Estd. 1962
NAAC 'A' Grade
MHRD-NIRF- 28th Rank

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दुरध्वनी (ईपीएबीएक्स) २६०९००० (अभ्यास मंडळे विभाग– २६०९०९४)
फॅक्स : ००९१-०२३१-२६९१५३३ व २६९२३३३.e-mail:bos@unishivaji.ac.in

SU/BOS/Sci. & Tech/7400 **Date: 21/07/2018**

To,

The Principal/ Director,
All affiliated Engineering Colleges/ Institute,
Shivaji University, Kolhapur.

Subject : Regarding Guidelines, structure, of CBCS B. Tech. Program and syllabus of First Year B. Tech. Program under Faculty of Science and Technology.

Sir/Madam,

With reference to the subject mentioned above, I am directed to inform you that the University Authorities have accepted and granted approval to Guidelines, structure of CBCS B. Tech. Program and syllabus of First Year B. Tech. Program to following branches under Faculty of Science and Technology:

B. Tech. Programme (Branch)

1.	Civil Engineering & Technology
2.	Mechanical Engineering & Technology
3.	Production Engineering & Technology
4.	Automobile Engineering & Technology
5.	Electrical Engineering & Technology
6.	Chemcial Engineering & Technology
7.	Electronics Engineering & Technology
8.	Electronics and Telecommunication Engineering & Technology
9.	Biotechnology Engineering & Technology
10.	Information Technology Engineering & Technology
11.	Environmental Engineering & Technology
12.	Computer Science Engineering & Technology

The revised syllabi shall be implemented from the academic year 2018-19 (i.e. from July 2018) onwards. A soft copy containing CBCS Guidelines, structure, and syllabus of First Year B. Tech. is enclosed herewith. The syllabus is also made available on university website www.unishivaji.ac.in.

Further, it is hereby informed that the question papers on the pre-revised syllabi shall be set for the examination to be held in October/November 2018 and April/May 2019. These chances are available for repeater students, if any.

You are therefore, requested to bring this to the notice of all students and teachers concerned.

Thanking you,

Yours faithfully,

Dy. Registrar

Encl-: as above.

Copy to-

1) I/c Dean, Faculty of Science & Technology
2) Director, Examination and Evaluation
3) The Chairman, respective BOS / Co-ordinating Committee

} For information

4) O.E. 4 Section
5) Appointment Section
6) Eligibility Section
7) Meeting Section

} For information & necessary action .

SHIVAJI UNIVERSITY, KOLHAPUR

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Accredided by NAAC 'A' Grade

Syllabus for

Bachelor of Technology

(B. Tech.) Program

(To be implemented from June, 2018 onwards)

SHIVAJI UNIVERSITY, KOLHAPUR

FIRST YEAR ENGINEERING AND TECHNOLOGY

Structure and Syllabus

(From the Academic Year 2018-2019)

(Course common to all branches except Architecture and Textile Engineering)

INSTRUCTIONS:

There are two groups in each semester:

1.Physics Group and

2.Chemistry Group

Allotment of groups to students:

a) Semester I: 50% students from each college will be admitted to Physics Group and remaining 50% will be admitted to Chemistry Group. The concerned College will decide the number and names of the students to be admitted in physics and chemistry groups and inform the same to the University.

b)Semester II: The students for Physics group in semester-I will be admitted to Chemistry Group in semester-II. The students for Chemistry Group in semester-I will be admitted to Physics Group in semester-II.

First Year Engineering and Technology – CBCS PATTERN (All Branches) (Sem I & II)

Sr. No		TEACHING SCHEME									EXAMINATION SCHEME							
		THEORY			TUTORIAL			PRACTICAL			THEORY					PRACTICAL (Term wok)		
		Credits	No. of Lecture	Hours	Credits	No. of Lecture	Hours	Credits	No. of Lecture	Hours	Hours	Mode	Marks	Total Marks	%Min	Hours	Max	%Min
SEMESTER - I																		
1	BSC-P-101 / BSC-C-101	3	3	3	-	-	-	1	2	2		CIE	30	100	40%	As per BOS Guidelines	25	40%
												ESE	70					
2	BSC-M-I-102	3	3	3	1	1	1	-	-	-		CIE	30	100	40%		25	40%
												ESE	70					
3	ESC-103	3	3	3	-	-	-	1	2	2		CIE	30	100	40%		25	40%
												ESE	70					
4	ESC-104	3	3	3	-	-	-	1	2	2		CIE	30	100	40%		25	40%
												ESE	70					
5	ESC-105	3	3	3	-	-	-	1	2	2		CIE	30	100	40%		25	40%
												ESE	70					
6	HM-I-106	1	1	1	-	-	-	1	2	2		-	-	-	-		25	40%
7	ESC-W-I-107	1	1	1	-	-	-	1	2	2		-	-	-	-		50	40%
	TOTAL	17	17	17	1	1	1	6	12	12				500			200	
SEMESTER –II																		
1	BSC-P-201 / BSC-C-201	3	3	3	-	-	-	1	2	2		CIE	30	100	40%	As per BOS Guidelines	25	40%
												ESE	70					
2	BSC-M-II-202	3	3	3	1	1	1	-	-	-		CIE	30	100	40%		25	40%
												ESE	70					
3	ESC-203	3	3	3	-	-	-	1	2	2		CIE	30	100	40%		25	40%
												ESE	70					
4	ESC-204	3	3	3	-	-	-	1	2	2		CIE	30	100	40%		25	40%
												ESE	70					
5	ESC-205	3	3	3	-	-	-	1	2	2		CIE	30	100	40%		25	40%
												ESE	70					
6	HM-II -206	1	1	1	-	-	-	1	2	2		-	-	-	-		25	40%
7	ESC-W-II-207	1	1	1	-	-	-	1	2	2		-	-	-	-		50	40%
	TOTAL	17	17	17	1	1	1	6	12	12				500			200	
	TOTAL	34	34	34	2	2	2	12	24	24				1000			400	

CIE – Continuous Internal Evaluation ESE – End Semester Examination

Candidate contact hours per week : 30 Hours(Minimum)
Total Marks for B.Tech I. Sem I & II :**1400**
Theory and Practical Lectures : 60 MinutesEach
Total Credits for B.Tech.-I (Semester I & II) :**48**
IntheoryexaminationtherewillbeapassingbasedonseparateheadofpassingforexaminationofCIEandESE
There shall be separate passing for theory and practical (term work)courses
Non-Credit Self Study Course : Compulsory Civic Courses(CCC) **For Sem I: CCC – I :** Democracy, Elections and Good Governance
Non-Credit Self Study Course : Skill Development Courses (SDC) For Sem II: SDC – I : Any one from following (i) to(v) i) Business Communication & Presentation ii) Event management iii) Personality Development, iv) Yoga & Physical Management v) Resume, Report & proposal writing

Note:
1.BSC : Basic Science Course arecompulsory.
2.HM : Humanities and Management arecompulsory.
3.ESC : Engineering Science Course **: ESC- P**for courses (subjects) are mandatory**Physics** group, while **ESC – C** courses (subjects) are mandatory for **Chemistry**group.
4.There will be two groups for Sem I & II Physics and Chemistry. The Candidate's those opting Physics group in Sem I shall appear for Chemistry group in Sem II andVice-versa.
5.ESC-W: Engineering Science Course-Workshop arecompulsory.

Course List

Semester – I

Physics Group			
Sl. No	**Code No.**	**Subject**	**Credits**
1.	BSC-P-101	Engineering Physics	4
2.	BSC-M-I-102	Engineering Mathematics-I	4
3.	ESC-P-103	Basic Electrical Engineering	4
4.	ESC-P-104	Basic Civil Engineering	4
5.	ESC-P-105	Engineering Graphics	4
6.	HM-I-106	Professional Communication-I	2
7.	ESC-W-I-107	Workshop Practice-I	2
		Total	24

Chemistry Group			
Sl. No	**Code No.**	**Subject**	**Credits**
1.	BSC-C-101	Engineering Chemistry	4
2.	BSC-M-I-102	Engineering Mathematics-I	4
3.	ESC-C-103	Fundamentals of Electronics and Computer Programming	4
4.	ESC-C-104	Applied Mechanics	4
5.	ESC-C-105	Basic Mechanical Engineering	4
6.	HM-I-106	Professional Communication-I	2
7.	ESC-W-I-107	Workshop Practice-I	2
		Total	24

Semester II

Chemistry Group			
Sl. No	**Code No.**	**Subject**	**Credits**
1.	BSC-C-201	Engineering Chemistry	4
2.	BSC-M-II-202	Engineering Mathematics-II	4
3.	ESC-C203	Fundamentals of Electronics and Computer Programming	4
4.	ESC-C204	Applied Mechanics	4
5.	ESC-C205	Basic Mechanical Engineering	4
6.	HM-II-206	Professional Communication-II	2
7.	ESC-W-II-207	Workshop Practice-II	2
		Total	24

Physics Group			
Sl. No	**Code No.**	**Subject**	**Credits**
1.	BSC-P-201	Engineering Physics	4
2.	BSC-M-II-202	Engineering Mathematics-II	4
3.	ESC-P-203	Basic Electrical Engineering	4
4.	ESC-P-204	Basic Civil Engineering	4
5.	ESC-P-205	Engineering Graphics	4
6.	HM-II -206	Professional Communication-II	2
7.	ESC-W-II-207	Workshop Practice-II	2
		Total	24

FIRST YEAR ENGINEERING AND TECHNOLOGY
Semester I and II
EngineeringPhysics

SECTION – I

Unit 1.Diffraction and Polarization of Light :(12 Marks)(7)

Diffraction : Diffraction- Concept and types (Fresnel and Fraunhofer diffraction), Diffraction grating – construction and theory, resolving power of planetransmission grating.

Polarization:

Introduction, double refraction, Huygens' theory (positive and negative crystals), Optical Activity, Specific Rotation, Laurent's half shade polarimeter.

Unit 2. Laser and FibreOptics:(12 Marks)(7)LASER :

Absorption, spontaneous emission, stimulated emission, pumping, population inversion, Ruby laser, characteristics of laser, Holography (construction and reconstruction)

Fibre Optics:

Total Internal Refection, structure of opticalfibre, acceptance angle, acceptance cone, numerical aperture and fractional refractive index change (noderivation), fibre optic communication system, advantages of optical fibres.

Unit 3. Sound: (11 Marks)(7)

Conditions for good acoustics, Reverberation, Reverberation time, Sabine's formula for reverberation time (no derivation), Absorption coefficient, Factors affecting architectural acoustics and their remedy.

SECTION – II

Unit 4.Crystal Physics: (12 Marks)(7)

Space Lattice, Basis and Crystal structure, Unit cell, Seven crystal system, number of atoms per unit cell, coordination number, atomic radius, packing fraction, relation between density and lattice constant, Miller indices - procedure, features and sketches for differentplanes, symmetry elements of cubic crystal,Bragg's law for X-ray diffraction.

Unit 5. Physics of Nano-materials: (12 Marks)(7)

Concept- Nanomaterial, Nanoscience and Nanotechnology, production techniques(Top down and bottom up), Ball milling and Colloidal technique for synthesis of nano particles, Types of Nanomaterial, Tools- Scanning Tunneling Microscope and Atomic Force Microscope, properties and applications of nano-materials.

Unit 6.QuantumMechanics (11 Marks)(7)

Wave-particle duality of light, dual nature of matter (De-Broglie's concept of matter waves) Wavelength of matter wave in terms of K.E. and P. D., Properties of matter waves, Heisenberg's uncertainty principle for position and momentum, Compton Effect (Statement, explanation and experimental verification).

List of Experiments;

Minimum 8 experiments should be performed from the following list.

01. Bi-prism experiment
02. Diffraction at Cylindrical obstacle.
03. Calculation of divergence of LASER beam.
04. Determination of wavelength of LASER using diffraction grating.
05 Wavelength of different spectral lines of mercury using grating.
06. Polarimeter.
07. Verification of inverse square law of intensity of light.
08. Resolving power of Telescope
09. Measurement of band gap energy.
10. Study of crystal structure.
11. Study of symmetry elements of cubic crystal.
12. Determination of 'd' (interplaner distance) using XRD pattern.
13. Study of Planes with the help of models related Miller Indices.
14. Determination of e/m of an electron
15. R. P. of grating

References :

1. R. K. Gaur & Gupta S. L, Engineering Physics -DhanapatRai Publication.
2. M. N. Avadhanulu& P. G. Kshirsagar - A Text Book of EngineeringPhysics -S. Chand Publication.
3. B. L. Theraja -Modern Physics - S. Chand & Company Ltd., Delhi.
4. Subramanyam&BrijLal, A Text Book of Optics –S. Chand & Company (P.) Ltd.
5. B. K. Pandey and S. Chaturvedi- EngineeringPhysics, Cengage Learning-2012
6. S. O. Pillai, Solid State Physics : Structure & Electron Related Properties,Eastern Ltd,, New Age International Ltd.
7. Charles Kittle, Introduction to Solid State Physics - Wiley India Pvt. Ltd.(8^{th}Edtion).
8. V. Rajendran – Engineering Physics- Mc. Graw Hills
9. Alan Giambattista and others- Fundamentals of physics, Tata Mc. Graw Hills
10. Vijay Kumari- Engineering Physics, Vikas Publications
11. ResnickHalliday, Physics Volume-I, Krane -John Wiley & Sons Pub.
12. ResnickHalliday, Physics Volume-II, Krane -John Wiley & Sons Pub.
13. Hitendra K. Malik, A. K. Singh – Engineering Physics - Tata Mc. Graw Hills Education Private Ltd.
14. A. Beiser – Concepts of Modern Physics - Tata Mc. Graw Hills
15. L. J. Schiff – Quantum Mechanics - Tata Mc. Graw Hills

FIRST YEAR ENGINEERING AND TECHNOLOGY
Semester -I

EngineeringMathematics-I

SECTION I

Unit 1: Matrices and Solution of Linear System Equations(8)(Weightage 15 Marks in Shivaji Uni Exam of 70 marks)

1. Rank of matrix: definition, normal form and echelon form
2. Consistency of linear system equations
3. System of linear homogeneous equations
4. System of linear Non-homogeneous equations

Unit 2: Eigen Values and Eigen vectors (7)

(Weightage 10 Marks in Shivaji Uni Exam of 70 marks)

1. Eigen Values
2. Properties of Eigen Values
3. Eigen vectors
3. Properties of Eigen vectors
4. Cayley-Hamilton's theorem (Without proof)

Unit 3: Complex Numbers (6)

(Weightage 10 Marks in Shivaji Uni Exam of 70 marks)

1. De Moivre's Theorem (Without proof)
2. Roots of complex numbers by using De Moivre's Theorem
3. Expansion of sinnθ and cosnθ in powers of sinθ and /or cosθ.
4. Circular functions of a complex variable - definitions

5Hyperbolic and Inverse Hyperbolic Functions- definitions .

SECTION II

Unit 4: Numerical Solution of linear simultaneous equations: (6)(Weightage 10 Marks in Shivaji Uni Exam of 70 marks)

1. Gauss elimination method
2. Gauss-Jordan method
3. Jacobi's iteration method
4. Gauss-Seidel iteration method

Unit 5: Expansion of Functions and Indeterminate forms: (7)(Weightage 10 Marks in Shivaji Uni Exam of 70 marks)

1. Maclaurin's theorem
2. Standard expansions
3. Taylor's theorem
4. Indeterminate forms and L' Hospital's rule

Unit 6: Partial Differentiation:(8)(Weightage 15 Marks in Shivaji Uni Exam of 70 marks)

1. Partial derivatives: Introduction
2. Total derivatives
3. Differentiation of implicit function
4. Euler's theorem on homogeneous function of two variables
5. Jacobian and its Properties .
6. Maxima and Minima of functions of two variables

General Instructions:

1. Batch wise tutorials are to be conducted. The number of students per batch should be as per the university pattern for practical batches.
2. Minimum number of assignments should be 8 covering all topics.

Recommended Books:

1. A text book of Applied Mathematics, Vol.I by P. N. Wartikar& J. N. Wartikar, Pune VidyarthiGrihaPrakashan, Pune.
2. Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers, Delhi.

Reference Books:

1. Advanced Engineering Mathematics by Erwin Kreyszig, Wiley India Pvt. Ltd.
2. Advanced Engineering Mathematics by H. K. Dass, S. Chand, New Delhi.
3. A text book of Engineering Mathematics Volume I by Peter V. O'Neil and Santosh K.Sengar, Cengage Learning.
4. Mathematical methods of Science and Engineering by Kanti B. Datta, Cengage Learning.
5. Numerical methods by Dr. B. S. Grewal, Khanna Publishers, Delhi.
6. A text book of Engineering Mathematics by N. P. Bali, Iyengar, Laxmi Publications (P) Ltd.,NewDelhi.

FIRST YEAR ENGINEERING AND TECHNOLOGY
Semester -I and II

Basic Electrical Engineering

SECTION I

Unit1: Analysis of D.C. circuits: (8)

(Weightage 12 Marks in Shivaji Uni Exam of 70 marks)

Concept of E.M.F, Potential Difference, Current, Resistance, Ohm's Law Kirchhoff's laws, mesh and node analysis

(Numerical on Mesh and Nodal Analysis of Two loops)

Unit 2:Magnetic circuits:(8)

(Weightage 11 Marks in Shivaji Uni Exam of 70 marks)

Concept of mmf, reluctance, magnetic flux, Magnetic Flux density, Magnetic field strength, BH curve, magnetic leakage, fringing, Comparison of Electric and Magnetic circuit, series magnetic circuits (Theoretical Concepts only).

Unit 3: Single phase AC Circuits: (8) (Weightage 12 Marks in Shivaji Uni Exam of 70 marks)

Fundamentals of Alternating quantities, Faraday's Law, Types of Induced E.M.F ,Generation of sinusoidal voltage, concept of R.M.S. & Average value, form factor, Peak Factor, Pure Resistive, Inductive, Capacitive , R-L, R-C, R-L-C series circuits, powers, Significance of power factor.

(Numerical Treatment on Series R-L, R-C, R-L-C circuits)

SECTION II

Unit 4: Three phase A.C. Circuits (7) (Weightage 12 Marks in Shivaji Uni Exam of 70 marks)

Advantages of 3 phase system, Generation of 3 phase AC supply, balanced 3 phase load, relation between line and phase quantities for star connected circuit and delta connected circuit.

Unit 5:Earthing and lamps: (7) (Weightage 11 Marks in Shivaji Uni Exam of 70 marks)

Necessity of Earthing, Earthing methods, Fuse (rewireble and HRC). MCB, Incandescent Lamp, Fluorescent tube, CFL, LED lamp, Mercury vapour lamp, single line diagram of electrical systems.

Unit 6: Single phase Transformer: **(8)** (Weightage 12 Marks in Shivaji Uni Exam of 70 marks)

Construction, operating principle, Types, emf equation, Ratios of voltage and current, operation on no load and with load, power losses, efficiency, voltage regulation, applications.

(Numerical Treatment on E.M.F Equations &Transformer losses and Efficiency)

List of Experiments

Minimum 8 experiments should be performed from the following list.

1. Laboratory Sessions covering,General Introduction to Electrical Engineering laboratory, Experimental Set ups, Instruments etc.. Electrical Symbols.
2. Electric Shocks and precautions against shocks(Do's and Don'ts) .
3. Study of Ohm's Law.
4. Verification of Kirchhoff's Voltage Law and Kirchhoff's Current Law.
5. B-H curve of magnetic material.
6. Study of Faraday's law.
7. Determination of Reactance's for Series R-L- C Circuit.

8. Measurement of active and reactive power in balanced 3-phase circuit using Two-watt meter method.
9. Study of Basic methods of Earthing. Use of Fuse and Miniature Circuit breaker.
10. Study of different luminaries including Incandescent lamp, Mercury vapor lamps, fluorescent tube, CFL, and LED lamps.
11. Polarity and Ratio Test for single Phase Transformer.
12. Pre-determination of efficiency and regulation by Open Circuit and Short circuit tests on single phase transformer.
13. Determine the Efficiency of single Phase Transformer by Direct Loading Test

Reference books:

1. P.V.Prasad and S.Shivan Raju – Electrical Engineering concepts and Applications – Cengage learning.
2. B.L.Theraja – Electrical Technology vol.1. – S.Chand.
3. B.L.Theraja – Electrical Technology vol.2. – S.Chand.
4. NagrathI.J. and D.P.kothari – Basic Electrical Engineering(2001) – Tata McGraw Hill.
5. .BharatiDwivedi and AnurasgTripathi – Fundamentals of Electrical Engineering – Willey Precise

FIRST YEAR ENGINEERING AND TECHNOLOGY

Semester -I and II

Basic Civil Engineering

SECTION I

Unit 1: Relevance of Civil Engineering and Building Planning(7)

Introduction, branches of civil engineering, application of civil engineering inother alliedfields.Principles of planning, introduction to Bye-Laws regarding building line, height of building, open space requirements, F.S.I., setbacks, ventilation, sanitation as per municipal corporation area requirement.

