic and GeneticAlgorithms",Pearson Education, 2003. **Reference Books:** 1. KalyanmoyDeb,"Optimization for Engineering Design, Algorithms and examples" PHI 1995.
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT31MP - MINI PROJECT

Course Category:	Program Core		Credits:	2
Course Type:	Implementation and Documentation	Lecture - Tutorial - Practical:		0-0-3
Prerequisite:	Require the fundamental knowledge in a few core computing areas	Sessional Evaluation: Univ. Exam Evaluation: Total Marks:		40 60 100
Objectives	• To apply the programming knowledge into a real- world situation/simple problem			

Course Outcomes	Upon successful completion of the course, the students will be able to:	
	CO1	Identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach
Course Guidelines and Evaluation	**GUIDELINE/INSTRUCTION** • The mini project must be done alone. • Submit an early proposal with 1 or 2 page(s) report as per the schedule, description of functionality and how the final product will be. **PROCEDURE** • Formulate a real world problem and gather its requirements, and develop a design solution • Test and validate the conformance of the developed prototype against the original requirements of the problem • Work as a responsible member and possibly a leader of a team in developing software solutions • Participate in and possibly moderate, discussions that lead to making decisions • Express technical ideas, strategies and methodologies in written form to prepare and conduct oral presentations • Self-learning tools, algorithms, and/or techniques that contribute to the software solution of the project must be exposed • Generate alternative solutions, compare them and select the optimum one. **INTERNAL ASSESSMENT (40):** • The internal examination will be conducted by the department and the performance shall be evaluated by the concerned guide and two other senior faculty members act as examiners based on the reviews/reports. **EXTERNAL ASSESSMENT(60):** • The end examination will be conducted jointly by the Guide and another Examiner nominated by Principal/Director as per list given recommended from department	

	REPORT : A report must be prepared based on the following contents: • Abstract/Synopsis • Introduction • SRS – An agreement between Developer and Customer or end user (Refer any standard template followed by industry, Organization and any Institute as per current trends) • System Design – Description of modules/functions and basic UML diagrams to support the behaviour of the system • Detailed Design – Supporting UML diagrams to expose different levels of representations including behaviour, Interaction and partial implementation • Implementation details – Coding and Testing • Bibliography – Reference books, web sites and journals (if any)
References:	Refer any standard document/template which may be suitable for current development based on organization/Industry or Institute through various web sites.
E-Resources	Visit any software industry sites or Google for downloading sample formats/templates suitable to your project.

17IT31P1 - IMAGE PROCESSING AND VISUALIZATION LABORATORY

Course Category:	Program Core		Credits:	2
Course Type:	Practical		Lecture - Tutorial - Practical:	0-0-3
Prerequisite:	Knowledge in computer systems, matrix algebra, calculus, color models.		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	• To simulate various strategies for simple image enhancement, compression, segmentation and restoration techniques in spatial and frequency domain			

Course Outcomes	Upon successful completion of the course, the students will be able to acquire the knowledge on image enhancement, compression, segmentation and restoration techniques in spatial and frequency domain.
Course Content	1. Display of gray scale images 2. Histogram equalization 3. Display of color image 4. Design Filtering 5. Spatial and frequency domain 6. Segmentation 7. Image smoothing and sharpening 8. Clustering 9. DCT & DWT image comparison techniques
Text Books	**Text Books:** 1. Rafael C. Gonzales, Richard E. Woods, "Digital Image Processing using MAT Lab", Second Edition, Pearson Education.
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT31P2 - WEB APPLICATION DEVELOPMENT USING PYTHON LABORATORY

Course Category:	Program Core	Credits:	2
Course Type:	Practical	Lecture - Tutorial - Practical:	0-0-3
Prerequisite:	Knowledge in fundamental concepts of Java programming and databases.	Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	• The course is designed to provide Basic knowledge of Python. Python programming is intended for software engineers, system analysts, program managers and user support personnel who wish to learn the Python programming language.		

Course Outcomes	Upon successful completion of the course, the students will be able to acquire knowledge on Python and to create web applications using python.
Course Content	1. Write a Program to illustrate the flow control in Python using django. 2. Write a Python Program to illustrate Exception Handling in Python. 3. Design a blog application in python using django. 4. Write a Python program to illustrate views and templates using django. 5. Write a Python program to publish django project to a web server. 6. Write a Python Program to illustrate the usage of advanced JavaScript and Ajax toolkit with django. 7. Write a Python program to customize the admin using django. 8. Create a photo Gallery-application using django. 9. Create your own web site using django web development frame work.
Text Books and References:	**Text Books:** 1. Jeff Forcier, Paul Bissex, Wesley Chun, Python Web Development with Django", Pearson Education,2009 **Reference Books:** 1. Marty Alchin "Pro Django", APress, 2013 2. Holovaty, Adrian, Kalpan-Moss,Jacob,"The Definitive Guide to Django Web Development Done Right", Apress,2009. 3. Steve Holden, "Python Web Programming", New Riders, 2002.
E-Resources	1. https://Wiki.python.org/moin/WebProgrammingBooks 2. https://realpython.com/tutorials/web-dev/ 3. https://nptel.ac.in/courses

NBKR INSTITUTE OF SCIENCE & TECHNOLOGY: VIDYANAGAR (AUTONOMOUS)
AFFILIATED TO JNTUA, ANANTAPURAMU
III YEAR OF FOUR YEAR B.TECH DEGREE COURSE – II SEMESTER
INFORMATION TECHNOLOGY
SCHEME OF INSTRUCTION AND EVALUATION
(With effect from the batch admitted in the academic year 2017-2018)

S.No	Course Code	Course Title	Instruction Hours/Week			Credits	Evaluation							
							Sessional Test-I		Sessional Test-II		Total Sessional Marks (Max. 40)	End Semester Examination		Max. Total Marks
		THEORY	L	T	D/P		Duration In Hours	Max. Marks (24+6+10)	Duration In Hours	Max. Marks (24+6+10)		Duration In Hours	Max. Marks	100
1	17IT3201	Internet of Things	3	-	-	3	2	40	2	40	0.8*Best of two + 0.2*least of two	3	60	100
2	17IT3202	Object Oriented Analysis and Design	3	-	-	3	2	40	2	40		3	60	100
3	17IT3203	Grid Computing	3	2	-	4	2	40	2	40		3	60	100
4	17IT3204	Data Mining and Data Warehousing	3	2	-	4	2	40	2	40		3	60	100
5	17IT3205	Cloud Computing	3	2	-	4	2	40	2	40		3	60	100
6	17IT32AC	Professional Ethics and Life Skills	2	-	-	-	2	40	2	40		3	60	100
7.	17IT32E2	Professional Elective-2	3	-	-	3	2	40	2	40		3	60	100
		PRACTICALS												
8.	17IT32P1	IOT Lab	-	-	3	2	-	-	-	40	Day to Day Evaluation and a test (40 Marks)	3	60	100
9.	17IT32P2	OOAD Lab	-	-	3	2	-	-	-	40		3	60	100
		TOTAL	20	6	6	25	-	280	-	360		-	540	900

17IT3201 - INTERNET OF THINGS

Course Category:	Program Core		Credits:	3
Course Type:	Theory		Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Require data communication and networking fundamentals		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	- To study about the fundamentals of Internet of Things, protocols used, its applications, programming language used and the programming about Raspberry Pi kit. - To study about the latest advancement in the Internet of Things			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Knowing about the definition and characteristics of Internet of Things
	CO2	Able to distinguish between IoT and M2M and also manages IoT Systems using NETCONG protocol and YANG Data modeling Language
	CO3	Designing an IoT system independent of any specific product / programming language
	CO4	Knowledgeable about IoT Devices and Endpoints like Raspberry Pi, pcDuino, Cubieboard etc. and also makes some case studies on IoT Role in Environment, Agriculture etc.
	CO5	Good at deciding which Framework / Cloud Service to use for a specific IoT Application.
	CO6	Well conversant with a few tools like Chef and Puppet used in IoT
Course Content	**UNIT-I** **Introduction and Concepts:** Introduction, Definition and characteristics of IoT, Physical design of IoT, IoT protocols, Logical design of IoT, Functional Communication models, communication API's. **IoT Enabling Technologies**: Wireless Sensor Networks, Cloud Computing, Big Data Analytics, Communication Protocols, Embedded Systems, IoT Levels & Deployment (6 levels). **UNIT-II** **IoT and M2M:** Introduction, Differences between IoT and M2M, Software Defined Networking and Network Function Virtualization **IoT System Management:** Need for IoT Systems Management, SNMP and its limitations, Network Operator Requirements, NECONF, YANG, IoT Systems Management with NETCONF-YANG, NETOPPER Tools. **UNIT-III** **Design Methodology of IoT Platforms:** Introduction, Specification of Purpose and Requirements, The Process, Domain and Information Models, Service, IoT Levels,	

	Functional and Operational Views, Device and Component Integration, Application Development, Weather Monitoring IoT System: Case Study, Why Python Language for IoT?
	UNIT-IV
	IoT Physical Devices and Endpoints: Basic building blocks of an IoT Device, Exemplary Device, Raspberry Pi, About the Board, Linux on Raspberry Pi, Rapberry Pi Interfaces, Programming Raspberry Pi with Python, other IoT devices - pcDuino, BeagleBone Black, Cubieboard.
	Case Studies Illustrating IoT Design: Cities - Smart Parking, Environment - Air Pollution Monitoring, Agriculture - Smart Irrigation
	UNIT-V
	IoT Physical Servers and Cloud Offerings: Introduction, WAMP and AutoBahn Framework for IoT, Xively loud for IoT, Django the WebApp Framework, Designing RESTful web API (Extension over Django), Amazon Web Services for IoT - EC2 and AutoScaling, S3, RDS, SQS and EMR, SkyNetIoT Messaging Platform.
	UNIT-VI
	Tools for IoT: Python Packages of interest for IoT - JSON, XML, HTTPLib, &URLib, SMTPLib. Tools for IoT: Setting up Chef and Puppet, Multi-tier Application Deployment creation using Chef and Puppet (comprising of HAProxy, Load Balancer, Django App Server and MongoDB Database Server). Steps for IoT Device Management with NETCONF-YANG and Smart Irrigation Management Case Study with the same.
Text Books and References:	**Text Books:** 1. Vijay madisetti and ArshdeepBahga,"Internet of Things: Introduction to a New Age of Intelligence", First edition, Apress Publications 2013 **Reference Books:** 1. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesnd, StamatisKamouskos, Dvaid Boyle, "From Machine-toMachine to the Internet of Things: Introduction to a New Age of Intelligence", First edition, Academic Press, 2014
E-Resources	1. https://nptel.ac.in/courses/106105166/ 2. https://onlinecourses.nptel.ac.in/noc17_cs22/preview

17IT3202 - OBJECT ORIENTED ANALYSIS AND DESIGN

Course Category:	Program Core		Credits:	3
Course Type:	Theory		Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Require software engineering basics and fundamentals of object oriented features.		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	- Specify, analyze and design the use case driven requirements for a particular system. - Model the event driven state of object and transform them into implementation specific layouts. - Identify, analyze the subsystems, various components and collaborate them interchangeably.			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Know the importance of modeling and principles, architecture and software development life cycle.
	CO2	Learn about the basics and advanced structural modeling techniques.
	CO3	Draw the class and object diagrams for various applications.
	CO4	Gain knowledge about the basics of behavioral modeling and its applicability.
	CO5	Learn the state, time and space issues and supporting applicability
	CO6	Study various component and deployment diagram properties for different applications
Course Content	**UNIT-I** **Introduction to UML:** The importance of modeling, Principles of modeling, Object oriented modeling, A conceptual model of the UML, Architecture, Software Development Life Cycle. **UNIT-II** **Basic Structural Modeling:** Classes, Relationships, Common Mechanisms and Diagrams. **Advanced Structural Modeling:** Advanced Classes, Advanced Relationships, Interfaces, Types and Roles, Packages. **UNIT-III** **Class & Object Diagrams:** Terms and Concepts, Common Modeling techniques for Class & Object Diagrams. **UNIT-IV** **Basic Behavioral Modeling:** Interactions, Interaction diagrams, Use cases, Use case diagrams, Activity diagrams.	