Unit 2: Components of Building (7)

A) Sub-structure: Types of soil and rocks as foundation strata, concept of bearing capacity,types of foundations i.e. shallow and deep and their suitability. Shallow foundation such as wall foundation, isolated foundation, deep foundation such as pile foundation.

B) Super-structure: Elements of super-structures and their functions

Unit 3: Building Materials and Design (7)

Use and properties of the following materials--Concrete – ingredients and grades, plain and reinforced cement concreteand ready mixconcrete, bricks, steel, timber, roofingmaterials etc.

Introduction to types of loads, load bearing and framed structures.

SECTION II

Unit 4: Linear and Angular Measurements(7)

Principles of surveying, Classification of surveys, Chain Surveying, Introduction to metricchain and tapes, error in chaining, nominal scale and R.F., ranging, chaining and offsetting, index plan, location sketch and recording of field book, Chain and compass survey, Meridian, bearing and its types, system of bearing, Types of compass: prismatic and surveyor's compass. Calculation

Ofincluded angles, correction for local attraction.

Unit 5: Leveling (7)

Terms used in leveling, use of Dumpy level and Auto Level, temporary adjustments.Methodsof reduction of levels, types of leveling, Contours, characteristics of contours, use of contour maps.Introduction and use of EDM's with special reference to Total Station.Measurement of area by planimeter – mechanical and digital.

Unit 6: Introduction to Transportation, Environmental and Irrigation Engineering (7)

Components of rigid and flexible pavement, components of railway track (Broad Gauge)Components of water supply scheme (flow diagram), Necessity of Irrigation, Types of Dams (Earthen and Gravity Dam)

Term work:

Student can choose either Model A or Model B for performing practical

Model A

List of Experiments: Minimum 8 experiments should be performed from the following list-Practicalexercises given be carried out and drawing sheets be plotted wherever necessary.

1. Introduction to Measurement of Distances.
2. Plotting the outlines of building by chaining, ranging and offsetting.

3. Plotting of closed traverse by prismatic compass.
4. Reduction of levels by rise and fall method.
5. Finding out gradient of line by rise and fall method
6. Measurement of area by mechanical
7. Study of total station for various measurements.
8. Site visit to study various construction processes and principles of planning.
9. Drawing sheet showing various building elements.
10. Drawing sheet showing various sign conventions

Model B

List of Experiments: Minimum 8 experiments should be performed from the following list-Practicalexercises given be carried out and drawing sheets be plotted wherever necessary.

1. Introduction to Measurement of Distances.
2. Plotting the outlines of building by chaining, ranging and offsetting.
3. Plotting of closed traverse by surveyor's compass.
4. Reduction of levels by collimation plane method.
5. Finding out gradient of line by collimation plane method.
6. Measurement of area by digital planimeter
7. Study of total station for various measurements.
8. Site visit to study various construction processes and principles of planning.
9. Drawing sheet showing various building elements.
10. Drawing sheet showing various sign conventions

Reference Books:

1. Basic Civil Engineering by S. S. Bhavikatti, New Age International Publications.
2. Civil Engineering Materials - Technical Teacher's Training Institute, Chandigarh
3. Surveying by N. Basak, Tata Mc-Graw Hill Publication.
4. Basic Civil Engineeringby G. K. Hiraskar, DhanpatRai Publication.
5. Surveying Vol.I, Vol.II, Vol.III by B.C. Punmia, Laxmi Publication.
6. Irrigation Engineering by B. C. Punmia, DhanpatRai Publications

FIRST YEAR ENGINEERING AND TECHNOLOGY

Semester -I and II

EngineeringGraphics

SECTION I

Unit1: Fundamentals of Engineering Graphics& Engineering Curves (6)

A) Fundamentals of Engineering Graphics: Introduction to Drawing instruments and their uses. Layout of drawing sheets, different types of lines used in drawing practice, Dimensioning system as per BIS (Theoretical treatment only)

B) Engineering curves: Construction of regular polygons (up to hexagon). Construction of Ellipse – (Directrix-Focus & Arcs of circle Method) Parabola-(Directrix-Focus & Rectangle Method) , Hyperbola-(Directrix-Focus & Rectangular Method), Involutes, Archimedian spiral and Cycloid only. (10 marks)

Unit 2: Projections of lines & Planes (9)

A) Projections of lines: Introduction to First angle and third angle methods of projection.
Projections of points on regular reference planes. Projections of horizontal, frontal and Profile lines on regular and auxiliary reference planes. Projection of oblique lines it's True length and angle with reference planes by rotation and auxiliary plane method. Concept of grade and bearing of line.

B) Projections of planes: Projections on regular and on auxiliary reference planes. Types of planes (horizontal, frontal, oblique and Profile planes). Edge view and True shape of a Plane. Angles made by the plane with Principle reference planes. Projections of plane figures inclined to both the planes. (Circle and regular polygon) (15 marks)

Unit 3: Projections of solids (5)

Projections of Prisms, Pyramids, Cylinder and Cones inclined to both referenceplanes(Excluding frustum and sphere)(10 marks)

SECTION- II

Unit 4: Orthographic Projections (7)

Orthographic views: lines used, Selection of views, spacing of views, dimensioning and sections. Drawing required views (any two views) from given pictorial views (Conversion of pictorial view into orthographic view) including sectional orthographic view. (15 marks)

Unit 5: Isometric projections (6)

Isometric projections: Introduction to isometric, Isometric scale, Isometric projections and Isometric views / drawings. Circles in isometric view. Isometric views of simple solids and objects. (10 marks)

Unit 6: Development of plane and curved surfaces (7)

Development of plane and curved surfaces: of the solids, Prisms, Pyramids, Cylinders and Cones along with cutting planes (Solids in simple position only). (10 marks)

Note: The above syllabus is to be covered according to the first angle method of projection.
Self-Study: Geometrical constructions and free hand sketches**,** Missing Views

Term work:

The following six sheets are to be drawn based on the above topics. All these sheets should be drawn on half imperial (A3 size) drawing sheets only.

1. Engineering curves	01
2. Projections of lines and planes	01
3. Projections of solids	01
4. Orthographic projections	01
5. Isometric projections	01
6. Sections of solids and development of surfaces	01

Reference Books:

1. Engineering Drawingby N. D. Bhatt, Charotor Publication House, Bombay
2. Fundamentals of Engineering by W. J. Luzadder, Drawing, Prentice Hall of India.
3. Engineering Design and Visualization by Jon M.Duff,William A. Ross, CENGAGE Learning
4. Machine Drawing by N. D. Bhatt, Charotor Publication House, Bombay.
5. Graphic Science by French and Vierck, Mc-Graw Hill International.
6. Engineering Drawing and Graphics by K. Venugopal, New Age Publication
7. A text book of Engineering Drawing by R. K. Dhawan, S. Chand and Co.
8. Machine Drawing by K. L. Narayana, New Age Publication
9. Engineering Drawing by N. B. Shaha and B. C. Rana, Pearson Education.
10. Engineering Drawing and Graphics Using AutoCAD by T. Jeyapoovan, Vikas Publication.
11. Engineering Drawing by Prof. Amar Pathak, WIELY India Publication.

FIRST YEAR ENGINEERING AND TECHNOLOGY
Semester -I
Professional Communication-I

Unit 1: Understanding Communication **(3)**

1. Introduction, nature and importance
2. Process of communication
3. Basic types of communication- Verbal and Non- verbal
4. Barriers and filters of communication

Unit 2: Grammar and Vocabulary **(2)**

1. Forms of Tenses
2. LSRW skills
3. Developing vocabulary (synonyms, antonyms, confused words etc.)

Unit 3: Phonetics **(2)**

1. Understanding Phonetics and its alphabets
2. Transcription practices

Unit 4: Developing Oral Skills **(3)**

1. Importance and techniques of spoken language.
2. Techniques of formal speech, meetings, Elocution, Extempore etc.

Unit 5: Professional Correspondence **(4)**

1. Importance, language and style, formats (British & American)
2. Letter Writing – Simple letter (seeking permission regarding absence etc.),
3. Preparation of technical events information broacher and manuals.

Term Work: Minimum 8 should be performed from the following list.

1. Elocution
2. Vocabulary building
3. Phonetic Alphabets (Listen & repeat)
4. Pronunciation
5. Fluency Tips
6. Extempore
7. Teamwork- story making
8. Effective reading (newspaper articles)
9. Active listening (memorizing)
10. Letter writing
11. Situational conversation

Instructions:

1. Minimum 7 assignments should be covered.
2. Use of language lab is mandatory for both the semesters.

Reference Books:

1. Handbook for Technical Writingby David A. McMurrey, Joanne Buckley, Cengage.
2. A Course in Englishby J.D. O'Connor.
3. Better English Pronunciation by J.D. O'Connor.
4. Communication Skills Handbook: How to succeed in written and oral communication by Jane Summers, Brette Smith, Wiley India Pvt.Ltd.
5. Personal Development for Life and Work by Masters, Wallace, Cengage.
6. Soft Skills for Managers by Dr. T. KalyanaChakravarthi, Dr. T. LathaChakravarthi, Biztantra.
7. Soft Skills for every one by Jeff Butterfield, Cengage.
8. Behavioural Science by Dr.Abha Singh, Wiley India Pvt.Ltd.
9. An Introduction to Professional English and Soft Skills by Bikram K. Das, KalyaniSamantray, Cambridge University Press New Delhi.
10. Speaking Accurately, K.C. Nambiar, Cambridge University Press New Delhi.
11. Speaking Effectivelyby Jeremy Comfort, Pamela Rogerson, Cambridge University Press New Delhi.
12. Cambridge English for Job Hunting by ColmDownes, Cambridge University Press New Delhi.
13. Body Language by Allen Pease.
14. The Ace of Soft Skills by Gopalswami Ramesh, Mahadevan Ramesh, Pearson Publication, Delhi.
15. Decision Making Skills by Khanka S.S.
16. Business Ethics and Communication by C.S. TejpalSheth.
17. Write Right by Syed AbdurRaheem.

FIRST YEAR ENGINEERING AND TECHNOLOGY

Semester -I and II

Workshop Practice-I

Unit 1: Safety (3)

Concept of accidents, causes of accidents, safety precautions while working in shop, safetyequipments and their use.

Unit 2: Measuring Instruments (3)

Brief introduction to instruments like – Steel rule, Calipers, Vernier Caliper, Micrometer, DialGauge, Vernier height Gauge etc. Least counts, common errors and care while using them, Use ofmarkinggauge, 'V'block and surface plate.

Unit 3: Smithy (4)

Introduction to smithy operations like- bending, forming, upsetting, drawing. Smithy toolshammer,hot & cold chisel flatters, tongs, anvil etc.

Unit 4: Fitting (4)

Study of various tools like- files, drills, taps, dies. Fitting operations.

Term work:

The term work consists of assignment on safety, measuring instruments, Smithy and fitting.
Every student should perform,

1. Smithy
One job in smithy involving upsetting, Drawing, bending such as- Hook, peg, square headedbolt etc.

2. Fitting
One job Male/Female fitting with operations- Marking, cutting, drilling, tapping filing etc.

Reference Books:
1. A Course in Workshop Technology, Vol – I by B. S. Raghuvanshi, Dhanapat Rai and Sons.
2. Elements of Workshop Technology, Vol – I by HajaraChaudhari, Media Promoters.
3. Workshop Technology, Vol – I by Gupta and Kaushik, New Heights.
4. Workshop Technology, Vol – I by Chapman, The English Language Book Society.
5. Workshop Technology, Vol.-I by H.S. Bawa, TMH Publications, New Delhi.

FIRST YEAR ENGINEERING AND TECHNOLOGY

Semester -I and II

EngineeringChemistry

Unit 1: Water **(7)**

Introduction, impurities in natural water, water quality parameters total solids, acidity, alkalinity, chlorides, and dissolved oxygen (definition, causes, significance), hardness of water types of hardness, units of hardness, ill effects of hard water in steam generation in boilers (scale & sludge formation), numerical on hardness, treatment of hard water (ion exchange and reverse osmosis).

Unit 2: Instrumental methods of chemical analysis **(7)**

Introduction, advantages and disadvantages of instrumental methods-----

A)Spectrometry: Introduction, Laws of spectrometry (Lamberts and Beer-Lambert's law),Single beam spectrophotometer (schematic, working and applications).

B)Chromatography: Introduction, types, gas-liquid chromatography (GLC), basic principle, instrumentation and applications.

Unit 3: Advanced materials **(7)**

A)Polymers: Introduction, plastics, thermo softening and thermosetting plastics, industrially important plastics like phenol formaldehyde, urea formaldehyde and epoxy resins, Conducting polymers and Biopolymers(Introduction, examples and applications.)

B)Composite materials: Introduction, Composition, properties and uses of fiber reinforced plastics (FRP) and glass reinforced plastic (GRP).

SECTION II

Unit 4: Fuels(7)

Introduction, classification, calorific value, definition, units (calorie, kcal, joules, kilojoules), characteristics of good fuels, comparison between solid, liquid and gaseous fuels, types of calorific value (higher and lower), Bomb calorimeter and Boy's calorimeter. Numericalproblems on Bomb and Boy's calorimeter.

Unit.5: Corrosion: **(7)**

Introduction, causes, classification, atmospheric corrosion (oxidation corrosion), electrochemical corrosion (hydrogen evolution and oxygen absorption mechanism), factors affecting rate of corrosion. Prevention of corrosion by proper design and material selection,cathodic protection, Protective coatings-hot dipping (galvanizing and tinning,), electroplating.

Unit 6: Metallic materials & Green Chemistry **(7)**

A)Metallic materials: Introduction, Alloy- definition and classification, purposes of making alloys. Ferrous alloys: Plain carbon steels (mild, medium and high), stainless steels. Nonferrous alloys: Copper alloy (Brass), Nickel alloy (Nichrome), Aluminum alloy (Duralumin and Alnico).

B)Green Chemistry: Definition, Twelve principles of Green Chemistry.

Term work:

List of Experiments:

Minimum 8 experiments should be performed from the following list out of which two experiments should be demonstrative on instrumental methods.

1. Determination of acidity of water.
2. Determination of alkalinity of water.
3. Determination of chloride content of water by Mohr's method.

4. Determination of total hardness of water by EDTA method.
5. Determination of moisture, volatile and ash content in a given coal sample by proximate analysis.
6. Preparation of urea-formaldehyde resin.
7. Preparation of phenol-formaldehyde resin.
8. Determination of percentage of copper in brass.
9. Estimation of zinc in brass solution.
10. Determination of rate of corrosion of aluminium in acidic and basic medium.
11. Demonstration of pH meter.
12. Demonstration of photo-colorimeter / spectrophotometer.
13. Demonstration of paper chromatography.

Reference books:

1.Engineering Chemistry by Jain and Jain, DhanpatRai Publishing Company Ltd., New Delhi.
2.A Textbook of Engineering Chemistry by S. S. Dara and S. S. Umare, S. Chand & Company Ltd., New Delhi.
3.A Textbook of Engineering Chemistry by C. P. Murthy, C. V. Agarwal and A. Naidu, BS Publications, Hyderabad.
4.Chatwal and Anand, Instrumental Methods of Chemical Analysis, Himalaya Publishing House, New Delhi.
5.Engineering Chemistry by Dr. A. K. Pahari and Dr. B. S. Chauhan, Laxmi Publications (P) Ltd, New Delhi.
6.A text Book of Engineering Chemistry by ShashiChawla, DhanpatRai& Co. (Pvt.) Ltd, Delhi.
7.Engineering Chemistry by Wiley India.
8.Engineering Chemistry by RenuBapna and Renu Gupta, MacMillan Publishers (India) Ltd, Delhi.

FIRST YEAR ENGINEERING AND TECHNOLOGY
Semester -I and II

Fundamentals of Electronics and Computer

Unit 1: Semiconductor Devices and Applications (7)

(Weightage 12 Marks in Shivaji Uni Exam of 70 marks)

Semiconductor Diode, Half wave, Full wave, Bridge rectifier, Voltage Regulator Using Zener Diode,BJT: characteristics, CE configuration, CE as an amplifier. Load Line, Operating Point, Leakage Currents, Saturation and Cut off Mode of Operations.

Unit 2: Digital Electronics (7)

(Weightage 11 Marks in Shivaji Uni Exam of 70 marks)

Logic Gates, Boolean algebra, Comparison of Specifications of Logic Families, Combinational Logic, Half Adder, Full Adder, Multiplexer, De-Multiplexer.

Unit 3: Applications (7)

(Weightage 12 Marks in Shivaji Uni Exam of 70 marks)

A) Transducers: for Displacement (LVDT), Temperature (RTD), Pressure (Strain Gauge), Speed (Shaft Encoder), Range, Specifications and Limitations.

B) Appliances: Operation of Appliances: Digital Thermometer, Weighing Machine, Washing Machine, Microwave Oven and Tachometer.

SECTION II

Unit 4: Computer Basics and Hardware (5)

(Weightage 12 Marks in Shivaji Uni Exam of 70 marks)

A) Generations & Classification of Computers.

B) Computer System Architecture– CPU, Input Unit, Output Unit, Storage Unit.

C) Applications of Computers.

Unit 5: Data Representation and Computer Software (8)

(Weightage 11 Marks in Shivaji Uni Exam of 70 marks)

A) Data Representation In Computer: Types Of Number System – Binary, Octal, Decimal, Hexadecimal & Their Conversions, Coding Schemes – ASCII, Unicode.

B) Computer Software:

A) Operating System: Types Of Operating System, Functions, Unix/Linux Commands: Listing, Changing, Copying, And Moving Files & Directories (ls, cd, cat, mkdir, rmdir)

B) System Software: Assembler, Interpreter, Compiler.

C) Application Software's: Word Processor, Spreadsheets, Presentation andtheir Applications.

Unit 6: Computer Programming and Networks (8)

(Weightage 12 Marks in Shivaji Uni Exam of 70 marks)

A) Computer Programming: Program Development Cycle, Algorithm, Flowchart, Programming Control Structures – Sequence, Selection, and Repetition.

B) Introduction to Computer Networks: Definition Of Computer Network, Need, Standards: OSI, TCP/IP, Types of Networks: LAN, WAN, MAN, Network Topologies.

Term work: FUNDAMENTAL OF ELECTRONICS

List of Experiments: Minimum 4 experiments should be performed from the following list.

1. Testing of Electronic components- resistors, capacitors, inductor, diode, transistor, LED and Switches using multi-meter &C.R.O.
2. V-I Characteristics of PN junction diode and Zener diode.
3. Study of Half and Full wave rectifiers and their comparison.
4. Study of Frequency response of CE amplifier.
5. Study of truth tables of logic Gates: OR, AND, NOT, NAND, NOR, EXOR.
6. Study of MUX/DEMUX.
7. Measurement of Displacement using LVDT/strain Gauge.
8. Measurement of Temperature using any transducer.

Self-Learning Activities: Different types of Communication systems & Communication Media.

Term work: FUNDAMENTAL OF COMPUTER

List of Experiments: Minimum 4 experiments should be performed from the following list.

1. Study of computer system – Internal Components & peripherals.
2. Use of Unix/Linux commands & create a file using any editor in Linux.
3. Create a document using any word processor (In Linux (open office) /Windows (Microsoft office).
4. Use any spreadsheet application to manipulate numbers, formulae and graphs (In Linux/Windows).
5. Use any power point presentation application and create a professional power point presentation using text, image, animation etc. (In Linux/Windows).
6. An assignment based on use of Internet and Web for searching and downloading Technical information.
7. Study of Tablet and Android Operating System Features and applications.

Text Books:

1. A Text Book of Applied Electronics by R S Sedha, S. Chand
2. Basic Electronics Engineering by Vijay Baru, RajendraKaduskar, S T Gaikwad (Wiley/ DREAMTECH)
3. Digital Principles & Applications by Albert Malvino, Donald Leach, TMGH Publication.
4. Principle of Electronics by V.K. Mehata, S. Chand
5. Electronic Instrumentation by H. S. Kalasi, Tata McGraw Hills Publication

Reference Books:

1) Electronics Devices and Circuit Theory by Robert L. Boylestad and Louis Nashelsky (Pearson Education Publication)
2) Fundamental of Digital Circuits by A. Anand Kumar (PHI- Publication)
3) Fundamental of Electronics Engineering by R.Prasad(CENGAGE- Learning)
4) Introduction to Information Technology, ITL Education Solutions LTD. Pearson Education
5) Fundamentals of Computers by V. Rajaram, PHI Publications.
6) UNIX concepts and applications by Sunitabha Das, TMGH.
7) Computer FundamentalsArchetucture and Organization by B.Ram New Age International Publishers.

FIRST YEAR ENGINEERING AND TECHNOLOGY

Semester -I and II

Applied Mechanics

Unit 1: Fundamentals of Statics (7)

Basic Concepts and Fundamental Laws, Force, Moment and Couple, System of Forces, Resultant, Resolution and Composition of Forces, Varignon's Theorem, Law of Moments.

Unit 2: Equilibrium (7)

Lami s' Theorem, Free Body Diagram, Equilibrium of Forces, Equilibrium conditions, Surface friction for bodies on horizontal and inclined planes.