	UNIT-V
	Advanced Behavioral Modeling: Events and Signals, State machines, Process and Threads, Time and Space, State chart diagrams.
	UNIT-VI
	Architectural Modeling: Components, Deployment, Component diagrams and Deployment diagrams.
Text Books and References:	**Text Books:** 1. Grady Booch, James Rumbaugh, IvarJacobson: The Unified Modeling Language User Guide, Pearson Education. **Reference Books:** 1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education. 2. AtulKahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT3203 - GRID COMPUTING

Course Category:	Program core		Credits:	4
Course Type:	Theory		**Lecture - Tutorial - Practical:**	3-2-0
Prerequisite:	Need to have a basic knowledge in parallel and computing techniques.		**Sessional Evaluation:** **Univ. Exam Evaluation:** **Total Marks:**	40 60 100
Objectives	- Understanding basic concepts, architecture and theoretical models of Grid computers. - Importance of compiler transformations, key issues and performance evaluation in parallel operating systems.			

	Upon successful completion of the course, the students will be able to:	
	CO1	Explore the need for grid computing
	CO2	Create awareness of Grid monitoring systems
Course Outcomes	CO3	Study different types of Security systems in grid
	CO4	Acquire knowledge on grid scheduling.
	CO5	Understand various grid portals
	CO6	Study the performance evaluation of grid computing with case study
Course Content	**UNIT - I** **Concepts and Architecture:** Introduction, Parallel and Distributed Computing, Cluster Computing, Grid Computing, Anatomy and Physiology of Grid,Web and Grid Services, Grid Standards , OGSAWSRF - Trends, Challenges and Applications. **UNIT-II** **Grid Monitoring:** Grid Monitoring Architecture (GMA), An Overview of Grid Monitoring Systems, GMA, GridICE, DS, Service Level Agreements (SLAs), Other Monitoring Systems - Ganglia, GridMon, Hawkeye and Network Weather Service. **UNIT-III** **Grid Security:** A Brief Security Primer, Cryptography, Symmetric cryptosystemes, Asymmetric cryptosystems, Digital signatures, PKI-X509 Certificates, certification Authority, Firewalls, Grid Security. **UNIT-IV** **Grid Scheduling and Resource Management:** Gridway and Gridbus Broker, Principles of Local Schedulers, Overview of Condor, SGE, PBS, LSF, Grid Scheduling with QoS. **UNIT-V** **Data Management and Grid Portals:** Data Management, Categories and Origins of Structured Data, Data Management Challenges, Architectural Approaches, Collective Data Management Services, Federation Services, Grid Portals, Generations of Grid Portals.	

	UNIT-VI
	Grid Middleware: List of globally available Middlewares, Case Studies - Recent version of Globus Toolkit and gLite - Architecture, Components and Features, Features of next generation grid.
Text Books and References:	**Text Books:** 1. The Grid 2: Blueprint for a New Computing Infrastructure by Ian Foster, Carl Kesselman, Elsevier Series, 2004. 2. The Grid: Core Technologies by Maozhen Li , Mark Baker , Wiley, 2005 **Reference Books:** 1. Grid Computing for Developers by Vladimir Silva, Charles River Media, January 2006. 2. Global Grids and Software Toolkits: A Study of Four Grid Middleware Technologies, High Performance Computing: Paradigm and Infrastructure by Parvin Asadzadeh, Rajkumar Buyya, Chun Ling Kei, Deepa Nayar, and Srikumar Venugopal, Laurence Yang and Minyi Guo (editors), Wiley Press, New Jersey, USA, June 2005. 3. Grid Resource Management: State of the Art and Future Trends , (International Series in Operations Research & Management Science) by Jarek Nabrzyski, Jennifer M. Schopf, Jan Weglarz, Springer; First edition, 2003 4. Grid Computing by Joshy Joseph, Craig Fellenstein, IBM Press, 2004
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT3204 - DATA MINING AND DATA WAREHOUSING

Course Category:	Program Core		Credits:	4
Course Type:	Theory		**Lecture - Tutorial - Practical:**	3-2-0
Prerequisite:	Require knowledge on database management system concepts.		**Sessional Evaluation:** **Univ. Exam Evaluation:** **Total Marks:**	40 60 100
Objectives	• Learn the basic concepts of data warehousing and data preprocessing concepts • Explore the data mining and data classification, prediction and clustering techniques for various applications.			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Know the importance of Data warehousing and Development methodologies
	CO2	Explore on Data warehousing design and modeling concepts for application development
	CO3	Learn the Implementation of ETL Process.
	CO4	Understand data mining and data-preprocessing techniques
	CO5	Identify the importance of Mining Frequent Patterns. to study various regression methods
	CO6	Study the classification and prediction,Cluster analysis and supporting major categories including outer analysis concepts to explore on various applications
Course Content	**UNIT-I** **Introduction to Data Warehousing:** Introduction, Data Warehouse, Data Warehousing, Framework of the Data Warehouse, Data Warehouse Options, Developing Data Warehouses, The Data Warehouse Development Life Cycle, Data Warehouse Development Methodologies. **UNIT-II** **Data Warehouse Design & Modeling:** Defining Dimensional Model, Granularity of Facts, Additivity of Facts, Functional Dependency of the Data, Slowly changing dimensions types, implementing rapidly changing Dimensions, Multi-use Dimensions, Designing: Identifying the source, Data Warehouse Architecture (ETL process). **UNIT-III** **Implementation of ETL Process:** Extract Processing, Interface Processing, Load into Staging, Transform and Prepare for Load, Load Process, Post Load Processing, Generic warehouse Population function. **UNIT-IV** **Introduction to Data Mining:** Data Mining, Architecture of Data Mining, Data Mining Functionalities, Classification of Data Mining Systems, Data Mining Task Primitives, Major issues in Data Mining.	

	Data Pre-processing: Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierachy Generation. **UNIT-V** **Attribute-Oriented Induction:** Characterization and Discrimination: Attribute-Oriented Induction for Data Characterization, mining class discriminations, presentation of both characterization and discrimination. **Mining Frequent Patterns, Associations and Correlations:** Basic concepts and a Road Map, the Apriori Algorithm, Generating Association Rules, improving the efficiency of Apriori, Mining Frequent Item sets without Candidate Generation. **UNIT-VI** **Classification and Prediction:** Issues regarding Classification and prediction, Decision Tree induction, Bayes' theorem, Naive Bayesian classification, Regression Methods. **Cluster Analysis:** Types of Data in clustering, Classification of Major Clustering Methods. **Outlier Analysis:** Types of Outliers, Classification of Major Outlier Analysis.
Text Books and References:	**Text Books:** 1. Data Warehousing Design, Development and Best Practices, SoumendraMohanty, TMH. 2. Data Mining Concepts and Techniques, Jiawei Han and MichelineKamber, Morgan Kaufman Publications, 2nd Edition. **Reference Books:** 1. Data Mining Introductory and Advanced Topics, Margaret H Dunhan, Pearson Education. 2. Data Mining, Ian H. Witten Eibe Frank, Morgan Kaufman Publications. 3. The Data Warehouse Life Cycle Toolkit, Ralph Kimball, WILEY Computer publishing.
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT3205 - CLOUD COMPUTING

Course Category:	Program Core		Credits:	4
Course Type:	Theory		Lecture - Tutorial - Practical:	3-2-0
Prerequisite:	Have knowledge on internet, security issues, social networks and computing technologies.		Sessional Evaluation:	40
			Univ. Exam Evaluation:	60
			Total Marks:	100
Objectives	- To introduce the broad perceptive of cloud architecture and model - To understand the concept of Virtualization and familiar with the lead players in cloud. - To understand the features of cloud simulator and apply different cloud programming model as per need. - To design of cloud Services and explore the trusted cloud Computing system			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Know basic idea about cloud computing infrastructure
	CO2	Learn the approaches to integrate the Saas
	CO3	Study about Cloud computing in business marketing
	CO4	Apply virtual machine principles for cloud
	CO5	Analyze various Tools and platforms for cloud computing
	CO6	Study the Architecture of Workflow Management for clouds
Course Content	**UNIT-I** **Introduction to Cloud Computing:** Cloud Computing in a Nutshell, Roots of Cloud Computing, Layers and Types of Clouds, Desired Features of a Cloud, Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers, Challenges and Risks. **Migrating into a Cloud:** Introduction, Broad Approaches to Migrating into the Cloud, The Seven-Step Model of Migration into a Cloud. **UNIT-II** **Enriching the 'Integration as a Service' Paradigm for the Cloud Era:** An Introduction, The Onset of Knowledge Era, The Evolution of SaaS, The Challenges of SaaS Paradigm, Approaching the SaaS Integration Enigma, New Integration Scenarios, The Integration Methodologies, SaaS Integration Products and Platforms, SaaS Integration Services, Businesses-to-Business Integration (B2Bi) Services, A Framework of Sensor-Cloud Integration, SaaS Integration Appliances. **UNIT-III** **The Enterprise Cloud Computing Paradigm:** Introduction, Background, Issues for Enterprise Applications on the Cloud, Transition Challenges, Enterprise Cloud Technology and Market Evolution, Business Drivers Toward a Marketplace for Enterprise Cloud Computing, The Cloud Supply Chain.	

Enhancing Cloud Computing Environments Using a Cluster as a Service: Introduction, Related Work, RVWS Design, Cluster as a Service, The Logical Design, Proof of Concept.

UNIT-IV

Virtual Machine Provisioning and Migration Services: Introduction and Inspiration, Background and Related Work, Virtual Machines Provisioning and Manageability, Virtual Machine Migration Services, VM Provisioning and Migration in Action, Provisioning in the Cloud Context.

UNIT-V

Aneka-Integration of Private and Public Clouds: Introduction, Technologies and Tools for Cloud Computing, Aneka Cloud Platform, Aneka Resource Provisioning Service, Hybrid Cloud Implementation, Visionary thoughts for Practitioners.

CometCloud-An Autonomic Cloud Engine: Introduction, CometCloud Architecture, Autonomic Behavior of CometCloud, Overview of CometCloud-based Applications, Implementation and Evaluation.

UNIT-VI

Workflow Engine for Clouds: Introduction, Background, Workflow Management Systems and Clouds, Architecture of Workflow Management Systems, Utilizing Clouds for Workflow Execution, Case Study: Evolutionary Multiobjective Optimizations, Visionary thoughts for Practitioners.

Data Security in the Cloud: An Introduction to the Idea of Data Security, The Current State of Data Security in the Cloud, Homo Sapiens and Digital Information, Cloud Computing and Data Security Risk, Cloud Computing and Identity, The Cloud, Digital Identity, and Data Security, Content Level Security-Pros and Cons.

Text Books and References:	**Text Books:** 1. Raj KumarBuyaa, James Broberg, and AndrzejGoscinski "Cloud Computing Principles and Paradigms", Wiley Publishers, 2016. **Reference Books:** 1. John W.Rittinghouse and James F.Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010. 2. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach", TMH, 2009. 3. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud" O'Reilly.
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT32AC - PROFESSIONAL ETHICS AND LIFE SKILLS

Course Category:	Audit Course		Credits:	0
Course Type:	Theory		**Lecture - Tutorial - Practical:**	2-0-0
Prerequisite:	Require the fundamentals of basic sciences		**Sessional Evaluation:**	40
			Univ. Exam Evaluation:	60
			Total Marks:	100
Objectives	- Demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions. - Practice assigning variables to quantities in order to describe relationships between those quantities - Understand their own communication style, learn the essentials of good communication and improve their confidence to communicate effectively. - Ability to give contribution to the planning and coordinate team work to make problem solving decisions related to ethics.			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Interpret quantitative information (i.e., formulas, graphs, tables, models, and schematics) and draw implications from them.
	CO2	Manipulate with algebraic formulas and critical thinking about graphical representation of data to verify data sufficiency
	CO3	Understand the basic perception of profession, professional ethics, various moral & social issues, industrial standards, code of ethics and role of professional ethics in engineering field.
	CO4	Identify key issues within each case to study and investigate the role behaviour of engineers within the context corporate culture
	CO5	Participate in discussion to acquire personal reflection , understand current personal working practices and identify the ways in which how to improve to face interviews
	CO6	Integrate, synthesize, and apply knowledge of vocabulary to improve the focus of compose, use, type and learn the structured English to avoid various problems
Course Content	**UNIT-I** **Quantitative Aptitude:** Number System-L.C.M & H.C.F- Find the Unit digit-Remainder Theorem- Problems on Ages- Problems on Averages-Percentages-Simple Interest-Compound Interest-Profit and Loss, Permutations and Combinations, Probability, Boats and Streams- Pipes and Cisterns- Data Interpretation-Table Graph-Bar Graph- Line Graph-Pie Chart. **UNIT-II** **Reasoning:** Number and Letter Series- Coding and Decoding, Directions, Classifications-Venn Diagrams- Syllogism-Seating Arrangement-Analogy-Blood Relation-Clocks-Calendars- Puzzle Test-Coded Inequality- Data Sufficiency.	

UNIT-III

Professional Ethics and Human Values: Morals, Values and Ethics, Integrity, Work Ethic, Service Learning, Civic Virtue, Respect for Others, Living Peacefully, caring, Sharing, Honesty, Courage, Valuing Time, Cooperation, Commitment, Empathy, Self-Confidence, Character, Spirituality

UNIT-IV

Business Etiquette and Personal Grooming:

Great First Impression: How to present yourself to people, Greetings, Introductions The art of small talk - How to make proper introductions, Paying & Receiving Compliments, Small Talk & Networking ,Developing Professional and Personal Image, Personal Hygiene & Polish interpersonal skill.

Etiquette of Dressing: The do's and don'ts in dressing, Understanding various dress codes, Clothes and Corporate Culture

UNIT-V

Accent Neutralization: P – Pitch, **I** – Inflection, **C** – Courtesy, **T** – Tone, **U** – Understanding, **R** – Rate of speech & **E** – Enunciation

Identifying and dealing with Mother Tongue Influence (MTI)
Preparation for interviews: Conducting Research & Commonly asked questions, speaking up during interviews, GDs, Debate & Resume Building.

UNIT-VI

Verbal Ability: Essay Writing, Comprehension, Email writing, Correction of Sentences, Synonyms & Antonyms.

Text Books and References:	**Text Books:** 1. Quantitative Aptitude for Competitive Examinations by Dr.R.S.Agarwal, S.Chand Publications. 2. A Modern Approach to Verbal & Non-Verbal Reasoning by Dr.R.S. Aggarwal, S. Chand Publications. 3. Soft Skills: Know Yourself and Know the World, 1/e by Dr.K.Alex, S.Chand Publications. 4. Technical Communication Principles and Practice by Meenakshi Raman and Sangeeta Sharma, Third Edition, Oxford University Press Publishers. 5. Charles D. Fleddermann, "Engineering Ethics", Pearson Education / Prentice Hall, New Jersey, 2004 (Indian Reprint).
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT32E1 - C # AND .NET FRAMEWORK

Course Category:	Professional Elective		Credits:	3
Course Type:	Theory		Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Need to have the knowledge of any one programming language.		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	- To introduce various principles of application development for the Microsoft .NET Framework. - To learn the architecture of .NET Framework, CLR managed execution environment, and C# language basics - To get exposure on Common Type System (CTS) and .NET components (assemblies), - To understand the Framework Class Library, as well as remoting and web services. - Understanding Server Object Types and building Client-Server applications			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Learn the basics of C#
	CO2	Understand preliminary Object oriented Aspects of C#
	CO3	Build applications on Windows environment using .net framework
	CO4	Develop various web based applications
	CO5	Understand the common language runtime environment and its applicability
	CO6	Build Client-Server applications using .Net Framework
Course Content	### UNIT-I **Basics of C#:** Introducing C#, Understanding .NET, Overview of C#, Literals, Variables, Data Types, Operators, Expressions, Branching, Looping, Methods, Arrays, Strings, Structures and Enumerations. ### UNIT-II **Object Oriented Aspects of C#:** Classes, Objects, Inheritance, Polymorphism, Interfaces, Operator overloading, Delegates, Events, Errors and Exceptions. ### UNIT-III **Application Development on .NET:** Building Windows Applications, Accessing Data With ADO.NET. ### UNIT-IV **Web Based Application Development on .NET:** Programming Web Applications With Web Forms, Programming Web Services.	

	UNIT-V **The CLR and the .NET Framework:** Assemblies, Versioning, Attributes, Reflection, Viewing metadata – Type discovery, Reflecting on a Type, Marshaling, Remoting, **UNIT-VI** **Understanding Server Object Types:** Specifying a Server With an Interface, Building a Server, Building the client – Using Single Call, Threads.

Text Books and References:	**Text Books:**
	
	   1. J. Liberty, Programming C#, 2nd Edition, O'Reilly, 2002
	
	Reference Books:
	
	   1. E. Balagurusamy, Programming in C#, TMH, 2004.
	   2. Herbert Schildt, The Complete Reference −C#, TMH, 2004.
	   3. Robinson et al, Professional C#, 2nd Edition, Wrox Press, 2002.
	   4. Andrew Troelsen, C# and the .NET Platform, A1 Press, 2003.
	   5. S. ThamaraiSelvi and R. Murugesan, A Textbook on C#, Pearson Education, 2003.

E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT32E2 - BIOINFORMATICS

Course Category:	Professional Elective	Credits:	3
Course Type:	Theory	Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Need to have basic knowledge on genetic algorithms	Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	• To explore the applicability of various techniques in different applications • To select good visualization tools for Analysis		

	Upon successful completion of the course, the students will be able to:	
	CO1	Understand the basics of Bioinformatics and patterns
	CO2	Get idea on different Protein Information
Course Outcomes	CO3	Design DNA Sequences
	CO4	Study of Pairwise Alignment Technique
	CO5	Explore Multiple Sequence alignment techniques
	CO6	Develop Sequence Search Protocol for real time applications
Course Content	**UNIT-I** **Introduction:** The dawn of sequencing, What is bioinformatics?, The Biological sequence/structure deficit, Genome projects, Status of genome project, Why Bioinformatics is important?, Pattern recognition and prediction, The folding problem, The role of chaperones, Sequence analysis, Homology and analogy **UNIT-II** **Protein Information Resources:** Introduction, Biological Databases, Primary sequence databases, Composite Protein Sequence databases, Secondary databases, Composite Protein pattern databases, Structure Classification databases. **UNIT-III** **DNA Sequence Analysis:** Introduction, Why analyse DNA, Gene Structure and DNA sequences, Features of DNA sequence analysis, Issues in the interpretation of EST searches, Two approaches to gene hunting, The expression profile of cell, cDNA and EST's, Different approaches to EST analysis, Effects of EST data on DNA databases **UNIT-IV** **Pairwise Alignment Techniques:** Introduction, Database searching, Alphabets and complexity, Algorithms and programs, Comparing two sequences – a simple case, Sub – sequence, identity and similarity, The dotplot, Local and global similarity, Global alignment, local alignment, pairwise database searching. **UNIT-V** **Multiple Sequence Alignment:** Introduction, The goal of multiple sequence alignment, Multiple Sequence Alignment: a definition, Computational complexity, Manual methods.	

	Simultaneous methods, Progressive methods, Databases of multiple alignments, Searching databases in multiple alignments.
	UNIT-VI
	Secondary Database Searching: Introduction, why bother with secondary database searches? What's in secondary database
	Building a Sequence Search Protocol: Introduction, A practical approach, when to believe a result, Structural and Functional interpretation
Text Books and References:	**Text Books:** 1. Introduction to Bioinformatics. TereseK.Attwood and David J. Parry - Smith. **Reference Books:** 1. Andreas D.Baxevanis, B.F. Francis Ouellette, "Bioinformatics - A Practical Guide to the Analysis of Genes and Proteins", Third Edition, 2005-2006, ISBN: 978-81-265-2192-0, published by John Wiley & Sons INC., U.K. 2. Jean-Michel Claverie, Cedric Notredame, "Bioinformatics For Dummies", 2nd Edition,2006, ISBN: 978-0-470-08985-9.
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT32E3 - INTELLIGENT SOFTWARE AGENTS

Course Category:	Professional Elective		Credits:	3
Course Type:	Theory		**Lecture - Tutorial - Practical:**	3-0-0
Prerequisite:	Need to have knowledge in artificial intelligence		**Sessional Evaluation:** **Univ. Exam Evaluation:** **Total Marks:**	40 60 100
Objectives	• To learn the principles, architecture, design and roles of software agents			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Learn the fundamental concepts of software agents in Information Society
	CO2	Know when multi-agent system is useful
	CO3	Understand the security issues in multi-agent systems
	CO4	Explore development methods and tools in the design of software agents
	CO5	Design applications of Intelligent Software Agents
	CO6	Specify how Intelligent Software Agents are useful in real-world
Course Content	**UNIT-I** **Agents as Tools of the Information Society:** On the Way to the Information Society, Tools of the Information Society, Intelligent Software Agents, Economic Potential. **Fundamental Concepts of Intelligent Software Agents:** Definition of Intelligent Software Agents, Characteristics of Intelligent Software Agents, Classification. **UNIT-II** **Base Modules of Agent Systems:** Areas of Influence, Architecture. **Communication and Cooperation in Multi-Agent Systems:** Introduction, Distributed Problem Solving, Communication, Cooperation Protocols, Negotiations, Matchmaking and Brokering. **UNIT-III** **Communication and Cooperation in Multi-Agent Systems:** Learning and Planning in Multi-Agent Systems, Security, Demands Made on the Base Systems-Introduction, Agent Runtime Environment, Middleware, Computer Operating System and Communications System, Development Tendencies- Introduction, Intelligent Agents in Multimedia Environments, Multimedia and Intelligent Agents. **UNIT-IV** **Development Methods and Tools:** Agent-Oriented Analysis and Design-Object-Oriented Analysis, Agent-Oriented Methods, Agent Languages- Requirements, Java, Telescript, Tcl/ Tk, Safe-Tcl, Agent-Tcl, Component-Based Software Development.	