Beams: Types of Loads, Types of supports, Analysisof Simple beams, Virtual work method for support reactions.

Unit 3: Centroid and Moment of Inertia (7)

Centroid and Center of Gravity, Moment of Inertia of Standard shapes from first principle, Parallel and perpendicular axis theorem, Moment of Inertia of plain and composite figures, Radius of Gyration.

SECTION II

Unit 4: Kinetics of Linear (8)

Introduction to Kinematics of Linear motion (no numerical on kinematics), Kinetics of linear motion, Newton's Laws, D'Alembert's Principle, Work- Energy Principle, Impulse Momentum Principal

Unit 5: Kinetics of Circular Motion (8)

Introduction to Kinematics of Circular motion (no numerical on kinematics), Rotation with constant and variable angular acceleration, centripetal and centrifugal force, condition of skidding and overturning.

Unit 6: Impact and Collision (5)

Impact, Types of Impact, Law of conservation of Momentum, Coefficient of Restitution,Numerical on Direct central Impact.

Term work:

Student can choose either Model 1 or Model 2 for performing practical

Model 1	Model 2
A) Experiments:	
1. Law of polygon of forces	**1.** Law of polygon of forces
2. Jib crane	**2.** Jib crane
3. Bell crank lever	**3.** Bell crank lever
4. Support Reactions of Beam	**4.** Support Reactions of Beam
5.Fleture's Trolley	**5.** Centrifugal force
B) Graphics Statics: (To be solved on A3 sheet)	
1. To find Resultant - 3 problems	1. To find Resultant - 3 problems
2.To find support reactions - 3 problems	**2.**To find support reactions - 3 problems
C) Home Assignments	
At least one assignment on each unit with minimum 5 numericals	At least one assignment on each unit with minimum 5 numericals

Reference Books:

1.Engineering Mechanics by S. S. Bhavikattis, New Age International Pvt. Ltd.
2.Engineering Mechanics by R. K. Bansal and Sanjay Bansal.
3.Vector Mechanics for Engineers Vol.I and II by F. P. Beer and E. R. Johnston, Tata Mc-Graw Hill Publication.
4.Engineering Mechanics by Manoj K Harbola, Cengage Learning
5.Engineering Mechanics by K. I. Kumar, Tata Mc-Graw Hill Publication
6.Engineering Mechanics by S. B. Junnerkar.
7.Engineering Mechanics by Irving H. Shames, Prentice Hall of India, New Delhi.
8.Applied Mechanics by S. N. Saluja, Satya Prakashan, New Delhi.
9.Engineering Mechanics by Statics and Dynamics by Ferdinand Singer, Harper and Row Publications
10.Engineering Mechanics by R. S. Khurmi, S. Chand Publications
11.Fundamentals of Engineering Mechanics by S. Rajasekaran, G. Sankarasubramanian,VikasPublishing House
12) "Applied Mechanics- Dynamics &Statics " by I.B.Prasad, Khanna Publisher, Delhi

FIRST YEAR ENGINEERING AND TECHNOLOGY

Semester -I and II

Basic Mechanical Engineering

Unit1:Thermodynamics(7)

Thermodynamic State, Process, Cycle, Thermodynamic System, Heat, work, Internal Energy,First Law of Thermodynamics, Application of First Law to steady Flow processes,Limitations of First Law (Numerical Treatment) Statements of Second Law of Thermodynamics.(12 marks)

Unit 2: Introduction to I C Engine (7)

Carnot Engine, Construction and Working of C.I. and S.I., Two stroke, Four Stroke Cycles,Air standard cycles- Carnot Cycle, Joule Cycle, Otto Cycle, Air Standard efficiency (DescriptiveTreatment only) (12 marks)

Unit 3: Introduction to Refrigeration and Air Conditioning (6)

Carnot refrigerator, Refrigerant types and properties, Vapour compression and vapourabsorption system, solar refrigeration, Window Air Conditioning, Psychometric properties ofmoistair, Applications of refrigeration and air conditioning (Descriptive Treatment only).(11 marks)

Unit4:EnergySources and power plants (7)

Renewable and nonrenewable, Solar-flat plate collector, concentric collector–Parabolic andcylindrical, Photovoltaic cell, Wind, Hydropower plant, Steam Power plant,Bio-gas, Bio-Diesel (Descriptive Treatment only). (12 marks)

Unit 5: Mechanical Power Transmission and Energy conversion devices(7)

Type of Belt and belt drives, chain drive, Types of gears and gear Trains, (Numerical Treatment on belt drive), Construction, workingand applications of centrifugal Pump, Reciprocating compressor and Peloton wheel Turbine.(12 marks)

Unit 6: Manufacturing Processes (6)

Introduction to manufacturing processes - Casting Process, Steps involved in castingprocesses, and their applications, Metal removing processes (Lathe, milling & drilling operations) Metal JoiningProcesses – Arc welding, soldering and brazing and their applications.(11 marks)

Term Work:

List of experiments: Minimum 8 experiments should be performed from the following list--

1. Demonstration of I.C. engine
2. Demonstration of Two stroke and four stroke engine
3. Demonstration of vapor compression refrigeration system and window airconditioner.
4. Demonstration of Solar water heating system.
5. Demonstration of Steam or Hydroelectric Power Plant
6. Demonstration of Diesel power plant
7. Demonstration of types of Gears and gear trains.
8. Demonstration of pumps and compressor.
9. Demonstration of hydraulic turbine
10. Demonstration of metal joining processes.
11. Demonstration of metal removal processes
12. Industrial visit based on syllabus.

Reference Books:

1. Solar Energy by Dr.S.P. Sukathame,Tata Mc-Graw Hill Publication
2. Non-Conventional Sources of Energy by G.D. Rai, Khanna Publication
3.Engineering Thermodynamics by R.Joel, The English Language Book Society.
4.Engineering Thermodynamics by Achultan, Prentice Hall of India.
5.Thermal Engineering by R.K. Rajput, Laxmi Publication, Delhi.
6.Elements of Heat Engine Vol.I,II,III by Patel and Karamchandani, Acharya Book Depot.
7.Power Plant Engineering by Arora and Domkunwar, Dhanpat Rai and Sons.
8. Manufacturing Technology Volume I and II by P. N. Rao, Tata Mc-Graw Hill Publication
9. Elements of Workshop Technology, Vol.I and II by HajaraChoudhari, Media Promoters
10. Basic Mechanical Engineering by Basant Agrawal & C. M. Agrwal, Wiley India Pvt. Ltd.
11.Energy Technology by S. Rao and Dr.B.B. Parulekar, Khanna Publication.

FIRST YEAR ENGINEERING AND TECHNOLOGY

Semester -II

EngineeringMathematics-II

SECTION-I

Unit 1: Ordinary Differential Equations of First Order and First Degree (7)
(Weightage 10 Marks in Shivaji Uni Exam of 70 marks)
1. Linear differential equations
2. Reducible to Linear differential equations
3. Exact differential equations
4. Reducible to Exact differential equations

Unit 2: Applications of Ordinary Differential Equations of First Order and First Degree (6)
(Weightage 10 Marks in Shivaji Uni Exam of 70 marks)
1.Applications to Orthogonal trajectories (Cartesian and Polar equations)
2. Applications to Simple Electrical Circuits
3. Newton's law of cooling

Unit 3: Numerical Solution of Ordinary Differential Equations of First Orderand First Degree(Weightage 15 Marks in Shivaji Uni Exam of 70 marks)**(8)**
1. Taylor's series method
2. Euler's method
3. Modified Euler's method
4. Runge-Kutta fourth order formula

SECTION-II

Unit 4:Numerical Solutions Of Algebraic and Transcendental Equations (6)(Weightage 10 Marks in Shivaji Uni Exam of 70 marks)
1. Bisection Method
2. Secant Method
3. Newton Raphson Method

Unit 5: Special Functions (7)
(Weightage 10 Marks in Shivaji Uni Exam of 70 marks) 1. Gamma function and its properties
2. Beta function and its properties
3. Error function and its properties

Unit 6: Multiple Integration and its applications: (8)
(Weightage 15 Marks in Shivaji Uni Exam of 70 marks)
1. Double Integrals and evaluation
2. Change of order of integration
3. Change into Polar Coordinates
4. Area enclosed by plane curves
5. Mass of a plane lamina

General Instructions:
1. Batch wise tutorials are to be conducted. The number of students per batch should be asperthe Universitypattern for practical batches.

2. Minimum number of assignments should be 8 covering all topics.

Recommended Books:

1. A text book of Applied Mathematics, Vol.-I by P. N. Wartikar& J. N. Wartikar, PuneVidyarthiGrihaPrakashan, Pune.
2. A text book of Applied Mathematics, Vol.-II by P. N. Wartikar& J. N. Wartikar, PuneVidyarthiGrihaPrakashan, Pune.
3. Dr. B. S. Grewal - Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers,Delhi.

Reference Books:

1. Higher Engineering Mathematics by B.V.Ramana, Tata McGraw-Hill Publications, NewDelhi
2. Advanced Engineering Mathematics by Erwin Kreyszig, Wiley India Pvt. Ltd.
3. Advanced Engineering Mathematics by H. K. Dass.
4. Mathematical methods of Science and Engineering by Kanti B. Datta, Cengage Learning.
5. A textbook of Engineering Mathematics Volume I by Peter V. O'Neil and Santosh K. Sengar, Cengage Learning.
6. A textbook of Engineering Mathematics by N. P. Bali, Iyengar, Laxmi Publications (P) Ltd.,New Delhi.

FIRST YEAR ENGINEERING AND TECHNOLOGY

Semester -I and II

Workshop Practice-II

Unit 1: Welding (4)

Types of welding – gas welding, arc welding, resistance welding, Welding equipment's,welding of various metals, electrode classification and coding, welding joints.

Unit 2: Carpentry (4)

Introduction, Classifications of wood, common varieties of Indian timber, carpentry toolslike- Marking tools, cutting tools, planes, striking tools, holding tools. Carpentry operations- marking,sawing,chiseling, grooving etc. carpentry joints.

Unit 3: Sheet metal work (4)

Specifications of metal sheets, working tools, sheet metal operations like-cutting, bending,folding, punching, reverting and joining by brazing and soldering.

Unit 4: Air pollution: (2)

Air pollution due to automobiles, causes, PUC testing.

Term work:

The term work consists of assignment on Welding, Carpentry, Sheet metal work, Airpollution.
Every student should perform---

1. Welding: One job on Arc welding- Lap / Butt Joint etc. (For individual student)
OR
Table, Shoe stand, Bag stand etc. (For 4-6 students)

2. Carpentry :One composite job involving dovetail joint, T joint, cross halving joint, pen stand etc.(Forindividual student)
OR
Table, Teapot, Stool etc. (For 4-6 students)

3. Sheet metal Work:
One job on commercial items such as Dust bin, funnel, tray etc.

Reference Books:

1. A Course in Workshop Technology, Vol – I by B. S. Raghuvanshi, Dhanapat Rai and Sons.
2. Elements of Workshop Technology, Vol – I by HajaraChaudhari, Media Promoters.
3. Workshop Technology, Vol – I by Gupta and Kaushik, New Heights.
4. Workshop Technology, Vol – I by Chapman, The English Language Book Society.
5. Workshop technology, Vol.-I by H.S. Bawa, TMH Publications, New Delhi.
6. I.C. Engines by Mathur& Sharma, Dhanpat Rai Publications, New Delhi.

FIRST YEAR ENGINEERING AND TECHNOLOGY

Semester -II

Professional Communication-II

Unit 1: Developing Writing Skills(3)

1. Importance of technical writing
2. Report Writing:

a) Techniques of Report Writing
b) Methods of data collection
c) Types of Report Writing- Survey, Inspection and Investigation

Unit 2: Behavioral Skills(5)

1. Understanding Self (SWOT analysis)
2. Attitude Building/ Developing Positive attitude
3. Decision Making Skills
4. Leadership Skills
5. Stress Management
6. Time Management
7. Team Work

Unit 3: Presentation Skills(2)

1. Importance & techniques
2. Presenting yourself professionally

Unit 4: Career skills (4)

1. Corporate Manners and Etiquettes
2. Planning and Managing Career
3. Job Application and Resume
4. Interview: Techniques& skills
5. Group Discussion
6. Debate

Term Work: Any 8 out of the following should be conducted

1. Group Discussion (lab session/class room activity)
2. Mock Interview
3. Report writing (lab session/class room activity)
4. Paragraph writing on current technical writing
5. Presentation on current affairs
6. Developing Professional Telephonic skills
7. Exercise of Application writing and Resume writing
8. Practice of Case Study
9. Team building activities
10. Report writing (3 types)
11. Introduction and use of modern communication techniques
12. Computer aided presentation of a project report (PPT)

Instructions:

1. Minimum 7 assignments should be covered.
2. Use of language lab is mandatory for both the semesters.

Reference Books:

1. Handbook for Technical Writingby David A. McMurrey, Joanne Buckley, Cengage.
2. A Course in Englishby J.D. O'Connor.
3. Better English Pronunciation by J.D. O'Connor.
4. Communication Skills Handbook: How to succeed in written and oral communication byJane Summers, Brette Smith, Wiley India Pvt.Ltd.
5. Personal Development for Life and Work by Masters, Wallace, Cengage.
6. Soft Skills for Managers by Dr. T. KalyanaChakravarthi, Dr. T. LathaChakravarthi,Biztantra.
7. Soft Skills for every one by Jeff Butterfield, Cengage.
8. Behavioural Science by Dr.Abha Singh, Wiley India Pvt.Ltd.
9. An Introduction to Professional English and Soft Skills by Bikram K. Das, KalyaniSamantray, Cambridge University Press New Delhi.
10. Speaking Accurately, K.C. Nambiar, Cambridge University Press New Delhi.
11. Speaking Effectivelyby Jeremy Comfort, Pamela Rogerson, Cambridge University PressNew Delhi.
12. Cambridge English for Job Hunting by ColmDownes, Cambridge University Press NewDelhi.
13. Body Language by Allen Pease.
14. The Ace of Soft Skills by Gopalswami Ramesh, Mahadevan Ramesh, PearsonPublication, Delhi.
15. Decision Making Skills by Khanka S.S.
16. Business Ethics and Communication by C.S. TejpalSheth.
17. Write Right by Syed AbdurRaheem.

SHIVAJI UNIVERSITY KOLHAPUR

REVISED SYLLABUS AND STRUCTURE

SECOND YEAR (B. Tech) - CBCS

INFORMATION TECHNOLOGY

To be introduced from the academic year 2019-20

(i.e… from June 2019) onwards

(Subject to the modifications will be made from time to time)

SECOND YEAR INFORMATION TECHNOLOGY – CBCS PATTERN

Sr. No	Course (Subject Title)	TEACHING SCHEME									EXAMINATION SCHEME										
		THEORY			TUTORIAL			PRACTICAL			THEORY					PRACTICAL			TERM WORK		
		Credits	No. of Lecture	Hours	Credits	No. of Lecture	Hours	Credits	No. of Lecture	Hours	Hours	Mode	Marks	Total Marks	Min	Hours	Max	Min	Hours	Max	Min
SEMESTER - III																					
1	BSC-IT301	3	3	3	1	1	1	-	-	-		CIE	30	100	40	As per BOS Guidelines	-	-	As per BOS Guidelines	25	10
												ESE	70								
2	PCC- IT302	4	4	4	-	-	-	1	2	2		CIE	30	100	40		50	20		25	10
												ESE	70								
3	PCC- IT303	3	3	3	-	-	-	-	-	-		CIE	30	100	40		-	-		-	-
												ESE	70								
4	PCC- IT 304	3	3	3	-	-	-	-	-	-		CIE	30	100	40		-	-		-	-
												ESE	70								
5	PCC - IT 305	3	3	3	1	1	1	-	-	-		CIE	30	100	40		-	-		25	10
												ESE	70								
6	PCC- IT 306	3	3	3	-	-	-	2	4	4		-	-	-	-		50	20		50	20
7	PW- IT 307	-	-	-	-	-	-	1	2	2							50	20		25	10
	TOTAL	**19**	**19**	**19**	**2**	**2**	**2**	**4**	**8**	**8**				**500**			**150**			**150**	
SEMESTER –IV																					
1	PCC- IT 401	3	3	3				1	2	2		CIE	30	100	40	As per BOS Guidelines	50	20	As per BOS Guidelines	25	10
												ESE	70								
2	PCC- IT402	3	3	3				-	-	-		CIE	30	100	40		-	-			
												ESE	70								
3	PCC- IT403	3	3	3	-	-	-					CIE	30	100	40						
												ESE	70								
4	PCC-IT404	3	3	3	1	1	1					CIE	30	100	40					25	10
												ESE	70								
5	PCC- IT405	3	3	3	-	-	-					CIE	30	100	40						
												ESE	70								
6	PCC- IT406	2	2	2	-	-	-	2	4	4		-	-	-	-		50	20		50	20
7	PW- IT407							1	2	2							50	20		50	20
8	MC- IT408	2	2	2	-	-	-	1	2	2		CIE	30	100	10		-	-		-	-
												ESE	70		25						
	TOTAL	**19**	**19**	**19**	**1**	**1**	**1**	**5**	**10**	**10**				**600**			**150**			**150**	
	TOTAL	**38**	**38**	**38**	**3**	**3**	**3**	**9**	**18**	**18**				**1100**			**300**			**300**	

• Candidate contact hours per week : 30 Hours(Minimum)	• Total Marks for S.E. Sem III & IV : **800 + 900 =1700**
• Theory and Practical Lectures : 60 Minutes Each	• Total Credits for S.E. Sem III & IV : **50 (SEM-I: 25 + SEM – II:25)**
• In theory examination there will be a passing based on separate head of passing for examination of CIE and ESE.	
• There shall be separate passing for theory and practical (term work)courses.	

Note:

1. **BSC-IT**: Basic Science Course - Information Technology arecompulsory.
2. **ESC-IT:** Engineering Science Course - Information Technology arecompulsory.
3. **PCC-IT:** Professional Core Course – Information Technology arecompulsory.
4. **MC-EV:** Mandatory Course - Environmental Studies which is compulsory for theory 70 marks and project work30 marks.

Semester-III

Sl. No	Code No.	Subject	Semester	Credits
1.	BSC-IT301	Statistics & Fuzzy Systems	3	4
2.	PCC- IT302	Digital System and Microprocessor	3	5
3.	PCC- IT303	Data Communication	3	3
4.	PCC- IT304	Fundamentals of Economics and Management	3	3
5.	PCC- IT 305	Discrete Mathematical Structures	3	4
6.	PCC- IT306	Problem solving using C	3	5
7.	PW- IT307	Soft Skills	3	1

Semester -IV

Sl. No	Code No.	Subject	Semester	Credits
1.	PCC- IT401	Computer Network	4	4
2.	PCC-IT402	Computer Organization and Architecture	4	3
3.	PCC-IT403	Data Structures	4	3
4.	PCC-IT404	Theory of computation	4	4
5.	PCC-IT405	Software Engineering	4	3
6.	PCC- IT406	Object Oriented Programming	4	4
7.	PW-IT407	Mini Project	4	1
8.	MC-IT408	Environmental Studies	4	3

S. Y. B.Tech (INFORMATION TECHNOLOGY) Sem – III

BSC-IT301 – STATISTICS AND FUZZY SYSTEMS

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory : 3 Hrs/week	**Term work:** 25 marks
	Tutorial : 1 Hrs/week	**Theory :** 100marks
	Practical: --	**Practical :--**
	Credits:- 4	

Prerequisite: Basic probability theory, Statistics

Course Objectives:

1. To develop mathematical skills and enhance thinking power ofstudents
2. To give the knowledge to the students of fuzzy sets theory, numerical methods, probabilityand statistics with an emphasis on the application of solving engineeringproblems
3. To prepare students to formulate a mathematical model using engineering skills and interpret the solution in realworld

Course Outcomes:

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

1. Describe the statistical data numerically by using Lines of regression and Curvefittings
2. Solve basic problems in probability theory, including problems involving the binomial, Poissonand normaldistributions
3. Calculate numericalintegration
4. Define fuzzy sets using linguistic words and represent these sets by membership functions, convexity, normality, supportetc…
5. Solve examples on the principle in performing fuzzy number arithmetic operations such as addition, multiplication and fuzzyequation
6. Solve assignment problems by using different techniques of operationresearch

SECTION – I

Unit No.	Unit NameandContents	No. of Lectures
1.	**Correlation, Regression &CurveFitting:** Introduction, Karl Pearson's Coefficient of Correlation, Lines of regression of bivariate data, Fitting of Curves by method of Least-squares, Fitting of Straight lines, Fitting of exponential curves, Fitting of second degree Parabolic curves	06
2.	**ProbabilityDistribution:** Random variables, Discrete Probability distribution, Continuous probability distribution, Binomial Distribution, Poisson Distribution, Normal Distribution	06
3.	**NumericalIntegration:** Newton Cotes formulae, Trapezoidal Rule, Simpson's 1/3 rd rule, Simpson's 3/8 th rule, Weddle's Rule	06

SECTION – II

4. **Introduction toFuzzy sets:** 06
Crisp set and Fuzzy set, Basic concepts of fuzzy sets, Basic operations on fuzzy sets, Properties of fuzzy sets

5. **FuzzyArithmetic:** 06
Fuzzy numbers, Fuzzy cardinality, Arithmetic Operations on Fuzzy numbers, Solutions of Fuzzy equations of type $A + X = B$ and $A.X = B$

6. **AssignmentProblem:** 06
Definition, Balanced and Unbalanced assignment problem, Hungarian Method, Balanced assignment problems, Unbalanced assignment problems

S. Y. B.Tech (INFORMATION TECHNOLOGY) Sem – III

PCC-IT302 – DIGITAL SYSTEMS AND MICROPROCESSOR

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory : 4 Hrs/week	**Term work:** 25 marks
	Tutorial : ---	**Theory :** 100marks
	Practical: 1 Hrs/week	**Practical :** 50marks
	Credits:- 5	

Prerequisite: Fundamentals of Electronics and Computers, basic number system.