	UNIT-V
	Application Areas for Intelligent Software Agents: Introduction, Information Retrieval and Filtering: Introduction, Simple Search Engines, Meta Search Engines.
	News Watcher: Introduction, Market Overview, PointCast Network, Free Loader, Concepts, Architecture.
	Advising and Focusing: Introduction, Market Overview, IBM Web Browser Intelligence, Letizia
	UNIT-VI
	Entertainment: Introduction, Market Overview, Life style Finder, Firefly.
	Groupware: Introduction, Market Overview, Lotus Notes Mail, MAXIMS, PLEIADES.
	Electronic Commerce: Introduction, Simple Buying Agents, Complex Buying Agents, Agent-Based Marketplace. Manufacturing.
Text Books and References:	**Text Books:** 1. Intelligent software agents: foundations and applications by Walter Brenner, Rüdiger Zarnekow, Hartmut Wittig Springer, 1998. **Reference Books:** 1. Intelligent Software Agents, Richard Murch, Tony Johnson, Prentice Hall, 2000. 2. Software Agents, Bradshaw, MIT Press, 2000.
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT32E4 - MICROPROCESSOR AND INTERFACING

Course Category:	Professional Elective		Credits:	3
Course Type:	Theory		Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Need to have knowledge on computer organization and architecture basics		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	- Get an overview of microcomputer-based applications - Gain the knowledge on typical microprocessor design and overview off dual microprocessor architecture based on different processors			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Understand the basics of 8086 microprocessors and its Instructions
	CO2	Learn writing Assembly Language Program (ALP) using 8086 instructions
	CO3	Correlate High Level Programming constructs and their implementations in ALP
	CO4	Study various advanced programming constructs of ALP
	CO5	Conceptualize techniques for I/O communication, Interrupts and DMA
	CO6	Explore Digital interfacing and Peripheral Buses like USB, PCI Express.
Course Content	**UNIT-I** **Introduction to Microprocessors:** Main features of 8086 microprocessor, 8086 pin Assignments, 8086 Microprocessor family and Internal architecture, Introduction to Programming using 8086, a Basic 8086 Micro-computer System overview **Instruction Set of 8086 Microprocessor:** Data transfer instructions, Arithmetic instructions, Bit manipulation Instructions, String Instructions, Program Execution Transfer Instructions, Processor Control Instructions **UNIT-II** **8086 Assembly Language Programming:** Writing assembly language program for assemblers – Program format, Assembler directives – SEGMENT, ENDS, ASSUME, END, Naming Data and Addresses – EQU, DB, DW and DD directives, Accessing Named Data with Program Instructions, Naming Addresses – Label, Initializing Segment Registers. Assembly Language Tools – Editor, Assembler, Linker, Locator, Debugger, Emulator. **UNIT-III** **Implementing Standard Program Structure in 8086 Assembly language:** Simple Sequence programs, Jumps, Flags and Conditional Jumps, If-then, if-then-else and Multiple if-then-else programs, while-do programs, Repeat-until Programs, Instruction timing and Delay Loops. **UNIT-IV** **Strings, Procedures and Macros:** 8086 String instructions, Procedures – Writing and Using Procedures, Usage of Stack, Parameter Passing and Return values, Recursive	

	Procedures, Macros and Procedures Compared, Macro definition and usage along with parameter passing. **UNIT-V** **Input and Output Modes and Interfacing:** Peripheral devices, Input/output devices, Controllers, I/O modes in computer System, Programmed I/O mode, Interrupt mode of I/O,8086 Interrupts and Interrupt Responses, Hardware Interrupt Applications, 8259A Priority Interrupt Controller, Software Interrupt Applications, Direct Memory Access (DMA) mode I/O. **UNIT-VI** **Digital Interfacing:** Programmable Parallel Ports and Handshake I/O, 8279 Circuit Connections and operations overview, Computer System Peripheral buses – USB, PCI Express.
Text Books and References:	**Text Books:** 1. Douglas V. Hall and SSSP Rao, Microprocessors and interfacing, TMH, 3rd edition. **Reference Books:** 1. "Microprocessors: Principles and Applications" by A Pal 2. "Introduction to Microprocessors and Microcontrollers" by Crisp John Crisp
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT32P1 - INTERNET OF THINGS LABORATORY

Course Category:	Program Core		Credits:	2
Course Type:	Practical		Lecture - Tutorial - Practical:	0-0-3
Prerequisite:	Python programming and knowledge about linux operating system is required.		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	• To design various simple programs using Raspberry Pi kit. • To develop and implement applications using IoT kit			

Course Outcomes	Upon successful completion of the course, the students will be able to:	
	CO1	Know about the definition and characteristics of Internet of Things, Establishment of communication, connecting various devices and components to support different operating systems for application development.
Course Content	1. Study of Raspberry Pi kit and Installation of NOOBS 2. Writing Hello World program 3. Connecting LED and changing its color 4. Connecting a Push Switch and toggling the switch to Raspberry Pi 5. Connecting a buzzer and touch sensor to Raspberry Pi 6. Sending SMS from a Python kit on the Raspberry Pi 7. Measuring the Humidity and Temperature using appropriate sensors (DHT22/AM2302) 8. Send email from a Linux terminal on the Raspberry Pi 9. Setting up a Web Server on Raspberry Pi 10. Setting up Wireless Access Point using Raspberry Pi 11. Controlling Raspberry Pi GPIO Pins using Telegram App	
Components Required	1. Raspberry Pi toolkit 2. Memory card 3. DHT22/AM2302 sensor 4. Bread board 5. Jumper cables 6. Buzzer 7. Multi colored LEDs 8. Any	

References	1. For Telegram GPIO Experiment https://circuitdigest.com/microcontroller-projects/control-raspberry-pi-gpio-with-telegram 2. For Webserver on RaspberryPi https://thepi.io/how-to-set-up-a-web-server-on-the-raspberry-pi/ 3. For configuring a Raspberry as an Access point https://circuitdigest.com/microcontroller-projects/setting-up-wireless-access-point-using-raspberry-pi 4. A link for Good number of IoT Projects https://circuitdigest.com/simple-raspberry-pi-projects-for-beginners
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT32P2 - OBJECT ORIENTED ANALYSIS AND DESIGN LABORATORY

Course Category:	Program Core		Credits:	2
Course Type:	Practical		Lecture - Tutorial - Practical:	0-0-3
Prerequisite:	Knowledge in any object oriented programming language is required.		Sessional Evaluation:	40
			Univ. Exam Evaluation:	60
			Total Marks:	100
Objectives	• To draw various UML diagrams and supporting relationships to explore the design and behavior of different applications			

Course Outcomes	Upon successful completion of the course, the students will be able to:	
	CO1	Develop suitable UML diagrams for various applications or domains as and when required.
Course Content	1. Student Marks Analysis System (Draw the Class diagram). 2. Library Management System (draw the Collaboration diagram). 3. Medical Expert System (Draw the Activity diagram). 4. Course Registration System (Draw the Class and Activity diagram). 5. Order Processing System (Draw the Sequence diagram). 6. Online Railway Ticket Reservation System (Draw the Class and Sequence diagram).	
Text Books and References:	**Text Books:** 1. Grady Booch, James Rumbaugh, IvarJacobson: The Unified Modeling Language User Guide, Pearson Education. **Reference Books:** 1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education. 2. AtulKahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.	
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm	

NBKR INSTITUTE OF SCIENCE & TECHNOLOGY: VIDYANAGAR (AUTONOMOUS)
AFFILIATED TO JNTUA, ANANTAPURAMU
IV YEAR OF FOUR YEAR B.TECH DEGREE COURSE – I SEMESTER
INFORMATION TECHNOLOGY
SCHEME OF INSTRUCTION AND EVALUATION
(With effect from the batch admitted in the academic year 2017-2018)

S.No	Course Code	Course Title	Instruction Hours/Week			Credits	Evaluation								
			L	T	D/P		Sessional Test-I		Sessional Test-II		Total Sessional Marks (Max. 40)	End Semester Examination		Max. Total Marks
		THEORY	L	T	D/P		Duration In Hours	Max. Marks (24+6+10)	Duration In Hours	Max. Marks (24+6+10)		Duration In Hours	Max. Marks	100
1	17IT4101	Mobile Application Development	3	-	-	3	2	40	2	40	0.8*Best of two + 0.2*least of two	3	60	100
2	17IT4102	Service Oriented Architecture	3	2	-	4	2	40	2	40		3	60	100
3	17IT4103	Big Data and Hadoop	3	-	-	3	2	40	2	40		3	60	100
4	17SH4101	Management Science	3	-	-	3	2	40	2	40		3	60	100
5	17IT41E3	Professional Elective-3	3	-	-	3	2	40	2	40		3	60	100
6		Open Elective-1	2	2	-	3	2	40	2	40		3	60	100
		PRACTICALS												
7.	17IT41P1	Mobile Application Development Lab	-	-	3	2	-	-	-	40	Day to Day Evaluation and a test (40 Marks)	3	60	100
8.	17IT41P2	Big Data and Hadoop Lab	-	-	3	2	-	-	-	40		3	60	100
		TOTAL	17	4	6	23	-	240	-	320		-	480	800

17IT4101 - MOBILE APPLICATION AND DEVELOPMENT

Course Category:	Program Core	Credits:	3
Course Type:	Theory	Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Awareness on programming languages, operating systems and mobile usage.	Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	• Implement the design using specific mobile development frameworks • Develop and deploy the mobile applications in marketplace for distribution		

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Gain knowledge in the accessibility and usability features for mobile innovation.
	CO2	Know the web content accessibility guidelines for mobile.
	CO3	Understand the overview of Mobile applications and Mobile interface.
	CO4	Implement the design and application development using Android SDK.
	CO5	Practice the skills of 2D graphics and UI design as well as multimedia in Android mobile apps.
	CO6	Explore the techniques of mobile cloud computing in mobile applications deployment.
Course Content	**UNIT-I** **Accessibility**: The Telephone and Accessible Innovation, Understand Disability, The Business Case for Accessibility, Advocating for Accessibility, The History of Inclusive Thinking: Universal and Inclusive Design. **UNIT-II** **Inclusive Thinking:** Persona Spectrum, Digital Inclusion, Users, Empathy. **Web Content Accessibility Guidelines for Mobile:** Perceivable, Understandable, Robust. **UNIT-III** **Overview of Mobile App and Mobile Interface:** Mobile System, Mobile Interface and Applications, Big Data Application in Mobile Systems, Data Security and Privacy Protection in Mobile Systems, Concept of Mobile Apps, Brief Introduction of Android and its Framework. **UNIT-IV** **Quick Start on Android:** Installing Java, Installing Integrate Development Environment, Installing Android SDK, Creating an Android Application, Android Virtual Device. **Introduction of Key Concepts of Android:** App Components-Activities, Services, Content Providers, Intents. App Resources, App Mainfest.	

	UNIT-V
	2-D Graphics and Multimedia in Android: Introduction of 2-D Graphics Techniques-Color, Paint, Path, Canvas, Drawable, Button Selector. Advanced UI Design-Multiple Screens, Action Bar, Custom Views. Overview of Multimedia in Android, Audio Implementations in Android, Executing Video in Android.
	UNIT-VI
	Data Storage and SQLite Operations: Local Data- Internal and External Storage, Save a File, Delete a File, SQLITE Database-Table Structure, Crud Operations, Usage of SQLITE Techniques. **Mobile Cloud Computing in Mobile Applications Deployment:** Concepts and main techniques of Mobile Cloud Computing, Mobile Cloud Computing Architecture.
Text Books and References:	**Text Books:** 1. Rob Whitaker, Developing Inclusive Mobile Apps: Building Accessible Apps for iOS and Android, A Press, 2020. 2. Meikang Qiu, Wenyun Dai, and Keke Gai "Mobile Applications Development with Android Technologies and Algorithms", CRC Press, Taylor & Francis Group, 2017. **Reference Books:** 1. Jeff McWherter and ScottGowell, "Professional Mobile Application Development", Wrox, 2012 2. Charlie Collins, Michael Galpin and Matthias Kappler, "Android in Practice", DreamTech, 2012
E-Resources	1. http://developer.android.com/develop/index.html

17IT4102 - SERVICE ORIENTED ARCHITECTURE

Course Category:	Program Core		Credits:	4
Course Type:	Theory		Lecture - Tutorial - Practical:	3-2-0
Prerequisite:	Require fundamental knowledge in software engineering and computer networks		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	• Gain a foundational understanding of several issues in the business adoption of SOA in an IT context			

	Upon successful completion of the course, the students will be able to:	
	CO1	Understand the fundamental types of software architectures
	CO2	Learn some SOA patterns and programming models
Course Outcomes	CO3	Acquire knowledge of SOA technologies
	CO4	Study various trends in SOA
	CO5	Understand security in web services
	CO6	Get the clear view of transaction processing in SOA
Course Content	**UNIT-I** **Software Architecture:** Types of IT Architecture, SOA, Evolution, Key Components, Perspective of SOA, Enterprise-wide SOA, Architecture, Enterprise Applications, Solution Architecture for Enterprise Application. **UNIT-II** **Software Platforms for Enterprise Applications:** Patterns for SOA, SOA Programming Models. Service-Oriented Analysis and Design, Design of Activity, Data, Client and Business Process Services **UNIT-III** **Technologies of SOA:** SOAP, WSDL, JAX, WS, XML WS for .NET, Service Integration with ESB, Scenario, Business Case for SOA, Stakeholder Objectives, Benefits of SOA, Cost Savings. **UNIT-IV** **SOA Implementation and Governance:** Strategy, SOA Development, SOA Governance, Trends in SOA, Event-Driven Architecture, Software as Service, SOA Technologies, Proof-of-Concept, Process Orchestration, SOA Best Practices **UNIT-V** **Meta Data Management:** XML Security, XML Signature, XML Encryption, SAML, XACML, XKMS, WS-Security, Security in Web Service Framework - Advanced Messaging.	

	UNIT–VI
	Transaction Processing: Paradigm, Protocols and Coordination, Transaction Specifications, SOA in Mobile, Research Issues.
Text Books and References:	**Text Books:** 1. Understanding SOA with Web Services by Eric Newcomer, Greg Lomow, Pearson Education. **Reference Books:** 1. Service Oriented Architecture for Enterprise Applications by Shankar Kambhampaty, Wiley India Pvt Ltd, 2008. 2. Web Services Security by Mark O' Neill, et al., Tata McGraw-Hill Edition, 2003
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT4103 - BIG DATA AND HADOOP

Course Category:	Program Core		Credits:	3
Course Type:	Theory		Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Should have knowledge of one programming language (Java preferably), practice of SQL (queries and sub queries) and exposure to Linux environment.		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	• To learn the concept and challenge of big data (3 V's: volume, velocity, and variety). • To apply skills and tools to manage and analyze the big data. • Understand the Big Data Platform and provide an overview of Apache Hadoop • Provide HDFS Concepts and understand Map Reduce Job. • Apply analytics on Structured and Unstructured Data. • Exposure to Data Analytics with R.			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Understand the basics of Big Data analytics and study its life cycle
	CO2	Learn the fundamentals of R and Hadoop to develop simple data analysis applications
	CO3	Study various file access and process operations and their utilization in a distributed environment
	CO4	Perform I/O operations and learn the environment of MapReduce basics
	CO5	Explore the components of Hadoop and Hadoop Eco-System with supporting tools
	CO6	Develop Big Data Solutions using Hadoop Eco System tools
Course Content	**UNIT-I** **Introduction to Big Data Analytics**: Big Data Overview, State of the Practice in Analytics, Key Roles for the New Big Data Ecosystem, Examples of Big Data Analytics **Data Analytics Life Cycle:** Data Analytics Lifecycle Overview, Discovery, Data Preparation, Model Planning, Model Building, Communicate Results, Operationalize, Case Study: Global Innovation Network and Analysis (GINA). **UNIT-II** **Introduction to R and Hadoop:** Introduction to R, Exploratory Data Analysis, History of Hadoop, Apache Hadoop, Analyzing Data with Unix tools, Analyzing Data with Hadoop, Hadoop Streaming, Hadoop Echo System. **UNIT-III** **IBM Big Data Strategy**: Introduction to Infosphere Big Insights and Big Sheets.	

	HDFS (Hadoop Distributed File System): The Design of HDFS, HDFS Concepts, Command Line Interface, Hadoop file system interfaces, Data flow, Data Ingest with Flume and Scoop and Hadoop archives.
	UNIT-IV
	Hadoop I/O: Compression, Serialization, Avro and File-Based Data structures.
	MapReduce: Anatomy of a MapReduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution, MapReduce Types and Formats, MapReduce Features.
	UNIT-V
	Hadoop Eco System - Tools:
	Pig: Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Grunt, Pig Latin, User Defined Functions, Data Processing operators.
	Hive: Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables, Querying Data and User Defined Functions.
	UNIT-VI
	Hadoop Eco System - Tools (Continued):
	Hbase: HBasics, Concepts, Clients, Example, Hbase Versus RDBMS.
	Big SQL: Introduction
Text Books and References:	**Text Books:** 1. Data Science & Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data by EMC Education Services, Published by John Wiley & Sons, Inc. 2. Tom White "Hadoop: The Definitive Guide" Third Edition, O'reily Media, 2012. **Reference Books:** 1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007. 2. Jay Liebowitz, "Big Data and Business Analytics" Auerbach Publications, CRC press (2013). 3. Tom Plunkett, Mark Hornick, "Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop", McGraw-Hill/Osborne Media (2013), Oracle press. 4. SeemaAcharya, SubhasiniChellappan, "Big Data Analytics" Wiley 2015
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17SH4101 - MANAGEMENT SCIENCE

Course Category:	Basic Sciences		Credits:	3
Course Type:	Theory		Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Require general awareness on database management systems		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	- Learn the disciplines of management science and manager's role in business and other decision-making. - Gain an overview of the process of developing and using quantitative techniques in decision making and planning. - Aware of the ethical dilemmas faced by managers and the social responsibilities of business. - Know the significance of strategic management in competitive and dynamic global economy			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Explain the concepts of management, ethical and social responsibilities.
	CO2	Describe various locations and layouts of plants.
	CO3	Apply work study techniques for increased productivity.
	CO4	Manage human resources efficiently and effectively with best HR practices.
	CO5	Develop marketing strategies based on product, price, place and promotion objectives.
	CO6	Determine activities' times (early start, early finish, late start, late finish, total float, and free float) and schedule the project using the CPM and PERT.
Course Content	**UNIT – I** **Introduction to Management:** Concept of Management, Functions of Management, Evolution of Management Thought, Taylor's Scientific Management Theory, Fayal's Principles of Management, Maslow's theory of Hierarchy of Human Needs, Douglas McGregor's Theory X and Theory Y, Hertzberg Two Factor Theory of Motivation, Leadership Styles. **UNIT – II** **Design of Organization:** Principles of Organization, Organization process, Types of Organization: Line, Line and Staff Organization, Function, Committee, Matrix, Virtual, Cellular, Team Organization. Boundary Less Organization, Inverted Pyramid Structure, Lean and Flat Organization. Managerial Objectives and Social Responsibilities. **UNIT-III** **Strategic Management:** Corporate Planning – Mission, Objectives, Programmes, SWOT Analysis – Strategy Formulation and Implementation. **Marketing Management:** Functions of Marketing, Marketing Mix, and Marketing Strategies based on Product Life Cycle, Channels of Distribution.	

	UNIT-IV **Human Resources Management:** Manpower Planning, Personnel Management, Basic Functions of Personnel Management, Job Evaluation and Merit Rating, Incentive Plans. **UNIT-V** **Production and Operations Management:** Plant Location and Plant Layout Concepts- Methods of Production (Job, Batch & Mass), Production Planning and Control, Work Study, Basic Procedure Involved in Method Study, Work Measurement. **UNIT-VI** **Project Management (PERT/ CPM):** Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying Critical Path, Probability of Completing the Project within given time, Project Cost Analysis, Project Crashing (simple problems).
Text Books and References:	**Text Books:** 1. Applied management Science and Operations Research", by Dr. T.P. Singh, Er. Arvind Kumar, UDHpublishers and Distributors Pvt Ltd. 2. "Management Science", by A.R.Aryasri, McGraw Higher Ed, 4th Edition. 3. "Industrial Engineering and Management", by O.P.Kanna, DhanpatRai Publications. **Reference Books:** 1. "Business organizations and management",byC.B.Gupta 2. "Industrial Engineering and Management (Including Production Management)", byT.R.Banga and S.C.Sharma
E-Resources	1. https://nptel.ac.in/courses 2. http://iete-elan.ac.in 3. https://freevideolectures.com/university/iitm

17IT41E1 - INTRODUCTION TO ROBOTICS AND NAVIGATION

Course Category:	Professional Elective	Credits:	3
Course Type:	Theory	Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Basics of probability and statistics, and Artificial intelligence concepts are required.	Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	- To Learn about the Basics of Robotics and its Teleoperations. - Identify the Hierarchical Paradigm and its Functionalities. - To evaluate the Performance of different Navigation Models.		

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Understand the evolution of Robotics and important areas of AI.
	CO2	Learn the Hierarchical Paradigm, Biological Foundations of Reactive Paradigm and its Importance .
	CO3	Know the Reactive Paradigm, Designing and its Implementation.
	CO4	Explore the Behavioral, Sensing Techniques for Reactive Robots.
	CO5	Analyze the Attributes, Architectural Aspects of Reactive Paradigm.
	CO6	Specify the Relational Methods, Associative Methods of Topological Path Planning and Objectives and Overview of Metrics Path Planning.
Course Content	**UNIT-I** **Teleoperation to Autonomy:** How can a Machine be Intelligent, What can Robots be used for, A Brief History of Robotics, Teleoperation, The Seven Areas of AI. **UNIT-II** **Hierarchical Paradigm:** Representative Architectures, Advantages and Disadvantages. **Biological Foundations of the Reactive Paradigm:** What are Animal Behaviors, Coordination and Control of Behaviors, Perception in Behaviors, Schema Theory. **UNIT-III** **Reactive Paradigm:** Attributes of Reactive Paradigm, Subsumption Architectures. **Designing a Reactive Implementation:** Behaviors as Objects in OOP, Steps in Designing a Reactive Behavioral System. **UNIT-IV** **Common Sensing Techniques for Reactive Robots:** Behavioral Sensor Fusion, Designing a Sensor Suite, Proprioceptive Sensors, Proximity Sensors, Computer Vision. **UNIT-V** **Hybrid Deliberative/Reactive Paradigm:** Attributes of the Hybrid Paradigm, Architectural Aspects, Managerial Architectures, State-Hierarchy Architectures, Model-	

	Oriented Architectures, Other Robots in the Hybrid Architectures, Interleaving Deliberation and Reactive Control. **<u>UNIT-VI</u>** **Topological Path Planning:** Landmarks and Gateways, Relational Methods, Associative Methods, Case Study of Topological Navigation with a Hybrid Architecture. **Metrics Path Planning:** Objectives and Overview, Configuration Space, Cspace Representations, Graph Based Planners, Wavefront Based Planners.
Text Books and References:	**Text Books:** 1. Introduction to AI Robotics, Robin R Murphy. **Reference Books:** 1. From AI to Robotics: Mobile, Social, and Sentient Robots, Bhaumik&Arkapravo. 2. Behavior Trees in Robotics and AI. An Introduction,Michele Colledanchise, Petter Ögren
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT41E2 - INFORMATION RETRIEVAL

Course Category:	Professional Elective	Credits:	3
Course Type:	Theory	Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Require the basics of database management system concepts.	Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	• To cover the foundations of information retrieval, design, analysis and implementation of IR systems. • To become familiar with difference between Information retrieval and data Base Management Systems		

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Understand the fundamentals of Information retrieval and the difficulty of representing and retrieving documents, images etc.
	CO2	Specify the design of indexing algorithms which is governed by hardware constraints and benefits of Compression.
	CO3	Learn the essentials of a search engine to rank the order of documents.
	CO4	Address the formal evaluation methodology that has been developed for evaluating unranked retrieval results.
	CO5	Generate the probabilistic approach to information retrieval and language models.
	CO6	Use the classification for standing queries and deal with web indexes
Course Content	**UNIT-I** **Introduction:** Overview of Information Retrieval, Motivation, History, Information Retrieval vs. Data Retrieval, Vocabulary and Posting lists, Dictionaries and Tolerant retrieval. **UNIT-II** **Index Construction:** Blocked Sort-Based Indexing, Single Pass in Memory Indexing, Distributed Indexing, Dynamic Indexing. **Index Compression:** Dictionary and Postings File Compression. **UNIT-III** **Vector Space Model:** Parametric and Zone Indexes, Term Frequency and Weighting, Scoring, Ranking, Components of IR Systems, Vector Space Scoring and Query Operator Interaction. **UNIT-IV** **Evaluation of IR:** Standard Test Collections, Evaluation of Unranked and Ranked Retrieval Sets, System Quality and User Utility, Relevance Feedback and Query Expansion Query Languages, Evaluation of XML Retrieval.	