Course Objectives:

1. To provide knowledge of basic arithmetic and logical operations in digitalsystems.
2. To design and construction of combinational and sequentialcircuits.
3. To understand architecture and working of 8 bit & 16 bit microprocessor andperipheral.
4. To learn the assembly languageprogramming.
5. To understand knowledge about working of different instructions using timingdiagrams.

Course Outcomes:

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

1. Solve different examples of arithmetic and logical operations on various numbersystems.
2. Design and demonstrate different sequential and combinational-logicdesign.
3. Summarize the working of 8085 & 8086 microprocessor andperipheral.
4. Design and execute assembly language programs using 8085 instructionset.
5. Distinguish different instructions using timingdiagrams.

SECTION – I

1	**Fundamental of Digital System:** Analog and digital systems, representation of signed numbers, 2's complement arithmetic, BCD addition & subtraction, octal &Hexadecimal addition and subtraction, Derived gates.	04
2	**Boolean algebra & combinationallogicdesign:** Reduction of Boolean expressions, Boolean function representation, expansion of Boolean expression (standard SOP & POS), simplification of Boolean expressions using K-map(up to 5 variable), prime implicants, Adders &Subtractors design using gates, Multiplexer, implementation of expression using MUX, Demultiplexer, decoder(74138),BCD to 7 segment decoder.	07
3	**SequentialLogicDesign:** Classification, Flip-Flops(S-R, J-K, T, D) using gates, Race around condition Master-Slave J-K Flip Flop, Counters (Asynchronous & Synchronous), Design examples, Shift registers, State transition diagram, excitation table.	06

SECTION – II

4	**8085 Microprocessor Architecture & MemoryInterfacing:**	06
	The 8085 MPU, Microprocessor communication and bus timing, De-multiplexing address and Data bus, Generating control signals, The 8085 Architecture , op-code fetch machine cycle, memory read and write machine cycle. Memory interfacing-memory structure, memory interfacing & address decoding.	
5	**8085Programming techniques:**	07
	8085 instruction groups, addressing modes writing and execution assembly language program, counters & delays, stack, Instruction related to stack execution of CALL and RET, The 8085 interrupt , RST instructions, vectored interrupts, RIM and SIM	
6	**Interfacing I/O devices &Introduction 8086:**	06
	Basic interfacing concepts, peripherals i/o instructions – IN, OUT, I/ O execution, memory mapped I/O, I/O mapped I/O, Architecture of 8086.	

Text Books:

1. Fundamental of Digital Circuits- A. Anand Kumar, 2nd Edition, PHI private Limited. (Chapter 1,2,3)
2. Microprocessor architecture, programming & applications- Ramesh S. Gaonkar, New Age International publication. (Chapter4,5,6)
3. The Microcomputer systems: The 8086/8088 Family - Yu Cheng Liu , Glenn A. Gibson (PHILtd)

Reference Books:

1. Digital fundamentals -Floyd & Jain, , Pearson education, eighth edition,2007
2. Digital Design –Morris Mano, PearsonEducation
3. Modern Digital Electronics, R.P.Jain, 3rd Edition, Tata McGraw-Hill,2003
4. Digital systems, principles and applications – Ronald Tocci, Neal S. Widmer, Gregory Moss (Pearson Education) 9 thEdition.
5. Microprocessors and Microcontrollers - N. Senthi Kumar, M. Saravanan andS.
6. Jeevananthan (Oxford UniversityPress)

Term Work:

Term work should consist of minimum of 10-12 experiments based on following topics.

1. Study of Basicgates.
2. Study of Universalgates.
3. Study of Boolean algebra & De Morgan's theorem usinggates.
4. Study ofMUX/DEMUX.
5. Study of74138.
6. Study of R-S and J-Kflip-flops
7. Study ofcounters
8. Interfacing of counters to seven segmentdisplay
9. Realization of 4/5 variableK-maps
10. Study of 8085 processor data transfer instructions using timingdiagrams.

11. Assembly language programming for 8085 (Arithmetic, Logical and data transfer, interrupts- Minimum 6 programs using kits)
12. Study of8086.

S. Y. B.Tech (INFORMATION TECHNOLOGY) Sem – III

PCC-IT303 – DATA COMMUNICATION

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory: 3 Hrs/Week	**Term work: --**
	Tutorial: --	**Theory:** 100 marks
	Practical: --	**Practical :--**
	Credits:- 4	

Prerequisite: Basic Knowledge of Computer Fundamentals

Course Objectives:

1. To understand fundamentals of Data communication andNetworking.
2. To learn Data Encoding techniques used in during DataTransmission.
3. To study layered architecture of OSI& TCP/IP referencemodel.
4. To gain knowledge of multiplexing and switching techniques used for bandwidthutilization.
5. To study basic components & devices used in Data communicationsystem

Course Outcomes:

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

1. Explain the basic concepts and components of Data communicationsystem.
2. Understand Data Encodingtechniques.
3. Compare various multiplexing & spreading techniques.
4. Understand responsibilities of each layers in OSImodel.
5. Study and understand protocols used at each layer in TCP/IP referencemodel.
6. Get familiar with hardware components required to buildnetwork.

SECTION – I

1 Introduction:

1. Data Communications-Definition, Components, Data representation, DataFlow.
2. Networks- Definition, Uses, Physical Structures, Types of Networks.
3. Protocols andStandards.

05

2 Data & Signals:

1. Data and Signals- Analog and Digital, Periodic and Non-periodicsignals.
2. Transmission Impairments-Attenuation, Distortion,Noise.
3. Data Rate Limits-Nyquist Bit Rate, Shannon Capacity.
4. Performance-Bandwidth, Throughput,Latency,Jitter. 05

3 Digital & AnalogTransmission:

1. Digital-To-Digital Conversion- Line coding (Unipolar, Polar, Bipolar), Block coding, scrambling.
2. Analog-to-Digital conversion – Pulse code modulation, deltamodulation.
3. Transmission Modes- Parallel andSerial; 08

4. Digital-to-Analog conversion – ASK, FSK,PSK;
5. Analog-to-Analog conversion – AM, FM, PM.

SECTION – II

4 BandwidthUtilization:

1. Multiplexing-FDM,WDM,TDM;
2. Spread Spectrum – Frequency Hopping Spread Spectrum (FHSS), Direct Sequence SpreadSpectrum(DSSS);
3. Switching – Circuit switched, Packet switched,Messageswitched. 06

5 **NetworkModels:**

1. Layeredarchitecture,
2. The OSI model- Layers in the OSIModel,
3. TCP/IP protocol suite,
4. Network Addressing – Physical, Logical, and Port. 05

6 **Network Hardware Components:**

1. Transmission Media-Guided (Twisted pair, Coaxial, OFC) and Unguided (Propagation Modes, Radio Waves, Microwave, Infrared)
2. Connecting Devices – NIC, Repeaters, Hub, Switches, Bridges, Routers, Gateways. 07

TEXT BOOKS :

1. Data Communications and Networking – Behrouz A. Forouzan ,4th Edition, TMGH.

REFERENCE BOOKS :

1. Data and Computer Communications –Williams Stallings ,5thEdition,PHI.
2. Computer Networks – A. S. Tenebaum.,3rdEdition,PHI.
3. TCP/IP Protocol Suite Networking – Behrouz A. Forouzan ,4thEdition,TMGH.

S. Y. B.Tech (INFORMATION TECHNOLOGY) Sem –III

PCC-IT304 – FUNDAMENTALS OF ECONOMICS ANDMANAGEMENT

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory : 3 Hrs/Week	**Term work:**
	Tutorial :	**Theory** : 100marks
	Practical:	**Practical :**
	Credits:- 3	

Prerequisite: --

Course Objectives:
To provide knowledge of following,
1. The fundamentals of economics and itsapplication
2. The basics of costconcepts
3. The importance ofmarket
4. The principles ofmanagement
5. The basic financialconcepts

Course Outcomes:
Upon successful completion of this course, the student will be able to –
1. Explain basic economics concepts
2. Describe different management related activities for businessenhancement
3. Explain basic costing and marketing policies

Unit 1.Introductionto Economics (8)
Definitions, Scope of Economics (Macro, Micro, International Industrial, Environmental, Public Finance, Managerial economics etc.) Managerial Economics meaning definition and decision making process. Basic terms in Economics: Economic Resources, firm - type of firms, goods, services, utility, value & wealth.

Unit 2 Demand andSupplyAnalysis (6)
Meaning of Demand - types, determinants, demand function, law of Demand, and elasticity of demand supply - determinants, supply function and elasticity of supply.

Unit 3 BasicCostConcepts (6)
Production function, Law of variable proportions, Returns to scale, production optimization and uses of production function. Cost Concepts -Types - Short run and long run costs -(total, fixed, variable, marginal Average and opportunity cost)

Unit 4.Markets (4)
Meaning of market – Types of Market-Perfect competition, Monopoly, oligopoly and monopolistic competition

Unit 5. Principlesofmanagement (8)
Nature and importance of management, levels of management, fundamental managerial skills,

functions of management, Henry Fayol's principles of management, motivation theory: X and Y

Unit 6. BasicFinancialconcepts (8)

Basic concept of :- Business, Capital, Assets, Liabilities, interest, Profit & Loss, Balance Sheet and related concept Profit & Loss Statement and related concepts.

Text Books:

1. Managerial Economics by Geetika, Payalii Ghosh, Puraba Roy Choudhury Publisher The Tata McGraw-Hill companies, New Delhi 2008 (units 1 to4)
2. Essential of management by Harold koonez and Heinz, Weihrich- Tata McGraw Hill for Principles of management(unit-5)
3. "Basic Financial Accounting For Management" by Paresh Shah Publisher- Oxford University Press New Delhi-2007 (unit-6)

Reference Books:

1. Fundamentals of Engineering Economics by Pravin Kumar , Wiley India Ltd.

S. Y. B.Tech (INFORMATION TECHNOLOGY) Sem – III

PCC-IT305 – DISCRETE MATHEMATICAL STRUCTURE

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory: 3 Hrs/Week	**Term work:** 25 marks
	Tutorial: 1 Hrs/Wek	**Theory:** 100 marks
	Practical: --	**Practical :--**
	Credits:- 4	

Prerequisite: Knowledge of basic mathematical concept

Course Objectives:

1. To develop mathematical logic and itsapplications.
2. To provide knowledge on sets, relations andfunctions.
3. To provide knowledge on algebraic systems and itsapplications
4. To provide knowledge on graph theory and its applications

Course Outcomes:

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

1. Understand mathematical logic, truth tables and itsapplications.
2. Discuss the basic principles of sets and operations insets.
3. Demonstrate an understanding of relations and functions and be able to determine theirproperties
4. Determine basic terminologies of groups, graphs and itsapplications.
5. Implement the knowledge of logical reasoning to solve variety ofproblems
6. Acquire ability to describe computer programs in a formal mathematical manner and become efficient to face GATE and other competitiveexams.

SECTION – I

1 MathematicalLogic: **06**

Statement and Notation, logical connectives, truth tables, tautologies, principle of duality, well formed formulas, logical equivalences, Inference of Theory for statement Calculus.

2 Sets: **06**

Set, Different of types of sets, Operations on sets, Venn Diagrams, Ordered Pairs, Cartesian product of two sets, Principle of Inclusion and exclusion.

3 Relations: **06**

Definition, types of relation, composition of relations, domain and range of a relation, Equivalence Relations and partitioning, Partial ordering relations, Hasse Diagrams, Introduction to Lattices.

SECTION – II

4	**Function:** Definition and types of function, composition of functions, recursively defined functions.	**06**
5	**Groups:** Algebraic Systems, Semi Groups, Groups, Monoid, Abelian Groups, subgroups, Isomorphism and Automorphisms, Homomorphism and Normal Subgroups.	**06**
6	**GraphTheory:** Basic Terminology, Multi graph and weighted graphs, Diagraphs and relations, Representation of graphs, Paths and circuits, Eulerian and Hamiltonian Paths and Circuits, Graph Coloring.	**06**

1. Itshould consist of minimum 06-08 assignments based on above subjects and GATE Papers.

TEXTBOOKS:

1. Discrete Mathematical Structures with Application to Computer Science - J. P. Tremblay & R. Manohar ,MGH International Edition.
2. Elementsof Discrete Mathematics- C. L. Liu and D. P. Mohapatra,,4Edition McGraw-Hill.

REFERENCEBOOKS:

1. Discrete Mathematics – SemyourLipschutz, Marc Lipson (MGH), Schaum' Outline Series.
2. Discrete mathematics and its applications - Kenneth H. Rosen (AT&T Bell Labs).
3. Discrete Mathematics With Proof, 2nd Ed, ERIC GOSSETT,Wiley India Ltd.

S. Y. B.Tech (INFORMATION TECHNOLOGY) Sem – III

PCC-IT306 – PROBLEM SOLVING USING C

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory : 3 Hrs/Week	**Term work:** 50 marks
	Tutorial :	**Theory :**
	Practical: 2 Hrs/Week	**Practical :** 50marks
	Credits:- 5	

Prerequisite: Basic knowledge of Electronics and Computers

Course Objectives:
1. To understand C programmingenvironment
2. To develop problem solving skills amongst thestudents.
3. To write, compile and debug programs in Clanguage.
4. Implement C programs for various problemstatements.

Course Outcomes:
Upon successful completion of this course, the student will be able to–
1. Illustrate flowchart and algorithm to the givenproblem
2. Understand basic Structure of the C-PROGRAMMING, declaration and usage ofvariables
3. Write C programs usingoperators
4. Exercise conditional and iterative statements to Write Cprograms
5. Write C programs using Pointers to access arrays, strings andfunctions.

SECTION – I

1	**Unit 1. Introduction to Programming and Problem Solving** The meaning of algorithms, Flowcharts, Pseudo codes, Writing algorithms and drawing flowcharts for simple exercises, Memory concepts, C Program development environment, Types of problems, problems solving with computers, difficulties with problem solving, Problem Solving Aspects, Problem Solving Concepts for computer, Programming Concepts – communicating with computers, organizing the problem, using the tools, Top downdesign	6
2	**Unit 2. Introduction to 'C' Language** Importance of 'C' Language, Sample 'C' Program, Structure of 'C' Program, Constants, variables and data types. Operators and expressions, Managing input / output operations, Control statements.	6
3	**Unit 3. Functions:** Need for user defined functions, elements of User defined functions, defining functions, return values and their types, function calls, function declaration, methods of parameter passing, user defined and library functions.	6

SECTION – II

4	**Unit 4. Arrays and Strings** The meaning of an array, one dimensional and two dimensional arrays, declaration and initialization of arrays, reading , writing and manipulation of above types of arrays, multidimensional arrays. Declaring and initialing string variables, reading string from terminal, writing string to screen, arithmetic operations on characters, putting strings together, comparison of two strings, string handling functions	8
5	**Unit 5. Structures and Pointers** Defining a structure, declaring structure variables, accessing structure members, structure initialization, copying and comparing structure variables, operations on individual members, array of structures, structures and functions, Unions. Understanding pointers, accessing the address space of a variable, declaring and initialization pointer variables, accessing a variable through its pointer, pointer expressions, pointers and arrays, pointer and characterstrings	8
6	**Unit 5. Structures and Pointers** Defining a structure, declaring structure variables, accessing structure members, structure initialization, copying and comparing structure variables, operations on individual members, array of structures, structures and functions, Unions. Understanding pointers, accessing the address space of a variable, declaring and initialization pointer variables, accessing a variable through its pointer, pointer expressions, pointers and arrays, pointer and characterstrings	6

Text Books :

1. Programming And Problem Solving Using C Language, ISRD Group, McGraw-HillPublications
2. How to Solve it by Computer, R G Dromey ISBN978-81-317-0562-9,Pearson.
3. C How to Program, Harvey M. Deitel , Paul J. Deitel, AbbeyDeitel,Pearson Publication.

Reference Books:

1. The 'C' Programming Language, By B.W. Kernigghan and D. M.Ritchie,Pearson Education.
2. C Programming Laboratory : Handbook for Beginners by Sidnal, Wiley IndiaLimited.
3. http://www.spoken-tutorial.org/NMEICT Project of Govt. OfIndia.

Term Work:

It should consist of minimum of 15-18 experiments based on the following topics:

1. Simple Programs using basic datatypes, scanf, printf, formatspecifiers
2. Programs using conditional control statements if-else, Switch-case
3. Programs using looping constructs while, do-while,for

4. Programs on Finding biggest of threenumbers
5. Programs to find roots of given quadraticequation
6. Programs to find the biggest and smallest of given set ofnumbers
7. Programs Exchanging values of two variables
8. Programs Counting, summation of set ofnumbers
9. Programs factorialcomputation
10. Programs sine functioncomputation
11. Programs Fibonacciseries
12. Programs reverse ofdigit
13. Programs BCD conversion
14. Programs Char to numberconversion
15. Programs Factoring methods - Square root of number, smallest divisor, GCD of twonumber
16. Programs prime number, prime factors ofinteger
17. Programs pseudo random number generation, raising the number to a largepower
18. Programs Matrix operations (addition, multiplication, transposeetc.)
19. Programs String operations and manipulation (finding length, reverse, change caseetc.)
20. Programs Demonstrate structures

S. Y. B.Tech (INFORMATION TECHNOLOGY) Sem – III

PCC-IT307 – SOFT SKILLS

	TEACHING SCHEME	EXAMINATION SCHEME
	Lecture : --	**Term work: 25**
	Tutorial :--	**Theory :--**
	Practical: 1 Hrs/Week	**Practical :50**
	Credits:- 1	

Prerequisite: English Communication

Course Objectives:

1. Introduce students to professional verbal and writtencommunication
2. Introduce students to team work and selfenhancement.

Course Outcomes:

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

1. Enhance the communications skills of thestudents.
2. Expose the students to basic skills of teamwork
3. Inculcate the writing skills necessary for businesscommunications.

Unit 1.	**Communication Skills Verbal Communication** Effective Communication - Active listening – Articulation Paraphrasing – Feedback Non Verbal Communication - Body Language of self and others Importance of feelings in communication - dealing with feelings in communication Inter and Intrapersonal communication- Self-esteem and confidence - Assertiveness
Unit 2.	**Importance of Team work Self Enhancement** Importance of developing assertive skills- developing self-confidence – developing emotional intelligence. Importance of Team work – Team vs. Group - Attributes of a successful team – Barriers involved Working with Groups – Dealing with People- Group Decision Making Effective teams – Elements of Team work - Stages in teamformation
Unit 3.	**Writing** Introduction to writing, Hallmark of good writing, Writing conventions, business writing, writing a notice, writing styles, e-mail writing, report writing, practice.

Books:

1. Developing Communication Skills by Krishna Mohan and Meera Banerji; MacMillanIndia Ltd.,Delhi
2. Essentials of Effective Communication, Ludlow and Panthon; Prentice Hall ofIndia.
3. Seven Spiritual Laws of Success - Deepak Chopra.
4. Good To Great - JimCollins.

S. Y. B.Tech (INFORMATION TECHNOLOGY) Sem – IV

PCC-IT401 – COMPUTER NETWORK

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory: 3 Hrs/Week	**Term work:** 25 marks
	Tutorial: --	**Theory:** 100 marks
	Practical: 1 Hrs/Week	**Practical :** 50marks
	Credits:- 4	

Prerequisite: Data Communication

Course Objectives:

To provide knowledge about local area networks, types of computer networks.

2. To understand computer network protocols and wirelessprotocols.
3. To understand functionalities of different layers
4. To provide knowledge about internet layerprotocol.
5. To provide knowledge about routing protocol and functionality of applicationlayer

Course Outcomes:

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

1. Explain functions of data linklayer
2. Describe network layer of OSImodel
3. Explain transport layer with itsfunctionality
4. Explain application layer of OSImodel.