	UNIT-V **Probabilistic Information Retrieval:** Probability Theory, Probability Ranking, E Binary Independence Model, Appraisal and some Extensions. **Language Models for Information Retrieval:** Query Likelihood Model, Language Modeling Versus other Approaches, Extended Language Modeling. **UNIT-VI** **Text Classification and Naive Bayes:** Naive Bayes Text Classification, Properties of Naive Bayes, Evaluation of Text Classification, Vector Space Classification. **Web Search:** History of Web, Index Size and Estimation, Web Crawling, Link Analysis (HITS, Google Pagerank), User Interfaces and Visualization.
Text Books and References:	**Text Books:** 1. "Introduction to Information Retrieval". C.D. Manning, P. Raghavan, and H. Schütze. Cambridge University Press, 2008. **Reference Books:** 1. "Modern Information Retrieval". Ricardo Baeza-Yates and Berthier Ribeiro-Neto. Addison Wesley, 1999. 2. "Mining the Web: Discovering Knowledge from Hypertext Data". Soumen Chakrabarti. Morgan Kaufmann, 2003. 3. "Information Retrieval: Algorithms and Heuristics", D. Grossman and O. Frieder. Springer, 2nd Ed., 2004. 4. "Managing Gigabytes: Compressing and Indexing Documents and Images", I. Witten, A. Moffat, and T. Bell. 2nd Ed., Morgan Kaufmann, 1999.
E-Resources	1. Lucene Text Search Engine (http://lucene.apache.org/) 2. Hadoop (https://hadoop.apache.org/) 3. Strang's Linear Algebra Course (MIT) (http://ocw.mit.edu/OcwWeb/Mathematics/18-06Spring-2005/CourseHome/index.htm) 4. Andrew Moore's Statistical Data Mining Tutorials (CMU) (http://www.autonlab.org/tutorials/) 5. Matei Zaharia's Introduction to Map Reduce and Hadoop (Cloud Computing) (in power point) or (archived video)

17IT41E3 - SOFTWARE TESTING AND QUALITY ASSURANCE

Course Category:	Professional Elective	Credits:	3
Course Type:	Theory	Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Knowledge of software engineering basics is required	**Sessional Evaluation:** 40 **Univ. Exam Evaluation:** 60 **Total Marks:** 100	
Objectives	• To understand various types of software testing techniques • To gain knowledge about manual and automated testing methods. • To study of different Software quality assurance standards and maturity models.		

	Upon successful completion of the course, the students will be able to:	
	CO1	Understand the Unit and Control flow testing concepts and applicability.
	CO2	Acquire knowledge on Data flow and Domain testing concepts to apply for software project.
Course Outcomes	CO3	Apply System integration testing and System test design issues for modules.
	CO4	Get the idea of System test planning, automation and Acceptance testing methods to have better awareness.
	CO5	Gain the basic knowledge in core concepts of Software quality standards.
	CO6	Apply various Maturity models to improve quality in software development.

<table>
<tr><td rowspan="8">Course Content</td><td>

UNIT-I

Unit Testing: Concept of Unit Testing, Static Unit Testing, Defect Prevention, Dynamic Unit Testing, Mutation Testing, Debugging, Unit Testing in eXtreme Programming, JUnit Framework for Unit Testing, Tools for Unit Testing.

Control Flow Testing: Outline of Control Flow Testing, Control Flow Graph, Paths in a Control Flow Graph, Path Selection Criteria, and Generating Test Inputs.

UNIT-II

Data Flow Testing: Data Flow Anomaly, Overview of Dynamic Dataflow Testing, Data Flow Graph, Data Flow Terms, Data Flow Testing Criteria, Comparison of Data Flow Test Selection Criteria, Comparison of Testing Techniques.

Domain Testing: Domain Error, Testing for Domain Errors, Sources of Domains, Types of Domain Errors, ON And OFF Points, Test Selection Criterion.

UNIT-III

System Integration Testing: Concept of Integration Testing, Different Types of Interfaces and Interface Errors, Granularity of System Integration Testing, System Integration Techniques, Software and Hardware Integration, Test Plan for System Integration, off-the-shelf Component Integration.

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| | **System Test Design:** Test Design Factors, Requirement Identification, Characteristics of Testable Requirements, Test Objective Identification, Modeling a Test Design Process, Modeling Test Results.

UNIT-IV

System Test Planning and Automation: Structure of a System Test Plan, Assumptions, Test Approach, Test Suite Structure, Test Environment, Test Execution Strategy, Test Effort Estimation, Scheduling and Test Milestones, System Test Automation, Evaluation and Selection of Test Automation Tools, Test Selection Guidelines for Automation.

Acceptance Testing: Types of Acceptance Testing, Acceptance Criteria, Selection of Acceptance Criteria, Acceptance Test Plan, Acceptance Test Execution, Acceptance Test Report, Acceptance Testing in Extreme Programming.

UNIT-V

Software Quality: Five Views of Software Quality, Mccall's Quality Factors and Criteria, ISO 9126 Quality Characteristics, ISO 9000:2000 Fundamentals, ISO 9000:2000 Requirements.

UNIT-VI

Maturity Models: Basic Idea in Software Process, CMMI Architecture, Five Levels of Maturity and Key Process Areas, Common Features of Key Practices, Application of CMM, Capability Maturity Model Integration, Test Process Improvement, Testing Maturity Model. |

| **Text Books and References:** | **Text Books:**

1. Software Testing and Quality Assurance: Theory and Practice by Kshirasagar Naik, Priyadarshi Tripathy, Wiley Publications.

Reference Books:

1. Software quality assurance – from theory to implementation by Daniel Galin, Pearson education, 2009.
2. Foundations of software testing by Aditya Mathur, Pearson Education, 2008
3. Software testing – principles and practices by Srinivasan Desikan and Gopalaswamy Ramesh, Pearson education, 2006
4. Software testing by Ron Patton, second edition, Pearson education, 2007
5. Software Quality Theory and Management by Alan C Gillies, Cengage Learning, Second edition, 2003 |

| **E-Resources** | 1. https://nptel.ac.in/courses
2. https://freevideolectures.com/university/iitm |

17IT41E4 - MACHINE LEARNING

Course Category:	Professional Elective		Credits:	3
Course Type:	Theory		Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Basic concepts of discrete mathematics and artificial intelligence is required		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	• To learn the basics and various Machine learning algorithms to solve problems of moderate complexity.			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Understand the importance of learning and some classification models
	CO2	Study and understand the multi variant procedures and analysis
	CO3	Learn and understand the various clustering algorithms
	CO4	Understand the basic concepts of decision trees
	CO5	Study and understand multi-layer perceptrons
	CO6	Explore the basics of kernel machines
Course Content	**UNIT-I** **Basics:** Definition-Machine Learning, Classification, Supervised/Unsupervised Learning, Probably Approximately Correct (PAC) Learning. **Bayesian Decision Theory:** Classification, Losses and Risks, Discriminant Functions, Utility Theory, Evaluating an Estimator: Bias and Variance, The Bayes' Estimator, Parametric Classification, Model Selection Procedures. **UNIT-II** **Multivariate Methods:** Multivariate Data, Parameter Estimation, Estimation of Missing Value, Multivariate Normal Distribution, Multivariate Classification, Multivariate Regression, Dimensionality Reduction Factor Analysis, Multidimensional Scaling, Locally Linear Embedding. **UNIT-III** **Clustering:** k-Means Clustering, Mixtures of Latent Variable Models, Hierarchical Clustering, Nonparametric Methods, Nonparametric Density Estimation, k-Nearest Neighbor Estimator, Nonparametric Classification, Smoothing Models. **UNIT-IV** **Decision Trees:** Univariate Trees, Pruning, Rule Extraction from Trees, Multivariate Trees, Linear Discrimination, Generalizing the Linear Model, Logistic Discrimination, Discrimination by Regression.	

	UNIT-V
	Multilayer Perceptrons: Neural Networks, Training a Perceptron, Learning Boolean Functions, Multilayer Perceptrons, Back propagation Algorithm, Training Procedures, Tuning the Network Size, Radial Basis Functions. **UNIT-VI** **Kernel Machines:** Optimal Separating Hyperplane, The Non separable Case: Soft Margin Hyper plane, v-SVM, Kernel Machines for Regression, One-Class Kernel Machines, Kernel Dimensionality Reduction.
Text Books and References:	**Text Books:** 1. EthemAlpaydi, Introduction to Machine Learning, Second Edition, The MIT Press, 2015. **Reference Books:** 1. Russell and Norvig, Artificial Intelligence, Third Edition, Prentice Hall, 2015 2. Mitchell, Tom, Machine Learning, Tata McGraw-Hill, 2017
E-Resources	1. https://onlinecourses.nptel.ac.in/noc18_cs26/preview 2. https://nptel.ac.in/courses/106106139/ 3. https://onlinecourses.nptel.ac.in/noc18_cs40/preview

17IT41P1 - MOBILE APPLICATION AND DEVELOPMENT LABORATORY

Course Category:	Program Core		Credits:	2
Course Type:	Practical		Lecture - Tutorial - Practical:	0-0-3
Prerequisite:	Required the basics of internet, usage of mobile and know the fundamentals of operating systems.		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	• Implement the design using specific mobile development frameworks • Develop and deploy the mobile applications in marketplace for distribution			

Course Outcomes	Upon successful completion of the course, the students will be able to:	
	CO1	Understand the fundamental issues and usage of mobile applications and develop various innovative applications which are useful for society.
Course Content	1. Develop an application that uses GUI components, Font and Colors 2. Develop an application that uses Layout Managers and event listeners. 3. Develop a native calculator application. 4. Write an application that draws basic graphical primitives on the screen. 5. Develop an application that makes use of database. 6. Develop an application that makes use of RSS Feed. 7. Implement an application that implements Multi- threading 8. Develop a native application that uses GPS location information 9. Implement an application that writes data to the SD card. 10. Implement an application that creates an alert upon receiving a message. 11. Write a mobile application that creates alarm clock	
Text Books and References:	**Text Books:** 1. Jeff McWherter and Scott Gowell, "Professional Mobile Application Development", Wrox, 2012. **Reference Books:** 1. Charlie Collins, Michael Galpin and Matthias Kappler, "Android in Practice", DreamTech, 2012. 2. James Dovey and Ash Furrow, "Beginning Objective C", Apress, 2012. 3. David Mark, Jack Nutting, Jeff LaMarche and Frederic Olsson, "Beginning Ios. 4. Development: Exploring the iOS SDK", Apress, 2013.	
E-Resources	1. http://developer.android.com/develop/index.html.	

17IT41P2 - BIG DATA AND HADOOP LABORATORY

Course Category:	Program Core	Credits:	2
Course Type:	Practical	Lecture - Tutorial - Practical:	0-0-3
Prerequisite:	Require the basics of database management Systems and awareness on social networks.	Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100

Objectives	• Optimize business decisions and create competitive advantage with Big Data analytics, Derive business benefit from unstructured data. • Imparting the architectural concepts of Hadoop and introducing mapReduce paradigm. • Study and practice various tools in Hadoop echo system.

Course Outcomes	Upon successful completion of the course, the students will be able to:
	CO1	Prepare data summarization, apply data modeling techniques to large data sets, create applications for Big Data analytics and build a complete business data analytic solutions

Course Content	1. Perform setting up and Installing Hadoop in its two operating modes such as
	2. Pseudo distributed and fully distributed.
	3. Use web based tools to monitor your Hadoop setup.
	4. Implement the following file management tasks in Hadoop:
	   • Adding files and directories
	   • Retrieving files
	   • Deleting files
	5. Benchmark and stress test an Apache Hadoop cluster.
	6. Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.
	7. Find the number of occurrence of each word appearing in the input file(s)
	8. Performing a MapReduce Job for word search count (look for specific keywords in a file).
	9. Write a MapReduce program that mines weather data. Weather sensors collecting data every hour at many locations across the globe gather large volume of log data, which is a good candidate for analysis with MapReduce, since it is semi structured and record-oriented. (Data available at: https:// github.com/ tomwhite / hadoopbook / tree/ master/ input/ ncdc / all)
	10. Find average, max and min temperature for each year in NCDC data set?
	11. Filter the readings of a set based on value of the measurement, Output the line of input files associated with a temperature value greater than 30.0 and store it in a separate file.
	12. Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter your data.
	13. Write a Pig Latin scripts for finding TF-IDF value for book dataset (A corpus of eBooks available at: Project Gutenberg).

	14. Install and Run Hive then use Hive to create, alter, and drop databases, tables, views, functions, and indexes.
Text Books and References:	**Text Books:** 1. Data Science & Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data by EMC Education Services, Published by John Wiley & Sons, Inc. 2. Tom White "Hadoop: The Definitive Guide" Third Edition, O'reily Media, 2012. **Reference Books:** 1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007. 2. Jay Liebowitz, "Big Data and Business Analytics" Auerbach Publications, CRC press (2013). 3. Tom Plunkett, Mark Hornick, "Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop", McGraw-Hill/Osborne Media (2013), Oracle press. 4. Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

NBKR INSTITUTE OF SCIENCE & TECHNOLOGY: VIDYANAGAR (AUTONOMOUS)
AFFILIATED TO JNTUA, ANANTAPURAMU
IV YEAR OF FOUR YEAR B.TECH DEGREE COURSE – II SEMESTER
INFORMATION TECHNOLOGY
SCHEME OF INSTRUCTION AND EVALUATION

(With effect from the batch admitted in the academic year 2017-2018)

S.No	Course Code	Course Title	Instruction Hours/Week			Credits	Evaluation				Total Sessional Marks (Max. 40)	End Semester Examination		Max. Total Marks
							Sessional Test-I		Sessional Test-II					
		THEORY	L	T	D/P		Duration In Hours	Max. Marks (24+6+10)	Duration In Hours	Max. Marks (24+6+10)		Duration In Hours	Max. Marks	100
1	17IT42E4	Professional Elective-4	3	-	-	3	2	40	2	40	0.8*Best of two + 0.2*least of two	3	60	100
2		Open Elective-2	2	2	-	3	2	40	2	40		3	60	100
3	17IT42I1	Internship	-	-	-	2	-	-	-	40		-	60	100
4	17IT42MO	MOOCs	-	-	-	3	-	-	-	40		-	60	100
5	17IT42MP	Project	-	-	22	11	-	-	-	80		-	120	200
		TOTAL	5	2	22	22		80		240			360	600

17IT42E1 - WIRELESS NETWORKS

Course Category:	Professional Elective	Credits:	3
Course Type:	Theory	Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Need to have basics of computer networks	Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	- To make the student understand the concepts of Wireless networks - To understand the platforms and protocols used in Wireless networks - To make the student take up further research as part of his higher studies		

Course Outcomes	Upon successful completion of the course, the students will be able to:	
	CO1	Understand the basics of wireless networks
	CO2	Learn various types of wireless network
	CO3	Explore MAC protocols of ad hoc wireless networks
	CO4	Design interactive routing protocols
	CO5	Study the Quality of service standards in wireless network
	CO6	Deal with energy management issues wireless network
Course Content	**UNIT-I** **Introduction:** Fundamentals, Characteristics, Modulation Techniques, Multiple Access Techniques, Voice Coding, Error Control, Computer Networks, Computer Network Architecture, IEEE 802 Standard, Wireless Network. **UNIT-II** **Wireless WANs and MANs:** Introduction, The Cellular Concept, Cellular Architecture, The First-Generation Cellular Systems, The Second-Generation Cellular Systems, The Third-Generation Cellular Systems, Wireless in Local Loop IEEE 802.16 Standard, Hi per Access. **UNIT-III** **Ad Hoc Wireless Networks:** Introduction, Issues, Ad hoc Wireless Internet. **MAC Protocols:** Issues in Designing a MAC protocol, Design Goals of a MAC Protocol, Classifications of MAC Protocols. **UNIT-IV** **Routing Protocols:** Introduction, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classification of Routing Protocols, Table-Driven Routing Protocols, On-Demand Routing Protocols, Hybrid Routing Protocols, Routing Protocols with Efficient Flooding Mechanisms, Hierarchical Routing Protocols, Power-Aware Routing Protocols.	

	UNIT-V
	Quality of Service in Ad Hoc Wireless Networks: Introduction, Issues and Challenges in Providing QOS in Ad Hoc Wireless, Networks, Classifications of QOS Solutions, MAC Layer Solutions, Network Layer Solutions, QOS Frameworks for Ad Hoc Wireless Networks.
	UNIT-VI
	Energy Management in Ad Hoc Wireless Networks: Introduction, Need for Energy Management in Ad Hoc Wireless Networks, Classification of Energy Management Schemes, Battery Management Schemes, Transmission Power Management Schemes, System Power Management Schemes.
Text Books and References:	**Text Books:** 1. Ad Hoc Wireless Networks: Architectures and Protocols – C. Siva Ram Murthy and B.S.Manoj, 2004, PHI. **Reference Books:** 1. Wireless Ad- hoc and Sensor Networks: Protocols, Performance and Control – JagannathanSarangapani, CRC Press 2. Holger Karl & Andreas Willig, "Protocols And Architectures for Wireless Sensor Networks", John Wiley, 2005.
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT42E2 - FREE AND OPEN SOURCE SOFTWARE

Course Category:	Professional Elective	Credits:	3
Course Type:	Theory	Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Require the fundamentals of any operating system and computing basics	Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	- To introduce students to open source software, study common open source software licenses and open source project structure etc. - To practice the distributed team software development and current events in the open source world. - To work on an open source project and will be expected to make a significant contribution.		

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Understand the open source basics
	CO2	Setup packages and binaries in Linux
	CO3	Learn basic commands in UNIX and LINUX
	CO4	Explore real time FOSS applications and development
	CO5	Develop web applications on LAMP with insights to MySQL and PHP
	CO6	Analyze licensing mechanisms and version controling
Course Content	**UNIT-I** **Introduction to Open Sources:** Need of Open Source, Advantages of Open Sources, Application of Open Sources, Who create Open Source, Who uses Open Source, Where do I get Open Source Software. **UNIT-II** **Introduction to Linux OS:** OS basics, Linux GUI: Exploring folders, Installation of binary packages, Built in Package Mangers Introduction to Linux File System, Man Pages, The first Command Cat, Command History. **Basic Unix Commands:** VI editor, Redirection operators, and some Unix Commands. **UNIT-III** **File Filters:** Basic understanding about uniq, grep, cut, paste, join, tr, df, du, who, w, rm, unlink, ulimit, chmod, umask, chown, chgrp, id, diff, sed, cmp, comm, Introduction to pipes. **Backup Commands:** tar, cpio, zip and unzip commands, mount and umount. **UNIT-IV** **Real Time FOSS Applications:** Ubuntu Operating System, LAMP, Mozilla Firefox, Virtual Box, Gimp, Moodle, Wordpress, Android, Libre Office, Maxima,Media Wiki, qBittorrent, LaTeX.	

	UNIT-V
	Open Source Database - MySQL: Introduction, Setting up Account, Starting, Terminating and Writing your own SQL programs, Record Selection Technology.
	Open Source Programming Languages - PHP: Introduction, Programming in Web Environment, Variables, Constants, Data types, Operators, Statements.
	UNIT-VI
	Open Source Software Development: Starting from what you have, Choose a License and apply it, Setting the Tone.
	Technical Infrastructure: What a project needs, Mailing lists, Version Control, Bug Tracker, RSS Feeds, Wikis, Websites.
Text Books and References:	**Text Books:** 1. Bernard Golden, "Succeeding with Open Source", Addison-Wesley Professional 2. N.B.Venkateswarlu,"Introduction to Linux: Installation and Programming", B S Publishers, 2005. (An NRCFOSS Publication). 3. Karl Fogel, Producing Open Source Software http://producingoss.com, 2010. **Reference Books:** 1. Remy Card, Eric Dumas and Frank Mevel, "The Linux Kernel Book", Wiley Publications, 2003. 2. Steve Suchring, "MySQL Bible", John Wiley, 2002
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm 3. http://opensource.org/history

17IT42E3 - PATTERN RECOGNITION

Course Category:	Professional Elective		Credits:	3
Course Type:	Theory		Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	Student must require the knowledge of mathematics including some of the areas such as markov models, neural networks, vector machines and clustering techniques.		Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	- Understand basic concepts in pattern recognition - Gain knowledge about state-of-the-art algorithms used in pattern recognition research. - Understand pattern recognition theories, such as Bayes classifier, Decision trees, Vector Machines and clustering methods. - Apply pattern recognition techniques in practical problems.			

	Upon successful completion of the course, the students will be able to:	
Course Outcomes	CO1	Able to get better exposure regarding the basics of data sets and data structures
	CO2	Study of algorithms creates awareness of solutions in databases, data reduction and prototype selection
	CO3	Ability to identify classifiers, estimation of probabilities, construction of BBN, basics of markov models and its applicability.
	CO4	Ability to use decision trees for classification, splitting nodes, Overfitting and Pruning etc.
	CO5	Able to get the utilization of VM in Neural Networks and various methods of combining classifiers
	CO6	Study the basics and supporting role of clustering methods and exposure on an example application.
Course Content	**UNIT-I** **PR Basics:** Introduction, Definitions, Data Sets and Different Paradigms. **Representation:** Data Structures for Pattern Representation, Representation of Clusters, Proximity Measures, Size of Patterns, Abstractions of the Data Set, Feature Extraction. **UNIT-II** **Representation (Continued):** Feature Selection, Evaluation of Classifiers and Clustering. **Nearest Neighbour Based Classifiers:** Nearest Neighbour Algorithm, Variants of the NN Algorithm, Use of the Nearest Neighbour Algorithm for Transaction Databases, Efficient Algorithms, Data Reduction, and Prototype Selection.	