SECTION – I

1	**Introduction Data Link Layer:** Introduction; Goal of Data Link Layer: Design issues of Data Link Layer; Services provided to the Network layer, Framing, Error control, Flow control, Error Detection and correction	**06**
2	**Data Link Layer:** Elementary data link protocols- Simplex, Stop & Wait, and Simplex for noisy channel. Sliding window protocols – 1-bit, go back n, selective repeat, Channel allocation- static, dynamic	**06**
3	**Data Link Layer protocols:** Network Layer Design Issues, Routing Algorithms: Shortest Path, Flooding, Distance Vector and Link State	**05**

SECTION – II

4	**Network Layer** IPv4 Addresses: Introduction, Classful and Classless Addressing, Special	**06**

	Addresses, Network, transaction from IPv4 to IPv6, IPv6 Addresses, packet format, ICMPv6	
5	**Transport Layer** The Transport service primitives, UDP: Process to Process communication, User Datagram Format, Operation and uses of UDP,TCP: TCP Services and Features, TCP segment format, TCP Connections, Flow and error control in TCP, Berkeley Sockets: Socket Addresses, Elementary Socket system calls byte ordering	**07**

6	**Routing Protocols and Application Layer:** Application Layer : DNS, Electronic Mail, Telnet, FTP, HTTP.	**06**

TERM WORK:

1. It should consist of minimum 06-08 assignments based on abovesubjects.

TEXT BOOKS:

1. Computer Networks , A. S. Tenebaum.,3rdEdition,PHI.
2. TCP/IP protocol suite , B A Forouzan,TMGH.
3. Computer Networks: Principles ,Technologies and Protocols for Network Design by olifer, WileyIndia Ltd.

REFERENCE BOOKS:

1. Unix Network Programming , W Richard Stevens,PHI

S. Y. B.Tech (INFORMATION TECHNOLOGY) Sem – III

PCC-IT402 – COMPUTER ORGANIZATION AND ARCHITECTURE

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory : 3 Hrs/Week	**Term work:** --
	Tutorial : --	**Theory :** 100marks
	Practical: --	**Practical :--**
	Credits:-3	

Prerequisite: Concepts of digital system and Microprocessors

Course Objectives:

- To introduce student the different component of CPU and theirinteractions.
- To design digital circuit for arithmeticoperation.
- To explain CPU design and memoryorganization

Course Outcomes:

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

- To understand the structure, function and characteristics of components ofcomputer.
- To examine the design at gate, register and processorlevel.
- To understand various processor architectures and datarepresentation.
- To apply algorithm to perform operation like multiplication anddivision.
- To illustrate control unit.
- To study memoryorganization.

- **SECTION –I**

1 Unit 1.Computing andComputers: **5**

Elements of computers: The brain versus the computer, Limitations of computers: unsolvable problems, speed limitations, The Evolution of computers: IAS Computers, IBM/360 computers, A typical personal computer system

2 Unit 2.DesignMethodology **7**

System Design: System Representation, Design Process: **The Gate level:** Combinational logic: Full Adder, Four bit ripple carry adder, Sequential logic: serial adder, 4- bit stream serial adder, **The Register level**: Register level components- Word Gates, Multiplexers to implement a full adder, Arithmetic Elements: Design of 4-bit magnitude comparator ,**Processor level design:** prototype structure, performance measurement

3 Unit 3. ProcessorBasics: **6**

CPU Organization: Fundamentals, design and architecture of a small accumulator based CPU, A typical CPU with general register organization, pipelining, RISC &CISC Machines

Data representation: Fixed- Point Numbers, Floating Point Number, Instruction Set: Instruction Formats, Addressing Modes, Instruction Types.

SECTION – II

4	**Unit 4. Datapath Design** Addition-subtraction-High speed adders A 4-bit carry-lookahead adder, Design of a complete twos-complement adder-subtractor, Multiplication: twos-complement multiplier, Booths multiplication algorithm, Division: Non-restoring division algorithm for unsigned integers.	**7**
5	.**Unit 5. Control Design** Hardwired Control-Design of GCD processor, Design Examples: Multiplier Control, **CPU control unit:** Hardwired control unit for accumulator based CPU	**5**
6	**Memory Technology**: Memory device Characteristics, Random access memories, Serial-Access Memories, Multilevel memories- General characteristic, Memory allocation, **Caches:** Cache organization, Cache read and write operation.	**6**

Text books*:*

Computer Architecture & Organization, J. P. Hayes. McGraw-Hill.

Reference books:

a. Computer Organization- HamacherZaky.McGraw-Hill.

b. Computer Architecture & Organization An Integrated Approach , Miles Murdocca,Vincent Heuring Wiley IndiaEdition

c. Computer Architecture and organization: An integrated Approach by Murdacca,WileyIndia Limited.

d. NPTEL Video Lectureshttp://nptel.ac.in

S. Y. B.Tech (INFORMATION TECHNOLOGY) Sem – III

PCC-IT403 – DATA STRUCTURE

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory: 3 Hrs/Week	**Term work: --**
	Tutorial: --	**Theory:** 100 marks
	Practical: --	**Practical :--**
	Credits:- 3	

Prerequisite: Computer Programming

Course Objectives:

1. To learn basic concepts of Clanguage.
2. To become familiar with advanced data structures such as Stacks, Queues, Treesetc.
3. To analyze and solve problems using advanced data structures such as Lists, Linked Lists, Queues, Stacks, Trees, andGraphs.
4. To write programs on Linked Lists, Doubly Linked Lists, Treesetc.

Course Outcomes:

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

1. Define the basic terms of Linear Lists, Linked List, Doubly Linked List, Non Linear DataStructures (Binary Trees, AVL Trees, Graphs)
2. Choose the appropriate and optimal data structure for a specifiedApplication
3. Analyze Time Complexity and Memory Complexity of differentAlgorithms
4. Write programs and applications with Static and Dynamic datastructures

SECTION – I

Unit no.	Chapter Name	
1.	**Algorithm Basics and Recursion** Algorithms, Its Pseudo code Representation , Abstract Data type, Data Structures, Algorithm Efficiency, Recursion, Towers of Hanoi and Ackermann's function, etc.	05
2.	**Sequential Representation of Linear Data Structures** Stack, Operations on Stack, Applications of Stack, Queue, Operations on Queue, Applications of Queue, Circular queue, Priority Queues	06
3.	**Linked Lists** Limitations of static memory allocation, Dynamic memory allocation Definition, representation, implementation and operations on singly, doubly and circular linked lists, stack and queue implementation using linked list	07

SECTION – II

4.	**Nonlinear Data Structures : (TREES)** Basic terminology, representation, binary tree, traversal methods, binary search tree, AVL search tree, B tree, B+ tree ,Heaps and its operations	05
5.	**Non Linear Data Structures (Graphs)** Concepts and terminology of graph, Representation of graph using adjacency matrix, storage representation ,Graph traversal Techniques- Depth first and Breath first search	05
6.	**Searching and Sorting Techniques** Need of sorting and searching, Sequential Search, Binary Search, Analysis of Searching Techniques (Best, Average and worst case)., Hashing Techniques, Types of Hash Functions, Collision resolution techniques, open and closed hashing, Bubble sort, insertion sort, selection sort, heap sort, Merge sort, quick sort, Analysis of Sorting Techniques (Best, Average and worst case).	08

TEXT BOOKS :

1. Data Structure using C- A. M. Tanenbaum, Y. Langsam, M. J. Augenstein(PHI)
2. Data Structures- A Pseudo code Approach with C – Richard F. Gilberg and Behrouz A. Forouzon, Cengage Learning, SecondEdition.
3. Schaum's Outlines Data Structures – Seymour Lipschutz (MGH), TataMcGraw-Hill.

REFERENCE BOOKS :

1. Fundamentals of Data Structures – Horowitz, Sahni CBSIndia
2. An introduction to data structures with Applications- Jean-Paul Tremblay,Paul.G. Soresan, Tata Mc-Graw Hill International Editions, SecondEdition.

S. Y. B.Tech (INFORMATION TECHNOLOGY) Sem – III

PCC-IT404 – THEORY OF COMPUTATION

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory :3 Hrs/Week	**Term work: 25**
	Tutorial : 1 Hrs/Week	**Theory** 100
	Practical: --	**Practical :**
	Credits:- 4	

Prerequisite: Knowledge of discrete mathematical structures

Course Objectives:

1. To introduce fundamentals of computermathematics.
2. To strengthen the students' ability to carry out formal and higher studies in computerscience.
3. To explain Grammar, Languages and their relationships.
4. To develop Automata design ability as language descriptors andrecognizers

Course Outcomes:

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

1. To expose the students to the mathematical foundations and principles of computerscience.
2. To make the students understand the use of automata theory in Compliers & Systemprogramming.
3. To make the **s**tudent aware of mathematical tools, formal methods & automata techniques tocomputing.
4. Face the successfully to the GATE as well as competitive exams.
5. Understand the fundamental mathematical, logical, statistical and scientific principles underlying computing and informationprocessing.

SECTION – I

Unit No.1 : RegularLanguages: **(6)**

Recursive Definitions, Definition & types of grammars & languages, Regular expressions and corresponding regular languages, examples and applications, unions, intersection & complements of regular languages.

Unit No.2: FiniteState Machines: **(6)**

Deterministic finite automata (DFA) definition and representation, Nondeterministic finite automata (NFA), NFA with ^ transitions, Equivalence of DFAs, NFAs and NFA-^s, minimum state FA for a regular language, minimizing number of states in an FA.

Unit No.3: GrammarsandLanguages: **(6)**

Derivation and ambiguity, BNF& CNF notations, Union, Concatenation and *'s of CFLs, Eliminating production & unit productions from CFG, Eliminating useless variables from a context Free Grammar.

SECTION – II

Unit No.4: PushDownAutomata: **(6)**

Definition, The Language of PDA, Deterministic PDA and Non Deterministic PDA,Acceptance by Final state and empty stack, Equivalence of PDA's and CFG- CFG to PDA,PDA to CFG

Unit No.5: Parsing And Propertiesof CFL's: **(6)**

Parsing – Top-Down, Recursive Descent and Bottom-Up Parsing,
Pumping lemma for Context free language, intersection and complement of Context free language

Unit No.6: TuringMachines: **(6)**

Models of computation, definition of Turing Machine as Language acceptors, combining Turing Machines, Computing a function with a TM, Turing machines with doubly-infinite tapes, more than one tape, Non-deterministic TM and Universal TM.

1. TERM WORK:

1. It should consist of minimum 06 to 08 tutorials based on the topics of the syllabus andexercise problems mentioned in the textbooks.

2. TEXT BOOKS:

1. Introduction to languages & Theory of computations – John C. Martin(MGH)
2. Discrete Mathematical Structures with applications to Computer Science J.P.Trembley &R.Manohar(MGH)

3. REFERENCEBOOKS:

1. Introduction to Automata Theory, Languages and computation—John E. Hopcraft, Rajeev Motwani, Jeffrey D. Ullman (PearsonEdition).
2. Introduction to theory of Computations—Michael Sipser (ThomsonBooks/Cole)
3. Theory Of Computation- Vivek Kulkarni, 1st edition OXFORD universityPress

S. Y. B.Tech (INFORMATION TECHNOLOGY) Sem – III

PCC-IT405 – SOFTWARE ENGINEERING

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory : 3 Hrs/Week	**Term work: --**
	Tutorial : --	**Theory** : 100marks
	Practical: --	**Practical :--**
	Credits:- 3	

Prerequisite: Computer Programming

Course Objectives:

1. To expose the students to basic concepts & principles of softwareengineering.
2. To make the student aware of the importance of SDLC in their project developmentwork.
3. To expose the students to software testing techniques and software qualitymanagement.

Course Outcomes:

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

1. Describe basic concepts of softwareengineering
2. Explain phases of software development life cycle indetail
3. Explain software reliability and quality management.

1	**The software problems** 1.1 cost, schedule &Quality 1.2 Scale and change 1.3 Software Processes: Process & Project, Component SoftwareProcesses, Software Development process Modules, Project ManagementProcess.	**06**
2	**Requirement analysis and specification:** 2.1 Requirements gathering &Analysis 2.2 Software Requirements Specifications 2.3 Formal System DevelopmentTechniques	**05**
3	**Software planning and scheduling:** 3.1 Responsibilities of Software ProjectManager 3.2 ProjectPlanning 3.3 ProjectScheduling 3.4 ProjectStaffing 3.5 PeopleCMM 3.6 RiskManagement	**06**
4	**Design** 4.1 DesignConcepts 4.2 Function OrientedDesign 4.3 Object OrientedDesign 4.4 DetailDesign 4.5 Verification	**06**

	4.6 Metrics	
5	**Coding and testing** 5.1 Coding & CodeReview 5.2 Testing 5.3 UnitTesting 5.4 Black BoxTesting 5.5 White BoxTesting 5.6 Program AnalysisTools 5.7 IntegrationTesting 5.8 SystemTesting	**07**
6	**Software reliability and quality assurance** 6.1 Reliability 6.2 Software Quality 6.3 Software Quality Management System 6.4 ISO 9000 6.5 SEI capability MaturityModel 6.6 SixSigma 6.7 Agile software Development & Extreme Programming 6.8 Agile ProjectManagement	**06**

Text book:

1) Software Engineering : A precise Approach - Pankaj Jalote (Wiley India) (Unit 1,4).
2) Fundamentals of Software Engineering - Rapit Mall (3_{rd} Edition)(PHI) (Unit 2, 5,6).
3) Software Engineering by Jan Sommerville (9_{th} Edition) Pearson (Unit 6, 7 &6.8).
4) Software Engineering Principles & Practices by RohitKhuranaITLESL (2_{nd}Edition) Vikas Publishing House Pvt. Ltd. (Unit3).

References:-

1) Software Engineering - Concepts & Practices -- Ugrasen Suman (CenageLearning)
2) Software Engineering Fundamentals -- Behforooz& Hudson (Oxford : Indian Edition 1_{st})

S. Y. B.Tech (INFORMATION TECHNOLOGY) Sem – III

PCC-IT406 – OBJECT ORIENTED PROGRAMMING

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory : 2 Hrs/Week	**Term work:** 50 marks
	Tutorial : --	**Theory :--**
	Practical: 4 Hrs/Week	**Practical :** 50marks
	Credits:- 4	

Prerequisite: Problem solving using C

Course Objectives:

1. Limitations of Procedural programming and Benefits of Object OrientedProgramming
2. OOPs concepts like Class, Objects, Data hiding, Data Encapsulation, DataAbstraction, Inheritance and polymorphism and their implementation usingC++
3. File handing using object oriented concepts
4. Advanced features like Generic programming using Templates, STL and ExceptionHandling

Course Outcomes:

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

1. To understand the basic object orientedconcepts.
2. To understand variables, pointer in CPP.
3. To implement types of inheritance
4. To understand file handling.

SECTION – I

1	**Unit1.Introduction to Object Oriented Programming:** Introduction to procedural, object-oriented programming, Limitations of procedural programming, Need of object-oriented programming, fundamentals of object-oriented programming: objects, classes, data members, methods, messages, data encapsulation, data abstraction and information hiding, inheritance,polymorphism.	5
2	**Unit 2.Basics of C++ programming:** Variable declarations, global scope, const variables, reference variables, function prototypes, functions with default arguments, call by value, call by reference, returning by reference, call by pointer, inline functions, constant arguments, 'cin', 'cout', formatting and I/O manipulators, Classes and Objects defining Class, data members, member functions, Access specifiers – public, private, protected, constructor, destructor, array of objects, passing objects to functions, returning object.	7
3	**Unit 3. Inheritance:** Need of Inheritance, Concept, public, private, protected inheritance, Single inheritance, Multiple and multilevel inheritance, Hybrid Inheritance, Virtual base class, overriding of member functions, static variable, static function, friend function, friend class.	6

SECTION – II

4	**Unit 4. Polymorphism:** Pointers basics of memory management, New and delete operators, Pointer to object, Pointer to data members, this pointer. Need of Polymorphism, concept, Compile time polymorphism or early binding: function over loading and operator overloading, operator overloading using member function and friend function, overloading - unary, binary, arithmetic operators, relational operators, Overloading new and delete operators, insertion and extraction operators, Run time polymorphism or late binding using Virtual function, pure virtual function, Abstract class, Type conversion	7
5	.**Unit 5. Files and Streams:** Concept of Streams, concept of File, opening and closing a file, detecting end-of-file, file modes, file pointer, reading and writing characters, strings and objects to the file, operations to move file pointers i.eseekg, seekp, tellg, tellp.	5
6	**Unit 6. Advanced C++ features:** Introduction to Generic Programming using Templates: Function template and class template, Introduction to Standard Template Library (STL), containers, iterators and algorithms, study of container template classes for vectors and stacks and related algorithms Exception handling: Introduction, syntax for exception handling code: try-catch-throw, Multiple Exceptions, Exceptions with arguments.	6

TERM WORK :

It should comprise detailed documentation on the below 10-12 experiments. Students in batches should implement programs based on the following topics preferably on Linux platform.

INTRUCTIONS FOR PRACTICAL EXAMINATIONS :

1 Implementation of Inline functions, functions with default arguments, referenceparameters
2 Implementation of Class Objects, Constructor, destructor, constructoroverloading
3 Implementation of Functions overloading
4 Implementation of Operatoroverloading
5 Implementation of Multiple and multilevel inheritance using virtual baseclass
6 Implementation of Virtualfunction
7 Implementation of Static variable, Staticfunctions
8 Demonstration of Pointers- new, delete operators
9 Implementation of Friend function, friend class
10 Implementation of class and functionTemplates

11 Implementation of ExceptionHandling
12 Implementation of File Handling using OOPconcepts
13 Demonstration of STL inC++

TEXT BOOKS :

1. C++: The Complete ReferenceFourth Edition -Herbert Schildt(McGraw-Hill)
2. C++ programming: From Problem Analysis to Program Design Fifth Edition -D.S. Malik(Cengage Learning)
3. C++ Programming with language –BjarneStroustrup (AT &T)

REFERENCE BOOKS:

1. Object Oriented Programming with C++ Fourth Edition-E Balguruswamy(McGraw-Hill)
2. Object oriented Programming in C++ 3rd Edition-R.Lafore (GalgotiaPublications)
3. C++ programming –John Thomas Berry(PHI)
4. Object –Oriented Analysis & Design: Understanding System Development with UML 2.0 ,Docherty, Wiley IndiaLtd.
5. http://www.spoken-tutorial.org/NMEICT Project of Govt. Of India. Computer Architecture and organization: An integrated Approach by Murdacca,Wiley India Limited.

S. Y. B.Tech (INFORMATION TECHNOLOGY) Sem – III

PCC-IT407 – MINI PROJECT

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory : --	**Term work: 50** marks
	Tutorial : --	**Theory :--**
	Practical: 2 Hrs/Week	**Practical :** 50marks
	Credits:- 1	

Prerequisite: Basic Knowledge of C & C++

Course Objectives:

1. To expose the students to use the engineering approach to solve thereal time problems.
2. To learn the skills of team building & teamwork.
3. To develop the logical skills and use of appropriate data structures for solving the engineering problems andpuzzles.
4. Structure for Solving the Engineering Problems &Puzzles.

Course Outcomes:

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

1. Solve the real time Problems with Logicalskills.
2. Simplify the problem structure with good team Management
3. Learn the skills of team building to achieve the finaloutput.
4. Develop the logical skill with appropriate datastructure.

Platforms:	Free and Open source software's.
Description:	Guidelines For Mini Project
	The mini project should be undertaken preferably by a group of 3-4 students who will jointly work and implement the project. The mini project must be based upon the problem statements as that of programming contest **(Advanced Computing Machines – Inter-Collegiate Programming Contest: ACM-ICPC).** The problems can be referred from the web links concerned with ACM-ICPC. The group will select a problem with the approval of the guide and prepare the solution guidelines for its implementation. The same should be put in the form of synopsis (3 to 5 pages), stating the usage of logic, algorithms and suitable data structures necessary for implementation of the solution. Further the group is expected to complete analysis of problem by examining the possible different inputs to the system and the corresponding outputs. The term work submission is to be done in the form of a report containing the details of the problem, solution techniques, implementation details, input-output scenarios and the conclusion. The project must be implemented in C/C++. Graphics is optional for GUI.

	Term Work Assessment: The term work assessment will be done jointly twice in a semester by a panel of teachers appointed by the department. The term marks distribution should be as following 1) Mid Term assessment - 5 marks. 2) End term assessment - 5 marks. 3) Final Performance evaluation is to be done by guide - 15marks **External Oral Exam:** The external oral examination will be conducted by the examiners appointed by the University

S. Y. B.Tech (INFORMATION TECHNOLOGY) Sem – III

PCC-IT408 – ENVIRONMENTAL STUDIES

	TEACHING SCHEME	EXAMINATION SCHEME
	Theory : 2 credits	**Term work:**
	Tutorial :	**Theory** 100
	Practical: 1 credit	**Practical :**

SHIVAJI UNIVERSITY,

KOLHAPUR

REVISED SYLLABUS AND STRUCTURE THIRD

YEAR (C.B.C.S.) BACHELOR OF TECHNOLOGY IN

Information Technology

To be introduced from the academic year 2020-21

(w. e. f. June 2020) onwards

	THIRD YEAR INFORMATION TECHNOLOGY - CBCS PATTERN																
	SEMESTER - V																
		TEACHING SCHEME							EXAMINATION SCHEME								
Sr. No.	Course Subject / Title	THEORY			TUTORIAL		PRACTICAL		THEORY				ORAL / PRACTICAL		TERMWORK		
		Credits	N0. Of Lectures	Hours	Credits	No. of Hours	Credits	No. of Hours	mode	marks	Total Marks	MIN.	MAX	MIN.	MAX	MIN.	
1	**PCC-IT501** Operating System-I	3	3	3			1	2	CIE ESE	30 70	100	40			50	20	
2	**PCC- IT502** Database Engineering	3	3	3			1	2	CIE ESE	30 70	100	40	25	10	50	20	
3	**PCC- IT503** Computer Algorithms	3	3	3					CIE ESE	30 70	100	40					
4	**PCC- IT504** System Programming	4	4	4	1	1			CIE ESE	30 70	100	40			25	10	
5	**OEC- IT505** Human Computer Interaction **OEC- IT506** Internet of Things	3	3	3					CIE ESE	30 70	100	40					
6	**PCC- IT507** Application Development Tool I	3	3	3			2	4					50	20	50	20	
7	**HM-IT508** Soft Skill				1	1							25	10	25	10	
	Total (SEM –V)	***19***	***19***	***19***	***2***	***2***	***4***	***8***			***500***		***100***		***200***		

	THIRD YEAR INFORMATION TECHNOLOGY - CBCS PATTERN																
	SEMESTER – VI																
		TEACHING SCHEME							EXAMINATION SCHEME								
Sr. No.	Course Subject / Title	THEORY			TUTORIAL		PRACTICAL		THEORY				ORAL / PRACTICAL		TERMWORK		
		Credits	N0. Of Lectures	No. of Hours	Credits	No. of Hours	Credits	No. of Hours	mode	marks	Total Marks	MIN.	MAX	MIN.	MAX	MIN.	
1	**PCC-IT601** Computer Graphics	3	3	3			1	2	CIE ESE	30 70	100	40			25	10	
2	**PCC- IT602** Information Security	4	4	4			1	2	CIE ESE	30 70	100	40			25	10	
3	**PCC- IT603** Internet Technology	4	4	4			1	2	CIE ESE	30 70	100	40	50	20	25	10	
4	**PCC- IT604** Operating System II	3	3	3	1	1			CIE ESE	30 70	100	40			25	10	
5	**OEC- IT605** Cyber Security **OEC- IT606** E- Commerce & Digital Marketing	3	3	3					CIE ESE	30 70	100	40					
6	**PCC- CS607** Application Development Tool II	2	2	2			1	2					50	20	25	10	
7	**PW- IT608** Seminar						1	2					50	20	25	10	
	Total (SEM –VI)	***19***	***19***	***19***	***1***	***1***	***5***	***10***			***500***		***150***		***150***		
	Total (SEM - V+ SEM - VI)	**38**	**38**	**38**	**3**	**4**	**9**	**18**			**1000**		**250**		**350**		

CIE- Continuous Internal Evaluation

ESE – End Semester Examination

• Candidate contact hours per week : 30 Hours (Minimum)	• Total Marks for T.Y. Sem V & VI : 8**00 + 800 =1600**
• Theory and Practical Lectures : 60 Minutes Each	• Total Credits for T.Y. Sem V & VI : **50 (SEM-V: 25 + SEM -VI: 25)**
• In theory examination there will be a passing based on separate head of passing for examination of CIE and ESE.	
• There shall be separate passing for theory and practical (term work) courses.	

Note:

1. **PCC-IT:** Professional Core Course - Information Technology are compulsory.
2. **HM-IT:** Humanities and Management- Information Technology are compulsory.
3. **PW-CS:** Seminar - Information Technology are compulsory.
4. **OEC-IT: Open Elective Course** – To be offered to Inter departmental students. # - 60% of the students from other branches to be chosen on merit.
   - 40% of the students may be from same branch based on merit.
   - Number of students to be allowed should be 72(Max.) for the branch with intake of 60 students.
   - The above ratio should be followed in proportionate to the sanctioned intake.

OPEN ELECTIVE COURSE-I

Sr. No.	Name of the Subject	Name of the concern Branch
1	i) Human Computer Interaction ii) Internet of Things	Information Technology

OPEN ELECTIVE COURSE-II

Sr. No.	Name of the Subject	Name of the concern Branch
1	iii) Cyber Security iv)E-Commerce & Digital Marketing	Information Technology

T. Y. B. TECH (INFORMATION TECHNOLOGY) SEM – V
PCC-IT501 – OPERATING SYSTEM-I

TEACHING SCHEME	EXAMINATION SCHEME
Theory: 3 Hrs/Week	Term work: -50 Marks
Tutorial: --	Theory : ESE 70 Marks CIE 30 Marks
Practical: -2 Hrs/Week	Practical :--
Credits:- 4	

Prerequisite:-

1) Basic knowledge of digital systems and microprocessors, memory, interrupts is essential.

Course Objectives:

1) To introduce Operating systems, types and its use.
2) To introduce process, threads and their management.
3) To introduce process and Thread scheduling, inter-process synchronization and communication
4) To introduce memory management
5) To introduce input output devices & their management

Course Outcomes:

At the end of successful completion of course, the students will be able to

1. Write and describe the general architecture of computers
2. Describe, contrast and compare differing structures for operating systems.
3. Construct the operating system for certain hardware modules.
4. Use operating system concepts efficiently at various stages of the software development process.
5. Understand and analyze theory and implementation of processes, resource control (concurrency etc.), physical and virtual memory, scheduling, I/O and files.
6. Design, implement and enhance various modules of the operating system to reduce time complexity and space complexity.
7. Compare and construct the various standard solutions to operating system problems

SECTION: I

UNIT I: Introduction to Operating Systems (8)

Introduction to Operating Systems, System structures: What operating systems do; Computer System organization; Computer System architecture; Operating System structure; Operating System operations; Types of Operating Systems, Distributed system; Special-purpose systems; Operating System Services; User - Operating System interface; System calls; Types of system calls; System programs; Operating System structure; Virtual machines; System boot.

UNIT II: Process Management (8)
Process concept; Process scheduling; Operations on processes; Inter-process communication. Multi-Threaded Programming: Overview; Multithreading models; Thread Libraries; Threading issues. Process Scheduling: Basic concepts; Scheduling criteria; Scheduling algorithms; Multiple-Processor scheduling; Thread scheduling.

UNIT III: Process Synchronization (7)
Synchronization: The Critical section problem; Peterson's solution; Synchronization hardware; Semaphores; Classical problems of synchronization; Monitors.

SECTION: II

UNIT IV: Deadlocks (6)
System model; Deadlock characterization; Methods for handling deadlocks; Deadlock prevention; Deadlock avoidance; Deadlock detection and recovery from deadlock.

UNIT V: Memory Management (7)
Memory Management Strategies: Background; Swapping; Contiguous memory allocation; Paging; Structure of page table; Segmentation. Virtual Memory Management: Background; Demand paging; Copy-on-write; Page replacement; Allocation of frames; Thrashing

UNIT VI: IO Systems (4)
Overview, I/O Hardware, Application I/O Interface, Kernel IO Subsystem, Transforming I/O Request to Hardware Operations, Streams.

Text Books :

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne: Operating System Principles, 8th edition, Wiley India, 2009

Reference Books:

1. Operating Systems –Concepts and design –Milan Milenkovic (TMGH)
(For Types of Operating Systems*-Refer Chapter 1 in Operating Systems –Concepts and design
–Milan Milenkovic (TMGH))
2. Operating Systems: Internals and Design Principles (8th Edition)- by William Stallings(Pearson Education International)
3. Modern Operating Systems by Andrew S. Tanenbaum (Pearson Education International)

Term Work:
It should consist of minimum 08-10 assignments/experiments based on above subjects.

T. Y. B. TECH (INFORMATION TECHNOLOGY) SEM – V
PCC-IT502 DATABASE ENGINEERING

TEACHING SCHEME	EXAMINATION SCHEME
Theory: 3 Hrs/Week	Term work: 25
Tutorial: --	Theory: CIE: 30 Marks ESE:70 Marks
Practical: 2 Hrs/Week	POE:50
Credits:- 4	

Prerequisites

1. Basic knowledge of data structures is essential

Course Objectives:

1. To understand the fundamental concepts of database management.
2. To give a systematic database design approach.
3. To understand the basics of transaction processing and concurrency control in database systems.

SECTION: I

UNIT I. Introduction: (6)

Purpose of Database Systems, View of Data, Data Models, Database Users and Administrators, Overall System Design, **Entity Relationship Model-** Basic Concepts, Constraints, Keys, E-R Diagram, Weak Entity Sets, Reducing E-R Diagrams to Tables.

UNIT II. Relational Model: (8)

Structure of Relational Databases, the Relational Algebra, Structured Query Language (SQL), PL/SQL- Stored Procedures, functions, trigger, cursor

UNIT III. Integrity Constraints and Design: (5)

Domain Constraints, Referential Integrity, Functional Dependencies, Closure of set of Functional Dependencies, Canonical cover, Normalization using Functional Dependencies (1NF, 2NF, BCNF, 3NF).

SECTION: II

UNIT IV. File and Index Structure: (7)

Physical storage media, Storage access, File Organization, Organization of Records in Files, Data Dictionary Storage, Indexing and Hashing: Basic Concepts, Ordered Indices, B+ Tree Index Files, B-Tree Index Files, Static Hashing, Dynamic Hashing,

UNIT V. Concurrency Control and Crash Recovery (8)

Transaction concept, Transaction state, Concurrent Executions, Serializability, Recoverability, Testing for Serializability, Lock-Based Protocols, Graph based Protocols, Time- Stamp Based Protocols, Validation based protocols, Failure Classification, Recovery and Atomicity, Log-Based Recovery, Checkpoints.

UNIT VI. Database Security and Authorization: (4)

Access Control, Discretionary Access Control, and Mandatory access control

Text Book:

1. Database System Concept by Henry F. Korth, Abraham Silberschatz, Sudarshan (McGraw Hill Inc.) **Fourth Edition onwards** (UNIT I to 5)
2. Database Management System – RamKrishnan, Gehrke (McGraw

Hill Inc.) Third Edition (UNIT VI)

Reference Books:

1. Principles of Database Systems by J.D. Ullman (Galgotia Publications)

2. Database Design by Wiederhold (McGraw Hill Inc.)

3. Fundamentals of Database Systems- Elmasri, Navathe (BengaminCummings, 1989).

Term Work:

It should consist of minimum 10 experiments based on above topics and should be implemented as per the note given below.

Set of Experiment is listed below:

1. Study and design of ER diagram
2. Reduction of ER diagrams.
3. Implementation of DDL commands. (Create table with all constraints, Alter table, Drop table).
4. Implementation of DML commands. (Basic SQL structure-select, from, where clause. Other DML clauses like insert, update, delete, in, between, etc.)
5. Implementation of Database joins- (Natural Join, outer joins.)
6. String, Set operations, Order by clause. Queries based on above commands.

7. Implementation of aggregate functions, Group by, has clauses.
8. Study of DCL commands (Grant, Revoke).
9. Creation and use of Views.
10. Introduction to PL/SQL- Stored Procedures, functions, trigger, cursor.
11. Study of Functional dependency, Closure & Canonical Cover. Implementation of closure of Functional dependencies and canonical cover.
12. Study of Normalization & Normal forms
13. Study of B+ index file (creation, traversal, deletion operations).
14. Implementation of static index structure.
15. Simulation of Deferred Log based recovery scheme.
16. Simulation of Immediate Log based recovery scheme.
17. Implementation of database connectivity using JDBC-ODBC

Note:

1. Experiments 1 and 2 and 11 to 12 are for demonstration and understanding of database designing and other concepts.
2. Experiments no. 3 to 10 should be implemented using RDBMS Package.
3. Experiments 14 to 17 are to be implemented using programming language and RDBMS (if required).

T. Y. B. TECH (INFORMATION TECHNOLOGY) SEM-V
PCC-IT503 – Computer Algorithms

TEACHING SCHEME	EXAMINATION SCHEME
Theory: 3 Hrs/Week	Term work: --
Tutorial: --	Theory: CIE: 30 Marks ESE:70 Marks
Practical: --	Practical :--
Credits:- 3	

Prerequisites: Data Structures, numerical problem solving methods.

Course Objectives:

1. Analyzing the amortized time complexity of a given algorithm and data structure operations.
2. To introduce to the students the methods of algorithm designs
3. To expose students to various searching and sorting techniques.
4. To familiarize with different design strategies and their analysis.
5. To develop skills to solve real life applications involving algorithm development

Course Outcomes:

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

1. Explain different design methods of algorithms.
2. Explain solvability, insolvability of a problem and computational models of parallel algorithms.
3. Apply different design methods of algorithms.
4. Apply different search techniques for efficient graph traversal.
5. Analyze complexity of different algorithm designs.

SECTION: I

UNIT I: Introduction to Algorithms (4)

What is algorithm, Algorithm Specification, Recurrence relations, Performance Analysis? Randomized Algorithms.

UNIT II: Divide and Conquer (6)

Divide and Conquer-The general method, Binary search, finding the maximum and minimum, Merge sort, Quick sort, Selection sort and analysis of these algorithms.

UNIT III: The Greedy method (6)

The general method, Knapsack problem, Job sequencing with deadlines, minimum-cost spanning trees – Prim's and Kruskal's Algorithms, Optimal storage on tapes, Optimal merge patterns, Single source shortest paths.

UNIT IV: Dynamic Programming (6)

The general method, Multistage graphs, All pair shortest paths, Optimal binary search trees, 0/1 knapsack, Reliability design, Traveling Sales person problem.

SECTION: II

UNIT V: Basic Traversal and Search Techniques (6)

Techniques for Binary Trees, Techniques for Graphs – Breadth First Search& Traversal, Depth First Search & Traversal, Connected components and Spanning Trees; Bi-connected components And depth first search.

UNIT VI: Backtracking (5)

The general method, 8-queen problem, sum of subsets, Knapsack Problem, Hamiltonian Cycle, Graph Coloring

NP Hard and NP Complete Problems (3)
Basic Concepts, Introduction to NP Hard Graph Problems.

TEXTBOOK:

1. Fundamentals of Computer Algorithms - Ellis Horowitz, Sartaj Sahani, Sanguthevar Rajasekaran, Universities Press, Second Edition.

References:

1. Introduction to Algorithms - Thomas Cormen, Charles Leiserson, Ronald Rivest, Clifford Stein, PHI, Third Edition
2. Essential Algorithms: A Practical Approach to Computer Algorithms, Rod Stephens, Wiley International.

T. Y. B. TECH (INFORMATION TECHNOLOGY) SEM – V
PCC-IT504 – System programming

TEACHING SCHEME	EXAMINATION SCHEME
Theory: 4 Hrs/Week	Term work: --25 Marks
Tutorial: -- 1 Hrs/Week	Theory: CIE: 30 Marks ESE:70 Marks
Credits:- 5	

Prerequisites: 1. Data structures
2. Assembly language programming
3. Microprocessors

Course Objectives:

1. Design & implement prototypes of language processors
2. Understand lexical, syntax and semantic analysis processes.
3. Understand and define the role of lexical analyzer, use of regular expression and transition diagrams

Course Outcomes:

At the end of successul completion of course, the students should be able to,

1. Identify various language processors.
2. Design & implement prototypes of language processors.
3. Apply language processors tool to create language processors.
4. Understand lexical, syntax and semantic analysis process.
5. Understand and define the role of lexical analyzer, use of regular expression and transition diagrams.
6. Gain experience in the area of designing and implementing software system like language processors (e.g. assembler, linker, loader etc.).
7. Identify the computing feasibility of problems.

SECTION –I

UNIT I: Language Processors: (8)
Introduction, language processing activities, Fundamentals of language processing, Fundamentals of language, Specification, language Processor development tools.

UNIT II: Assemblers: (8)
Elements of assembly language programming, A simple assembly scheme, Pass structure of assemblers, design of a two pass assembler, A single pass assembler for IBM PC.

UNIT III: Macros and Macro Processors: (8)
Macro definition and call, Macro Expansion, Nested macro calls, Advanced macro facilities, Design of macro pre-processor.

SECTION – II

UNIT IV: Compilers and Interpreters: (9)

Input & Lexical Analysis, Context free grammars, top-down parsing, bottom-up parsing, code generation, memory allocation, compilation of expressions, compilation of control structures, code optimization, Interpreters.

UNIT V: Linker and Loader: (8)
Relocation and linking concepts, design of a linker, Self-relocating programs, A linker for MS DOS, Linking for overlays, Loaders.

UNIT VI: Open Source Software: (7)
gcc, gdb, ddd, lex and yacc.

TEXTBOOK:

1. Systems Programming: D.M. Dhamdhere, McGraw Hill, 1st Edition

Reference Books:

1. Systems Programming & Operating systems: D.M Dhamdhere, 2nd Edition (TMH)
2. Systems Programming: J.J. Donavan – (TMH)
3. System Programming , Srimanta Pal , Oxford University Press.

Open Source Resources:

1. gcc.gnu.org
2. www.gnu.org/s/gdb/
3. www.gnu.org/software/ddd/

Tutorial work:

It consist minimum of 8-10 tutorials based on above topics.

T. Y. B. TECH (INFORMATION TECHNOLOGY) SEM – V
ELECTIVE I -OEC-IT505 1)Human Computer Interaction
Open Elective Course-I

TEACHING SCHEME	EXAMINATION SCHEME
Lectures:- 3Hrs/Week	**ESE:-** 70 Marks **CIE:-** 30 Marks
Tutorial:- --	**Term Work:-** --
Credit:- 3	**Practical/Oral:-** --

Pre-requisite:-

1. Knowledge of User Interfaces .
2. Knowledge of programming languages such as C, HTML.

Course Objectives:-

1. To introduce the need for human-computer-interaction study or human-centered software design.
2. To familiarize information, interaction and GUI design process for enhancing user-experience.
3. Develop meaningful user interface.
4. Design and implement useful, usable, and engaging graphical computer interfaces.
5. Design effective HCI for individuals and persons with disabilities.

Course Outcomes:-

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

1. To explain importance of HCI study and principles of user interface.
2. To develop understanding of human factors in HCI design.
3. To design effective user-interfaces.
4. To develop understanding of models, paradigms and context of interactions
5. To understand HCI design processes.
6. To apply cognitive models for predicting human-computer-interactions.

Syllabus:

Unit I : Introduction: (6)

Importance of user Interface - definition, importance of good design. Benefits of good design. A brief history of Screen design, The graphical user interface - popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user - Interface popularity, characteristics- Principles of user interface.

Unit II: Design process (6)

Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, and understanding business junctions.

Unit III: Screen Designing (6)

Design goals - Screen planning and purpose, organizing screen elements, ordering of screen data and content - screen navigation and flow - Visually pleasing composition - amount of information - focus and emphasis - presentation information simply and meaningfully - information retrieval on web - statistical graphics - Technological consideration in interface design.

Unit IV: Windows (6)

New and Navigation schemes selection of window, selection of devices based and screen based controls. Components - text and messages, Icons and increases - Multimedia, colors, uses problems, choosing colors.

Unit V: Software tools (6)

Specification methods, interface - Building Tools. Components - text and messages, Icons and increases - Multimedia, colors, uses problems, choosing colors.

Unit VI: Interaction Devices (6)

Keyboard and function keys - pointing devices - speech recognition digitization and generation - image and video displays -drivers.

TEXT BOOKS:

1. Wilbert O Galitz; The essential guide to user interface design; 2nd Edition; Wiley DreamTech, 2002.
2. Ben Shneidermann; Designing the user interface; 3rd Edition; Pearson Education, 2009.

REFERENCE BOOKS:

1. Alan Dix, et.al; Human - Computer Interaction; 3rd Edition; Pearson Education, 2003.
2. Prece, Rogers and Sharps; Interaction Design; 3rd Edition; Wiley Dreamtech, 2011.
3. Soren Lauesen; User Interface Design; Pearson Education, 2005.
4. D.R.Olsen; Human -Computer Interaction; 1st Edition; Cengage Learning, 2009.

T. Y. B. TECH (INFORMATION TECHNOLOGY) SEM – V
ELECTIVE II - OEC-IT506 2) Internet of Things
Open Elective Course-I

TEACHING SCHEME	EXAMINATION SCHEME
Theory: 3 Hrs/Week	Term work: -
Tutorial: -- 1 Hrs/Week	Theory: 100 Marks
Practical: -	Credits:- 3

Course Objectives:
1. To learn Internet of Things Technology
2. To know the basics of RFID, sensor and GPS technologies
3. To aware students about wireless technologies and IoT applications

Section - I

UNIT I. Introduction (6)
What is the Internet of Things? : History of IoT, About objects/things in the IoT, Overview and motivations, Examples of applications, IoT definitions, IoT Frame work, General observations, ITU-T views, working definitions, Basic nodal capabilities.