	UNIT-III
	Bayes Classifiers: Bayes Theorem, Minimum Error Rate Classifier, Estimation of Probabilities, Comparison with the NNC, Naive Bayes Classifier, Bayesian Belief Network. **Hidden Markov Models:** Markov Models for Classification, Hidden Markov Models and Classification Using HMMs. **UNIT-IV** **Decision Trees:** Introduction, Decision Trees for Pattern Classification, Construction of Decision Trees, Splitting at the Nodes, Overfitting and Pruning, Example of Decision Tree Induction. **Support Vector Machines:** Introduction, Learning the Linear Discriminant Function. **UNIT-V** **Support Vector Machines (Continued):** Neural Networks, SVM for Classification. **Combination of Classifiers:** Introduction, Methods for Constructing Ensembles of Classifiers, Methods for Combining Classifiers. **UNIT-VI** **Clustering:** Why is Clustering Important, Hierarchical Algorithms, Partitional Clustering, and Clustering Large Data Sets. **Case Study- An Application of Handwritten Digit Recognition:** Description of the Digit Data, Pre-processing, Classification Algorithms, Selection of Representative Patterns and Results.
Text Books and References:	**Text Books:** 1. M. NarasimhaMurty, V. Susheela Devi "Pattern Recognition-An Algorithmic Approach", Springer- Universities Press, 2011. **Reference Books:** 1. "Pattern Recognition", Second Edition by S.THEODORIDIS and K. KOUTROUMBAS, Elsevier Academic Press, 2003. 2. " Pattern Classification" by Richard O Duda, Peter E. Hart and David G Stork, Wiley Publishers, 2001. 3. J. P. Marques de Sa " Pattern Recognition: Concepts, Methods and Applications", Springer Publishers, 2001. 4. Introduction to Pattern Recognition Statistical, Structural, Neural and Fuzzy Logic Approaches" by Menahem Friedman & Abraham Kandel, World Scientific Publishers, 2000. 5. Christopher M. Bishop "Pattern Recognition and Machine Learning", Springer, 2006.
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT42E4 - VIRTUAL RELAITY

Course Category:	Professional Elective	Credits:	3
Course Type:	Theory	Lecture - Tutorial - Practical:	3-0-0
Prerequisite:	General awareness on computing basics	Sessional Evaluation: 40 Univ. Exam Evaluation: 60 Total Marks: 100	
Objectives	• Design a virtual environment and compelling virtual reality experience. • Comprehend and analyze the fundamental issues of virtual reality.		

	Upon successful completion of the course, the students will be able to:	
	CO1	Understand the fundamental issues of virtual reality with example transformations
	CO2	Learn the basic dynamic model of virtual environment to track users.
Course Outcomes	CO3	Study and apply the role of visual and acoustic modalities in virtual reality
	CO4	Explore haptic modality and learn the basics of augmented reality
	CO5	Learn the interaction with virtual environment and study multimodal simulations
	CO6	Study various individual applications based on Virtual and Augmented realities
Course Content	**UNIT-I** **Introduction to Virtual Reality:** Definition of Virtual Reality, History of Virtual Reality, Applications of Virtual Reality, Virtual Reality System. **Degrees of Freedom, Pose, Displacement and Perspective:** Degree of Freedom, Translational Transformation, Rotational Transformation, Pose and Displacement, Pose of Elements in Mechanical Assembly and Perspective Transformation Matrix. **UNIT-II** **Dynamic Model of a Virtual Environment:** Equations of Motion, Mass, Center of Mass and Moment of Inertia, Linear and Angular Momentum, Forces and Torques Acting on a Rigid Body, Collision Detection, Computation of Body Motion. **Tracking the User and Environment:** Pose Sensor, Measuring Interaction Forces and Torques, Motion Tracking and Physical Input Devices. **UNIT-III** **Visual Modality in Virtual Reality:** Human Visual Perception, Computer Graphics, Visual Displays. **Acoustic Modality in Virtual Reality:** Acoustic Modality, Fundamentals of Acoustics, Sound Perception, the Spatial Characteristics of Hearing, Recording Techniques. **UNIT-IV** **Haptic Modality in Virtual Reality:** Human Perceptions and Motor System, Haptic Representation in Virtual Reality, Collision Detection, Haptic Rendering in Virtual Reality, Control of Haptic Interfaces, Haptic Displays.	

	Augmented Reality: Definition, Modeling the Real Environment, Displays, User Interfaces and Applications.
	UNIT-V **Interaction with a Virtual Environment:** Manipulation within Virtual Environment, Navigation Within the Virtual Environment, Interaction with Other Users. **Design of a Multimodal Virtual Environment:** Interactive Computer Game, Simulated Operation of Complex Systems, Modeling and Simulation of an Avatar, Interactive Configuration of Products. **UNIT-VI** **Exploring Virtual Reality Use Cases:** Art, Education, Entertainment and Healthcare. **Exploring Augmented Reality Use Cases:** Art, Education, Industry and Commerce, Entertainment and Utilities.
Text Books and References:	**Text Books:** 1. Virtual Reality Technology and Applications by MatjazMihelj, Domen Novak SamoBegus, Springer publishers, New York/ London. 2. Virtual and Augmented Reality for dummies (a wiley brand) by Paul Mealy, John Wiley & Sons publishers **Reference Books:** 1. "Developing Virtual Reality Applications - Foundations of Effective Design" by Alan B. Craig, William R. Sherman, and Jeffrey D. Will, Morgan Kaufmann Publishers 2. Designing Virtual Reality Systems The Structured Approach by Gerard Jounghyun Kim, Springer-Verlag London
E-Resources	1. https://nptel.ac.in/courses 2. https://freevideolectures.com/university/iitm

17IT42I1 - INTERNSHIP

Course Category:	Program Core	Credits:	2
Course Type:	Interaction with Industry	Lecture - Tutorial - Practical:	0-0-4
Prerequisite:	Require the fundamental knowledge in a few core computing areas and basics of any programming language	Sessional Evaluation: 40 Univ. Exam Evaluation: 60 Total Marks: 100	
Objectives	- Explore career alternatives prior to integrate theory and practice. - Assess interests and abilities in their field of study. - Identify, write down, and carry out performance objectives (mutually agreed upon by the employer and the student) related to their job assignment.		

Course Outcomes	Upon successful completion of the course, the students will be able to:	
	CO1	Gain more experience at identifying the necessary technical and non-technical methods needed to solve an industrial problem.
Course Guidelines and Evaluation	**GUIDELINES:** Every student shall undergo a four-week internship during the B.Tech programme. The internship may be completed in a phased manner with a minimum duration of one week in any phase during inter-semester break / summer vacation. The student shall obtain prior permission from the concerned head of the department regarding the industry / company in which the internship is to be carried out. Every student shall submit a report on the work carried out during the internship in the format specified by the department and shall also submit evidence of on-site internship from the concerned authorities in the industry / company in which the internship is carried out. The report of internship will be evaluated by the examiners for the award of two credits at the end of 42 semester. **INTERNAL ASSESSMENT (40):** The sessional marks will be awarded based on the performance during Internship at the Industry/Company. The distribution of sessional marks shall be 10 for the preparatory work before commencing Internship and 30 for the performance awarded by the supervisor at the Industry. **EXTERNAL ASSESSMENT (60):** The end Examination will be conducted jointly by the Guide and another Examiner nominated by Principal/Director as per list recommended from department	
References	Go through the course regulations and guide lines given by Internal Review Committee appointed by department	
E-Resources	Visit the college web site for reference and supporting guidelines.	

17IT42MO - MASSIVE OPEN ONLINE COURSES

Course Category:	Program Core	Credits:	3
Course Type:	Online Course	Lecture - Tutorial - Practical:	0-0-6
Prerequisite:	Require the fundamental knowledge in a few core computing areas and basics of programming language	Sessional Evaluation: Univ. Exam Evaluation: Total Marks:	40 60 100
Objectives	- To captured the interest and attention of academics chosen by student to improve his/her knowledge and learning skills other than curriculum - Conventional teaching tool are exposed in a well-defined manner rather traditional tools. - Choose the best course which is suitable for current industry expectations - Open access to any one can participate in an online course for free and courses are designed to support an indefinite number of participants		

Course Outcomes	Upon successful completion of the course, the students will be able to:	
	CO1	Identify and observe various teaching methods, tools and acquire knowledge in any advanced domain as per his/her interest/choice.
Course Evaluation	Massive Open Online Courses (MOOCs) are freely available courses offered online for distance based learners who have access to the internet. It enables the students to access high quality reading resources, take tests and allocate academic grades. Students may register for the course of minimum 40 hours duration offered by authorized Institutions/Agencies through online at any time from the 31semester with the approval of the Head of the Department concerned. This course may be completed by the end of 42 semesters. The certificate issued by the Institutions/Agencies after successful completion of the course will be considered for the award of the grade to that course in 42 semesters. In case a student fails in securing the grade from the Authorized Institutions/Agency, the assessment will be done by the department concerned by conducting a test in the course and credits are awarded on passing the course. **INTERNAL ASSESSMENT (40):** The performance shall be evaluated by the faculty concerned based on the reviews. **EXTERNAL ASSESSMENT (60):** The end Examination will be considered based on getting certificates issued by the Institute/Agencies after successful completion of the course will be for the award of the grade to that course in 4-2 semester.	
References	Visit any IITs or other Institutions offering MOOCs to know the guidelines, Course structure, number of modules and examination pattern to get the certificate based on out of the time boundaries	
E-Resources	Search the Internet and get the information to download hard copy of resources(Digital videos) as per the concern of Interest	

17IT42MP - PROJECT

Course Category:	Program Core	Credits:	11
Course Type:	Implementation and Documentation	Lecture - Tutorial - Practical:	0-0-22
Prerequisite:	Require the fundamental knowledge in a few core computing areas and basics of programming language	Sessional Evaluation: 80 Univ. Exam Evaluation: 120 Total Marks: 200	
Objectives	• Acquire practical knowledge within the chosen area of technology for project development • Develop effective communication skills for presentation of project related activities		

Course Outcomes	Upon successful completion of the course, the students will be able to:	
	CO1	Identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach
Course Content	**GUIDELINE/INSTRUCTION** • The project must be done in a group of 3 to 4 students. • Each group must prepare a title that relates to any engineering discipline and the title must emulate any real-world situation. • Submit an early proposal with 1 or 2 page(s) report as per the schedule, description of functionality and how the final product will be. **ASSESSMENT (Internal - 80 and External - 120)** **Internal - 80** • Project title and problem definition– 15 % • Analysis and Design - 20 % • Implementation – 25 % • Final report(Guide lines are given below) – 10 % • Final Review conducted by INTERNAL REVIEW COMMITTEE with Guide-30 % **External -120** • External evaluation will be conducted by two INTERNAL (from the department) and one EXTERNAL (Outside the college) examiners chosen by Principal/Director from panels recommended by the respective Head of the department. **REPORT : A report must be prepared based on the following contents:** • Abstract/Synopsis • Introduction and plan of the report • Literature Survey • Feasibility Analysis - Feasibility of solution (Economical, Technical etc.)	

	• SRS - An agreement between Developer and Customer or end user (Refer any standard template followed by industry, Organization and any Institute as per current trends) • System Design - Description of modules/functions and basic UML diagrams to support the behaviour of the system • Detailed Design - Supporting UML diagrams to expose different levels of representations including behaviour, Interaction and partial implementation • Implementation details - Coding and Testing • Future Enhancements • Bibliography - Reference books, web sites and journals (if any)
References	Refer any standard document/template which may be suitable for current development based on organization/Industry or Institute through various web sites.
E-Resources	Visit any software industry sites or Google for downloading sample formats/templates suitable to your project.