UNIT II. Fundamental IoT Mechanisms & Key Technologies : (6)
Identification of IoT objects and services, Structural aspects of the IoT, Environment characteristics, Traffic characteristics ,scalability, Interoperability, Security and Privacy, Open architecture, Key IoT Technologies ,Device Intelligence, Communication capabilities, Mobility support, Device Power, Sensor Technology, RFID technology, Satellite Technology.

UNIT III. Radio Frequency Identification Technology: (6)
Introduction, Principles of RFID, Components of an RFID system, Reader, RFID tags, RFID middleware, Issue.
Wireless Sensor Networks: History and context, node, connecting nodes, networking nodes, securing communication.

Section - II

UNIT IV. Wireless Technologies For IoT : Layer ½ Connectivity : (6)
WPAN Technologies for IoT/M2M, Zigbee /IEEE 802.15.4, Radio Frequency for consumer Electronics (RF4CE), Bluetooth and its low-energy profile , IEEE 802.15.6 WBANS, IEEE 802.15 WPAN TG4j,MBANS,NFC,dedicated short range communication(DSRC) & related protocols. Comparison of WPAN technologies cellular & mobile network technologies for IoT/M2M.

UNIT V. Governance of The Internet Of Things: (6)
Introduction, Notion of governance, aspects of governance, Aspects of governance Bodies subject to governing principles, private organizations, International regulation and supervisor, substantive principles for IoT governance, Legitimacy and inclusion of stakeholders, transparency, accountability. IoT infrastructure governance, robustness, availability, reliability, interoperability, access. Future governance issues, practical implications, legal implications.

UNIT VI. Internet Of Things Application Examples: (6)
Smart Metering, advanced metering infrastructure, e-Health/Body area network, City

automation, automotive applications. Home automation, smart cards, Tracking, Over-The-Air passive surveillance/Ring of steel, Control application examples.

Text Books :

1. Hakima Chaouchi, The Internet of Things, Connecting Objects to the Web, Wiley Publications (for Units 1, 3, 5, 6)
2. Daniel Minoli,"Building the Internet of Things with IPv6 and MIPv6 The Evolving World of M2M Communications", Wiley Publications (for Units 2,4)

Reference Books :

1. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3842-19156-5, Springer.
2. Olivier Hersent, David Boswarthick, Omar Elloumi, "The Internet of Things" Key Applications and Protocols, ISBN 978-1-119-99435-0, Wiley Publications.

T. Y. B. TECH (INFORMATION TECHNOLOGY) SEM – V
PCC-IT507-APPLICATION DEVELOPMENT TOOL – I

TEACHING SCHEME	EXAMINATION SCHEME
Theory: 3 Hrs/Week	Term work: 50 Marks
Tutorial: --	Practical :--50 Marks
Practical: 4 Hrs/Week	
Credits:- 5	

Prerequisites:

1) Knowledge of basic C programming, concepts of object orientation.

Course Objectives:

1. To understand differences between C++ and JAVA
2. To understand fundamental concepts like objects, classes, interfaces and polymorphism and its implementation in JAVA
3. To understand robust GUI applications using event handling and Swing with proper exception handling
4. To understand I/O concepts, database connectivity and collections framework in JAVA
5. To Identify classes, objects, members of a class and the relationships among them needed for a specific problem

Course Outcomes:

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

1. Understand the structure and model of the Java programming language.
2. Use the Java programming language for various programming technologies.
3. Develop software in the Java programming language.

SECTION: I

UNIT I: Introduction: **(8)**

Overview of Java, Java buzzwords, Difference between C++ & Java, Data Types, Arrays, Command line Arguments.

Classes: The Object class, Object Construction, Garbage Collection, Nested & Inner classes, String class, Wrapper classes, Class Design Hints.

Inheritance: Member Access, Super keyword, final keyword, Abstract Classes, Access Protection, Interfaces, Design Hints for Inheritance.

Packages: Defining a package, Searching packages and setting CLASSPATH.

UNIT II: Exceptions: **(8)**

Dealing with Errors, Catching Exceptions, Tips for Using Exceptions.

I/O: Streams, Text Input and Output, Reading and Writing Binary data, Multi-Threading: What are threads?, Interrupting threads, Thread states, Thread properties and synchronization.

UNIT III: Swing: **(7)**

Introducing AWT and Swing, Creating a Frame, Positioning a Frame, Displaying

Information in a Component, Introduction to Layout Management, Text Input, Choice Components, Menus, Dialog Boxes.
Event Handling: Basics of Event Handling, Mouse Events, the AWT Event Hierarchy.

SECTION: II

UNIT IV: Generic Programming: **(6)**
Why Generic Programming? Definition of a Simple Generic Class,
Generic Methods.
Collections: Collection Interfaces, Concrete Collections, the Collections Framework.

UNIT V: Database Programming: **(4)**
Design of JDBC, JDBC Configuration, and Executing SQL statements.

UNIT VI: Deploying Applications and Applets: **(3)**
JAR Files, Applets.

TEXT BOOK:

1. Core Java- Volume I Fundamentals: Cay Horstmann and Gary Cornell, Pearson, Eight edition
2. Core Java- Volume II Advanced Features: Cay Horstmann and Gary Cornell, Pearson, Eight edition (UNIT II and UNIT V)

Reference Books:

1. JAVA-The Complete Reference: Herbert Schildt, Oracle Press, Mcgraw Hill, Ninth edition
2. A Programmer's guide to JAVA SCJP Certification: Khaleed Mughal and Rolf W. Rasmussen, Addison Wesley, Third edition
3. An introduction to Programming through C++ Abhiram G. Ranade, McGrawHill
4. www.spokentutorial.org, NMEICT Project of MHRD Govt Of India & IIT Bombay.

Guidelines for term work distribution

The distribution of the term work marks is as follows:

1. 25 Marks for performance in practical and experiments
2. 25 Marks for mini-project to be developed in Java.

Guidelines for experiment list

The experiment list should consist of minimum 15 practical assignments on the above topics. Each experiment should be a problem statement which can be solved using some features of Java. Sample experiment list is given below:

1) Installation of JDK on Linux.
2) Write a program to implement vector class (Understanding basic structure of java programs.)
Write a program to implement matrix class (Understanding basic structure of java programs).
4) Write program to implement given inheritance hierarchy (Understanding of inheritance concept).

5) Write a program to create linked list through interface. (Understanding of Interface).
6) Create a Mymath package that will have following features.
a. Trigonometric functions : (sine, cosine, tangent, secant, cosecant and cotangent) that accepts input in degrees instead of radians.
b. Performs Statistical operations like min, max, count, sum and average (Understanding of package).
7) Write a program to create applet and perform the slideshow of images using Multithreading (Multi-threading).
8) Write a program to remove whitespaces from a text file. Name of the file is given using command line (Understanding of basic IO concepts, command line arguments and exception handling).
9) Write a program to merge and sort data from different files in a single file. (I/O concepts and exception handling).
10) Write a program to copy text from one text box to another on a button click. (Swing and event handling).
11) Write a program to create a GUI student registration form. (Swing controls and event handling).
12) Write a program to demonstrate key and mouse event handling (Event handling).
13) Write a program to demonstrate various methods of ArrayList class. (Collections).
14) Write a program to store and retrieve, delete and update Student's information in Database. (Implementation of database connectivity in java).
15) Study of frame works like stud, spring hibernates etc.

Guidelines for Mini-project

Three students (Maximum) in a group will carry out a mini project.
A batch of practical should be divided into mini project groups. The faculty should guide the project group for selection of the topic and the work to be done. (Topics preferably data structure algorithm simulation using graphics and thread and other concepts).The mini project should consist of defining the problem, analyzing, designing the solution and implementing it using Java (preferably IDE should be used). The faculty shall monitor the progress periodically. A presentation based on the above work is to be given by the group at the end of the semester. The work will be jointly assessed by a team of faculty from the department. A hard copy of project report, along with a softcopy of the programs is to be submitted to the department.

T. Y. B. TECH (INFORMATION TECHNOLOGY) SEM – V
HM-IT508 Soft Skills

TEACHING SCHEME	EXAMINATION SCHEME
Lecture:- --	Oral Exam : 25 Marks
Practical: --	Term work : 25 Marks
Tutorial: 1 hr/week	
Credit : 1	

Course Objectives:

1. To enable students to acquire and enhance communication and professional skills required for personality development, corporate business and entrepreneurship skills.
2. During the tutorial and practical sessions, it is expected that the contents of all modules should be delivered to the students of different batches and assignments be given based on the activities discussed as per the modules.
3. Evaluation of the term work should be done on a continuous basis and two tests (mid-term and end term tests) should be conducted.
4. Students must demonstrate the acquired skills by means of giving presentations, group discussions, interviews etc.

Course Outcomes:

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

1. Effectively communicate through verbal/oral communication and improve the listening skills
2. Write precise briefs or reports and technical documents .
3. Actively participate in group discussion / meetings / interviews and prepare & deliver presentations .
4. Become a more effective individual through goal/target setting, self motivation and practicing creative thinking.
5. Function effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership quality.

UNIT I:
Introduction to Soft Skills & Hard Skills, Art of communication, Communication Theory Barriers and Filters, Active Listening, Non Verbal Communication, Feedback and Response Body Language.

UNIT II:
Hidden data of communication, Dealing with feelings, Assertiveness, Self – confidence Emotional Intelligence, Priority Management & Time Management, Psychometric Test.

UNIT III:
World of teams, Team concept, Elements of team work, Formation of a Team based activities.

UNIT IV:
Adapting to corporate life, Corporate Grooming and dressing, Business Etiquette Business Ethics, Dinning Etiquette, Ethics policy.

UNIT V:
Discussions, decisions and presentations, what are group discussions, Types of Group Discussions, Presentations, Decision making, Interview Skills, Resume Writing.

UNIT VI:
Job Interview: The Gateway to the Job Market, Types of Interviews, Importance of body language, Need of proper articulation, Probable interview questions, Telephonic or Video Interview.

Text Books :

1. Soft -skills Manual, Infosys Campus connect Program
2. Personality Development and Soft- Skills ,Barun K. Mitra ,Oxford University Press.

T. Y. B. TECH (INFORMATION TECHNOLOGY) SEM – VI
PCC-IT601 – COMPUTER GRAPHICS

TEACHING SCHEME	EXAMINATION SCHEME
Theory: 3 Hrs/Week	Term work: 25 Marks
Tutorial: --	**Theory:** ESE: 70 Marks CIE: 30 Marks
Practical: 2 Hrs/Week	Practical:- --
Credits:- 4	

Pre-requisite: Basic knowledge of C language and data structures, geometric constructions.

Course Objectives

1. To provide knowledge to the students about the basics of computer graphics and different display devices.
2. To provide knowledge to the students about 2D and 3Dtransformations in computer graphics.
3. To make the students aware of generation of curves and surfaces
4. To give students with hands on exposure to Open GL and Animation tools.

Course Outcomes:

Upon successful completion of this course, the student will be able –

1. To express basic ideas of computer graphics and different
2. To demonstrate 2D and 3D transformations.
3. To Implement and understand different types of clipping algorithms used to perform clipping operations on geometric objects.
4. To demonstrate different types of curves in computer graphics.
5. To make use of various multimedia editing tools and software.

SECTION – I

UNIT I. Basic Concepts and Graphics Devices: (4)

Introduction to computer graphics, Applications of computer graphics, Pixel, Frame Buffer, Resolution, aspect ratio. **Video display devices:** CRT (Raster-Scan and Random-Scan displays), Flat-Panel Displays. **Input devices:** Keyboards, Mouse, Joysticks, Digitizers, Touch Panels and Light Pens. **Hard-Copy Devices:** Printers

UNIT II: Geometric Transformations and Multimedia: (8)

Basic 2D & 3D transformations - Translation, Scaling, Rotation, Reflection, Shearing, Multiple Transformations, Definitions -Where to use Multimedia, Uses of multimedia :Multimedia in Business, Multimedia in Schools, Multimedia in Home, Multimedia in Public Places, Virtual Reality

UNIT III: Windowing and Clipping: (8)

The Viewing Pipeline, Window-to-Viewport Coordinate Transformation, Clipping Operations,

Point Clipping, **Line Clipping:** Cohen –Sutherland, **Polygon clipping:** Sutherland- Hodgeman. **Filled-Area Primitives:** Scan-Line Polygon Fill Algorithm, Inside-Outside Tests, Boundary-Fill Algorithm, Flood-Fill Algorithm.

SECTION – II

UNIT IV: Curves and Surfaces: (6)

Curve Representation, Non-parametric and parametric curves, representation of space curves, Cubic Spline, Parabolic Blended curves, Bezier curves and B-spline curves, Z- buffer, Warnock algorithm.

UNIT V: Introduction to OpenGL & GLUT Libraries: (5)

Introduction to OpenGL, OpenGL basic graphics primitives: The OpenGL data types, OpenGL state, establishing the coordinate systems, Line drawing in OpenGL, drawingpoly-lines and polygons, Design & use of GLUT & GLUI menus.

UNIT VI: Computer Animation: (5)

Introduction, Key frame animation, Construction of an animation sequence, Motion control Methods, Procedural animation, Key-frame animation vs. Procedural animation, Introduction to Morphing, Wrapping techniques, Three dimensional morphing.

TERM WORK

It should consist of minimum of 8-10 experiments based on the following topics: -

1) Installation of computer graphics devices and adapters.
2) Drawing of different Geometric objects by using C/CPP programs
3) Implementation of Bresenham's line and circle drawing algorithms
4) Implementation of 2D Transformations
5) Implementation of 3D Transformations
6) Implementation of clipping algorithm
7) Implementation of filling algorithms
8) Implementation of Bezier curves
9) Implementation of B-Spline curves
10) Construction of simple pictures by drawing line, polylines, polygons using openGL.
11) Animations using Blender 3-D software.

TEXT BOOKS:

1. Mathematical elements for Computer Graphics - David F. Rogers, J. Alan Adams (MGH Int.) (For UNITs 1, 4)
2. Procedural elements for Computer Graphics - David F. Rogers (MGH International) (For UNITS 2, 3)

3. Computer Graphics- Rajesh Maurya (WILEY India) (For UNIT VI)
4. Computer Graphics C Version second edition –Donald D. Hearn, M. Pauline Baker (Pearson) (For UNIT I, 2, 3, 4, 6).

REFERENCE BOOKS:

1. Principles of Computer Graphics Theory and Practice Using OpenGL and Maya, Saline Govil-Pai, (Springer).
2. Computer Graphics (second Edition) - Zhigang Xiang & Roy Plastock (Schaum's Outline Series, TMGH).
3. Computer Graphics Using OpenGL F.S. Hill Jr. Stephen M. Kelley, (Pearson Education).

T. Y. B. TECH (INFORMATION TECHNOLOGY) SEM– VI
PCC-IT602 – INFORMATION SECURITY

TEACHING SCHEME	EXAMINATION SCHEME
Theory: 4 Hrs/Week	Term work: --25 Marks
Tutorial: --	Theory : ESE 70 Marks CIE 30 Marks
Practical: 2 Hrs/Week	Practical :--
Credits:- 5	

Prerequisites: Basic knowledge of Computer Networks, OSI layer, TCP/IP model.

Course Objectives:

1. To understand the basics of cryptography, how it has evolved, and some key encryption techniques.
2. To understand principal concepts, major issues, technologies, and basic approaches in information security.
3. To learn security policies such as authentication, integrity and confidentiality.
   To understand major information security threats and countermeasures.

Course Outcomes:

At the end of successful completion of course, the students will be able to

1. Design, implement and enhance security modules for software
2. Architect the security system for certain hardware modules
3. Understand ethical issues of usage of intern security
4. Compare and contrast the various standard solutions to the security problems
5. Utilize security system concept efficiently at software development process

SECTION: I

UNIT I: Overview and Classical Encryption Techniques

Overview: (3)

Computer Security Concepts, The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, A Model for Network Security

Classical Encryption Techniques: (3)

Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Rotor Machines

UNIT II: Block Ciphers and the Data Encryption Standard (5)

Block Cipher Principles, The Data Encryption Standard (DES), A DES Example, The Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles

UNIT III: Public Key Cryptography (4)

Principles of Public-Key Cryptosystems, The RSA Algorithm, Diffie-Hellman Key Exchange, ElGamal Cryptosystem

SECTION: II

UNIT IV: Cryptographic Data Integrity Algorithms

Cryptographic Hash Functions: (5)

Applications of Cryptographic Hash Functions, Two Simple Hash Functions, Requirements and Security, Hash Functions Based on Cipher Block Chaining, Secure Hash Algorithm (SHA), SHA-3

Message Authentication Codes: (4)

Message Authentication Requirements, Message Authentication Functions, Message Authentication Codes and Security of MACs, MACs Based on Hash Functions: MAC, MACs Based on Block Ciphers: DAA and CMAC

Digital Signatures: (3)

Digital Signatures, ElGamal Digital Signature Scheme, Schnorr Digital Signature Scheme, Digital Signature Standard (DSS)

UNIT V: Key Management and Distribution (5)

Symmetric Key Distribution Using Symmetric Encryption, Symmetric Key Distribution Using Asymmetric Encryption, Distribution of Public Keys, X.509 Certificates, Public Key Infrastructure

UNIT VI: Network And Internet Security

Transport-Level Security (4)

Web Security Issues, Secure Sockets Layer (SSL), Transport Layer Security (TLS), HTTPS

Electronic Mail Security (3)

Pretty Good Privacy (PGP), S/MIME

IP Security (3)

IP Security Overview, IP Security Policy, Encapsulating Security Payload

Text Book:

1. Williams Stallings – Cryptography and Network security principles and practices. Pearson Education (LPE), Fifth Edition
2. Cyber Security, Nina Godbole , Wiley Publications.
3. Cryptography & Network Security B.A. Forouzan McGrawHill.

Reference Books:

1. Cryptography and network security – Atul Kahate (TMGH)
2. Handbook of Applied Cryptography - Menezes, A. J., P. C. Van Oorschot, and S. A. Vanstone

Term work:

- Minimum of 10 Experiments to be performed from the list given below.

- Implementation can be in C/C++ Programming Language
- Practical should include the implementation and use of the following mechanisms/Algorithms/Tools /Techniques

Experiment List

1. GCD Using Euclidean algorithm/Computing Multiplicative inverses/ Prime number and modular arithmetic operations.
2. Substitution/Transposition/ Product Cipher and their Analysis
3. Single round of DES algorithm/Double DES/ Triple DES and its analysis
4. RSA Algorithm to provide Confidentiality and Authentication services or any other Public-Key Algorithm.
5. Diffie–Hellman or any other key exchange Algorithm.
6. Implementation and use of any authentication functions / algorithm.
7. Generation and use of Digital Signature for real world situation.
8. Usage of PGP security package and S/MIME features.
9. Experimenting with SSL/TLS/E-Commerce Applications and identifying their Vulnerabilities.
10. Experimentation on identifying non-cryptographic Protocol Vulnerabilities and remedies thereon.
11. Experimenting on identifying software Vulnerabilities using various tools/techniques and their analysis.
12. Any other4 Implementation/Demo/Experimentation based on the topics of syllabus.

T. Y. B. TECH (INFORMATION TECHNOLOGY) SEM – VI
PCC-IT603 – Internet Technology

TEACHING SCHEME	EXAMINATION SCHEME
Theory: 4 Hrs/Week	Term work: --25 Marks
Tutorial: --	CIE: 30 Marks ESE:70 Marks
Practical: --2 Hrs/Week	Practical :--50
Credits:- 5	

Prerequisites: Knowledge of Computer Networks.

Course Objectives:

1. To make students able to identify and understand client-server model and implement it using Java Socket programming
2. To use and analyze various Protocols using Protocol analyzing tools like wireshark and tcpdump.
3. To introduce students with emerging protocols IPv6 and the ICMPv6 and write applications to communicate using IPv6
4. To make students familiar with architecture of WWW
5. To understand working of email system and write an application to send and receive e-mail
6. To identify various protocols related multimedia over Internet

Course Outcomes:

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

1. Program the client server model using sockets
2. Understand and apply next generation protocol and addressing model
3. Elaborate the fundamentals of Domain Name Systems
4. Apply the concepts of Remote login and FTP in network applications
5. Learn fundamentals of web, HTTP and e-mail communication protocols.
6. Understand multimedia streaming and relevant protocols.

SECTION: I

UNIT I: Client-Server paradigm, Socket Interfaces, Protocol analyzing (8)

The client-server model and software design, concurrent processing in client-server software, algorithms and issues in client-server design, multi-protocol servers, multi-service servers, concurrency in clients, Unix Internet Super Server (inetd).The Socket Interface, Socket Java API: connection oriented- Socket and ServerSocket. Connectionless- DatagramSocket and DatagramPacket. Utility classes- URL, URLConnection, InetAddress, and InterfaceAddress. tcpdump, wireshark.

UNIT II: Next GenerationIPv6 and ICMPv6 (6)

IPv6 addressing, IPv6 Packet format, Transition from IPv4 to IPv6, ICMPv6

UNIT III: DHCP, DNS, TELNET and SSH (8)

DHCP: Introduction, Previous Protocols, DHCP operation, Packet Format, DHCP Configuration.

DNS: Need, Name Space, Domain Name Space, Distribution of name space, and DNS in the internet, Resolution, DNS massages, Types of records, Compression examples, encapsulation.

TELNET and SSH: Concept, NVT, Embedding, Options &options/sub-option negotiation, controlling the server, Out-of-band signaling, Escape charter, Mode of operation, user interface, security issue in telnet, **SSH**, format of SSH packets.

SECTION: II

UNIT IV: FTP, TFTP and HTTP (6)

FTP: Connections, Communication, Command processing, File transfer, User interface, Anonymous FTP, **TFTP. HTTP:** Architecture, Web Documents, HTTP Transaction, Request & Response messages: header & examples, Persistent vs. non persistent HTTP, Proxy Servers.

UNIT V: Electronic Mail and SNMP (6)

Architecture, User agents, addresses, delayed delivery, Aliases, Mail transfer agent SMTP commands & responses, mail transfer phases, MIME, Mail Delivery, mail access protocols, SNMP.

UNIT VI: Multimedia in Internet (6)

Streaming stored audio/video, streaming live audio/video, real-time interactive audio/video, real-time transport protocol (RTP), real-time transport

TEXTBOOK:

1. TCP/IP Protocol Suite Edition 4 by Behrouz Forouzan (McGraw Hill)

Reference Books:

1. Internet and Web Technologies ,Raj Kamal McGraw Hill
2. http://docs.oracle.com/javase/7/docs/api/java/net/package-summary.html
3. http://nmap.org/ncat/guide/

Lab work:

It should consist of 10 to 12 assignments to be implemented in JAVA (preferably on Linux).

Following is the minimum list of practical problems.

1. Client program using TCP and UDP to connect to well-known services. (ECHO, TIME OFDAY, FINGER, TIME, etc)
2. Study of tcpdump and wireshark.

3. Iterative UDP client-server application. Server should keep a log of client requests.
4. Concurrent TCP client-server application. Server should keep a log of client requests.
5. Client-Server application using IPv6.
6. Study of DNS client utilities and implementation of nslookup/host.
7. Implement file transfer protocol using FTP messages.
8. Implement a simple web server. Use the browser as a client for your server.
9. Send/receive mail using SMTP/POP3 (IMAP) commands.
10. Develop personal website using database connectivity.

T. Y. B. TECH (INFORMATION TECHNOLOGY) SEM – VI
PCC-IT 604 -OPERATING SYSTEM-II

TEACHING SCHEME	EXAMINATION SCHEME
Theory: 3 Hrs/Week	Term work: --25 Marks
Tutorial: --	Theory: CIE: 30 Marks ESE:70 Marks
Practical: --2 Hrs/Week	Practical :--
Credits:- 4	

Prerequisites: Basic fundamental knowledge of Operating Systems.

Course Objectives:

1) To understand fundamental concepts of the Unix System.
2) To understand the File system and system calls
3) To study structure of process
4) To study Process control and scheduling
5) To study Memory management and I/O subsystem

SECTION: I

UNIT I: Overview of the UNIX System (7)

System structure, user perspective, Operating System services, assumption about H/W. Architecture of UNIX operating system, introduction to system concepts, kernel data structure, system administration

UNIT II: The Buffer Cache (5)

Buffer headers, structure of the buffer pool, scenarios for retrieval of a buffer, reading and writing disk blocks, advantages and disadvantages of cache

UNIT III: Internal Representation of Files (13)

Inodes, structure of the regular file, directories, conversion of a pathname to inode, super block, inode assignment to a new file, allocation of disk blocks, other file types System Calls for the File System Open, Read, Write, Close, File Creation, and Creation of special files, change directory and change Root, Pipes, Mounting and Unmounting File Systems, Link,Unlink

SECTION: II

UNIT IV: The Structure of process (5)

Process stages and transitions, layout of system memory, the context of a process, saving Context of a process, manipulation of the process address space

UNIT V: Process Control (4)

Process creation, signals, process termination, awaiting process termination, invoking other programs, the user id of a process, the shell, system Boot and the Init process.

UNIT VI: Scheduling: **(3)**

Process Scheduling, system call for time, clock

UNIT VI: Memory Management and I/O Subsystem **(3)**

Swapping, Demand paging, A Hybrid system with swapping and demand paging, Driver Interfaces, Disk Drivers, Streams

Text Book:

1. The design of Unix Operating System - Maurice J. Bach (PHI) Second edition

Term Work:

It should consist of 10 experiments of implementation based on UNIX/LINUX operating system.
Proposed List of Experiment:

1) Study of Unix Operating System
2) Study & Implementation of General Utilities, Directory & File Utilities
3) Study & Implementation of pipes
4) Implementation of Scheduling Algorithms.
5) Study & Implementation of process related utilities
6) Study & implementation of Shell programming
7) Study of system start-up & init
8) Semaphore implementation
9) Implementation of IPC using message
10) Implementation of IPC using shared memory
11) Memory allocation algorithm (best-fit, first-fit, worst-fit)

T. Y. B. Tech (Information Technology) SEM – VI

ELECTIVE II OEC - IT605 1)Cyber Security

Open Elective Course - II

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs./Week	**Theory :** ESE 70 Marks CIE 30 Marks
Tutorial : -----	**Term work :** -----
Credit:-3	**Practical :** -----

Prerequisite: Fundamental knowledge of Data Communication, Networking and Information Security.

Course Objectives:

1. To gain knowledge about securing both clean and corrupted systems, protect personal data, and secure computer networks
2. To examine secure software development practice
3. To understand key terms and concepts in I.T. ACT
4. To incorporate approaches for incident analysis and response

Course Outcomes:

On completion of the course, student will be able to

1. Explain the cyber security concepts.
2. Describe the cyber security vulnerabilities and prevention techniques.
3. Explain the different rules and regulations under I.T. ACT.
4. Explain the concepts of digital forensics & incident management

UNIT I. Computer and Network Security (6)

Introduction to Computer Security - Introduction, How Seriously Should You Take Threats to Network Security? Identifying Types of Threats, Basic Security Terminology, Concepts and Approaches, Online Security Resources Networks and the Internet
Introduction, Network Basics, How the Internet Works, Basic Network Utilities, Advanced Network Communications Topics

UNIT II. Cyber Frauds, DoS, Viruses: (6)

Cyber Stalking, Fraud, and Abuse: Introduction, How Internet Fraud Works, Identity Theft, Cyber Stalking, Protecting Yourself Against Cyber Crime. Denial of Service Attacks: Introduction, DoS, Illustrating an Attack, Malware: Introduction, Viruses, Trojan Horses, The Buffer-Overflow Attack. The Sassier Virus/Buffer Overflow, Spyware, Other Forms of Malware, Detecting and Eliminating Viruses and Spyware

UNIT III. Techniques Used by Hackers: (6)

Introduction, Basic Terminology, The Reconnaissance Phase, Actual Attacks, Malware Creation, Penetration Testing

UNIT IV. Computer Security Technology: (6)

Introduction, Virus Scanners, Firewalls, Antispyware, IDS, Digital Certificates, SSL/TLS, Virtual Private Networks, Wi-Fi Security

UNIT V. I.T. ACT: (6)

Introduction, Cyber Security Regulations, Roles of International Law, the state and Private Sector in Cyberspace, Cyber Security Standards. The INDIAN Cyberspace, I.T. Act

UNIT VI. Introduction to Forensics: (6)

Introduction, General Guidelines, Finding Evidence on the PC, Finding Evidence in System Logs , Getting Back Deleted Files, Operating System Utilities, Operating System Utilities, Mobile Forensics: Cell Phone Concepts

Text Books:

1. Computer Security Fundamentals - Chuck Easttom, Pearson, third edition.

Reference Books:

1. Jason Luttgens, Matthew Pepe, Kevin Mandia, Incident Response & Computer Forensics, McGraw-Hill Osborne Media, 3 rd edition , 2014.

2. Keith J. Jones, Richard Bejtlich, Curtis W. Rose, Real Digital Forensics: Computer Security and Incident Response, Paperback – Import, 2005.

3. John Sammons, the Basics of Digital Forensics: The Primer for Getting Started in Digital Forensics Paperback, February 24, 2012.

4. Hacking Exposed: Network Security Secrets & Solutions, Stuart McClure, Joel Scambray and George.Kurtz, McGraw-Hill, 2005.

5. Ethical Hacking, Thomas Mathew, OSB Publisher, 2003.

7. Dave Shackleford, Virtualization Security: Protecting Virtualized Environments, John Wiley & Sons, 2012.

8. BRAGG, Network Security: The Complete Reference, McGraw Hill Professional, 2012

T. Y. B. Tech (Information Technology) SEM –VI
ELECTIVE II OEC - IT606 2) E- Commerce & Digital Marketing
Open Elective Course – II

TEACHING SCHEME	EXAMINATION SCHEME
Theory : 3 Hrs./Week	**Theory :** ESE 70 Marks CIE 30 Marks
Tutorial : -----	**Term work : -----**
Credit:-3	**Practical : -----**

Course Objectives:

1. To get the knowledge about business advantages of the e-commerce and digital marketing and its importance
2. To develop a digital marketing plan and to make SWOT analysis
3. To get introduced with various digital channels, business tools in social networking
4. To understand the optimization of a Web site and SEO optimization

Course Outcomes:

1. Students will be able to identify the importance of the e-commerce and digital marketing for business success
2. Students will be able to create a digital marketing plan, starting from the SWOT analysis and defining a target group
3. Students will be able to identifying digital channels, business tools used in social networking
4. Students will be able to demonstrate the optimization of web site using business tools.

UNIT I. Introduction to E-commerce, frameworks & architectures (4)

Introduction: The term "E-Commerce", Business models related to E-Commerce, Technical and economic challenges

Frameworks and architectures: Actors and stakeholders, Fundamental sales process, Technological elements

UNIT II. B2C business, B2B business (5)

B2C Business: The process model and its variants, The pricing challenge, The fulfillment challenge, The payment challenge, B2C- business and CRM, B2C software systems

UNIT III. Introduction to Digital Marketing (6)

How digital technologies transformed marketing?, Definitions- digital marketing and multichannel marketing- Paid, owned and earned media, the growing range of digital marketing platform, digital marketing strategy-key features of digital marketing strategy, applications of digital marketing, benefits of digital marketing, alternative digital business models, difference between e-commerce and e-business, challenges in developing and managing digital marketing strategy

UNIT IV. Online marketplace analysis & macro environment (8)

Introduction: situation analysis for digital marketing, the digital marketing environment, understanding customer journeys, online consumer behavior and implications for marketing, business models for e-commerce

Online macro environment: Technological forces, economic forces, political forces, Legal forces, social forces and cultural forces

UNIT V. Digital Marketing Strategy and relationship marketing (6)

Digital Marketing strategy development: how to structure digital marketing strategy, strategy implementation

Relationship marketing using digital platforms: Introduction, the challenge of customer engagement, customer lifecycle management

UNIT VI. Marketing Communications (7)

Marketing Communications using digital media channels: Introduction, search engine marketing, online public relations, e- mail marketing and mobile text messaging, social media and viral marketing, offline promotion techniques.

Case study: How the ministry of food processing took to social media or world food India 2017.

Text Books:

1. Introduction to E-commerce: Combining Business & Information Technology 1st Edition, (2016) Martin Kutz. & bookboon.com
2. Digital Marketing: Strategy, Implementation and Practice, 6th Edition by Dave Chaffey, Fiona Ellis-Chadwik, Pearson Education.

Reference Books:

1. The Beginner's Guide to Digital Marketing (2015). Digital Marketer. Pulizzi, J.(2014) Epic

Content Marketing, McGraw Hill Education.
2. "Electronic Commerce", Jeffrey F Rayport and Bharat Bhasker, Tata McGraw Hill.

It should consist of assignments on following topics within group of 4-5 students & its evaluation will be considered for CIE

1. Define a target group (working in groups)
2. Creating web sites, MS Expression (working in groups)
3. Writing the SEO content (working in groups)
4. Google AdWords (working in groups)
5. CRM strategy (working in groups)

T. Y. B. TECH (INFORMATION TECHNOLOGY) SEM – VI
PCC-IT607-APPLICATION DEVELOPMENT TOOL – II

TEACHING SCHEME	EXAMINATION SCHEME
Theory: 2 Hrs/Week	**Term work:** --25 Marks
Tutorial: --	Practical :--50 Marks
Practical: --2 Hrs/Week	Credits:- 3

Prerequisites: Basic knowledge of Object Oriented Programming

Course Objectives:

1. To understand fundamentals of .NET framework.
2. To understand fundamental concepts like objects, classes, interfaces, polymorphism, delegates and events and its implementation in C#.
3. To understand robust GUI applications using event handling and Windows form controls with proper exception handling.
4. To understand I/O concepts, database connectivity using ADO.NET and collections and generics in C#
5. To analyze problems and devise suitable solution using C#.NET features

Course Outcomes:

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

1. Understand the structure and model of the programming language C #
2. Develop, implement Applications with C#.

SECTION: I

UNIT I: Introduction to .net: **(4)**
Evolution of .net, Benefits of .net, CLR, CTS, MSIL, JIT, BCL, metadata and assemblies in detail, GAC and strong name assemblies, Security Manager.

UNIT II: C# fundamentals: **(3)**
Data types - Value types, Reference types, boxing and unboxing, Arrays, Pass by value and by reference and out parameters, params parameter.
Namespaces, classes, objects, structs: definition and creation.

UNIT III: Delegates and Events: **(8)**
Creating and using delegates, multicasting with delegates, event sources, event handlers
GUI Programming: Introduction to GUI Application and their components, Windows forms – buttons, check boxes, radio buttons, panels, group boxes, list boxes, picture

boxes, Menus, ToolStrips, StatusStrips and progress bars, events, Creating and using MDI application.

SECTION: II

UNIT IV: (4)
File handling: The abstract stream class, working with StreamWriters and StreamReaders, Working with StringWriters and StringReaders, Working with BinaryWriters and BinaryReaders.

UNIT V: ADO.NET: (4)
Exploring ADO.net Entity framework, Connected and disconnected architecture, data access with ADO.net.

UNIT VI: Collection and Generic: (3)
Collection classes in .net, Understanding Generics, generic collection classes in .net.

Text Book

1. C# 4.0 The Complete Reference: Herbert Schildt, McGraw Hill.

Reference Books:

1 Microsoft Visual C# 2010 Step by Step: John sharp, Microsoft Press
2 .NET 4.5 Programming (6 – in -1) Black Book – Kogent – Dreamtech Press
3 CLR via C# :Jeffrey Richter, Microsoft Press, 3rd edition
4 ASP.Net 4.5 Black Book ,Dreamtech ,Wiley International.

Guidelines for term work distribution

The distribution of the term work Marks is as follows

1. 25 Marks for performance in practical and experiments

Guidelines for experiment list

The experiment list should consist of minimum 12 practical assignments on the above topics. Each experiment should be a problem statement which can be solved using some features of .Net and C#. Sample Experiment List is given below:

1) Introduction to .Net framework & implementation of simple console application.
2) Study and implementation of different types of Constructors in C#.
3) Write a program to study use of Properties in C#.
4) Write a program to implement inheritance concepts.
5) Program to implement Different types of Delegates.
6) Program to demonstrate the events handler in C#.
7) Study of Collections and Generics and create a simple shopping cart Application that can be sorted by the price of the items using ArrayList.
8) Study of window-based application.
9) Program to study various controls for windows form application.
10) Create a small registration form layout using Windows Form Applications.

11) Demonstrate the Menu controls and Different Dialog controls in windows form application.
12) Study and Implementation of File Handling.
13) Program to display the account details with help of ADO.Net and windows form application.
14) Demonstrating dataset, data adapter and grid views in disconnected data access layer of ADO.NET.
15) Introduction to Visual web development application with ASP.NET.

T. Y. B. TECH (INFORMATION TECHNOLOGY) SEM – VI
PCC-IT608 – SEMINAR

TEACHING SCHEME	EXAMINATION SCHEME
Theory: --	**Term work:** 25 Marks
Tutorial: --	**Practical/Oral:** -- 50 Marks
Practical: --2 hrs/Week	Credit :-1

Students should deliver seminar individually. It should consist of a talk of 30-45 minutes on a topic preferably from the area in which a student intends to work for his Project in B.E Semester – VII and Semester – VIII or any upcoming technology not covered in syllabus.

Term Work assessment:

The seminar to be delivered by students should be assessed by a panel of at least two faculties within the department.

The assessment for the seminar should include but not limited to following points.
1) Novelty of the topic
2) Technical depth
3) Organization of the topic
4) Presentation skills
5) Communication skills
6) Answering Questions raised by faculties

The seminar report there-on is to be submitted which is to be internally assessed for 25 Marks.

External oral exam:

The external oral examination will be conducted by the examiners appointed by the University

SHIVAJI UNIVERSITY
KOLHAPUR

REVISED SYLLABUS AND STRUCTURE

FINAL YEAR (B. Tech)

INFORMATION TECHNOLOGY

To be introduced from the academic year 2021-22

(i.e… from June 2022) onwards

(Subject to the modifications will be made from time to time)

FINAL YEAR INFORMATION TECHNOLOGY – CBCS PATTERN

SEMESTER – VII

Sr. No	Course (Subject Title)	TEACHING SCHEME									EXAMINATION SCHEME											
		THEORY			TUTORIAL			PRACTICAL			THEORY					PRACTICAL			TERM WORK		
		Credits	No. of Lecture	Hours	Credits	No. of Lecture	Hours	Credits	No. of Lecture	Hours	Hours	Mode	Marks	Total Marks	Min	Hours	Max	Min	Hours	Max	Min
1	PCC-IT701	4	4	4	-	-	-	1	2	2		CIE	30	100	40	As per BOS Guidelines	-	-		50	20
												ESE	70								
2	PCC-IT702	3	3	3	1	1	1	-	-	-		CIE	30	100	40		-	-		50	20
												ESE	70								
3	PCC-IT703	3	3	3	-	-	-	1	2	2		CIE	30	100	40		50	20		50	20
												ESE	70								
4	PCE-IT704	3	3	3	1	1	1	-	-	-		CIE	30	100	40		-	-		25	10
												ESE	70								
5	PCC-IT705	3	3	3	-	-	-	2	4	4							50	20		50	20
6	PW-IT706	-	-	-	-	-	-	2	4	4		-	-	-	-		50	20		25	10
7	WI-IT707	-	-	-	-	-	-	1	2	2		-	-	-	-		-	-		-	-
	TOTAL	**16**	**16**	**16**	**2**	**2**	**2**	**7**	**14**	**14**				**400**			**150**			**250**	

SEMESTER –VIII

1	PCC-IT801	4	4	4	-	-	-	1	2	2		CIE	30	100	40	As per BOS Guidelines	50	20		50	20
												ESE	70								
2	PCC-IT802	4	4	4	1	1	1	-	-	-		CIE	30	100	40					25	10
												ESE	70								
3	PCE-IT803	3	3	3	1	1	1					CIE	30	100	40					25	10
												ESE	70								
4	PCE-IT804	3	3	3	1	1	1	-	-	-		CIE	30	100	40		-	-		25	10
												ESE	70								
5	PCC-IT805	3	3	3	-	-	-	2	4	4		-	-	-	-		50	20		50	20
6	PW-IT806	-	-	-	-	-	-	2	4	4		-	-	-	-		50	20		25	10
7	WI-IT807	-	-	-	-	-	-	-	-	-		-	-	-	-		-	-		50	20
	TOTAL	**17**	**17**	**17**	**3**	**3**	**3**	**5**	**10**	**10**				**400**			**150**			**250**	
	TOTAL	**33**	**33**	**33**	**5**	**5**	**5**	**12**	**24**	**24**				**800**			**300**			**500**	

CIE- Continuous Internal Evaluation

• Candidate contact hours per week : 30 Hours (Minimum)	• Total Marks for B.E. Sem VII & VIII : **800 + 800 = 1600**
• Theory and Practical Lectures : 60 Minutes Each	• Total Credits for B.E. Sem VII & VIII : **50 (SEM-I: 25, WI + SEM – II: 25)**
• In theory examination there will be a passing based on separate head of passing for examination of CIE and ESE.	
• There shall be separate passing for theory and practical (term work) courses.	

Note :

1. **PCC-IT:** Professional Core Course – Information Technology are compulsory.
2. **PCE-IT:** Professional Core Elective – Information Technology are compulsory.
3. **MC-IT:** Mandatory Course- Information Technology are compulsory.
4. **SI-IT:** Summer Internship- Information Technology are compulsory.
5. **PW-IT:** Project Work- Information Technology are compulsory

Semester –VII

Sr. No	Code No.	Subject		Semester	Credits
1.	PCC-IT701	Distributed Computing		7	5
2.	PCC-IT702	Mobile Computing		7	4
3.	PCC-IT703	Advanced Database Systems		7	4
4.	PCE-IT704	Elective –I	Image processing	7	4
			Soft Computing		
			Data Science		
5.	PCC-IT705	Web Technology		7	5
6.	PW-IT706	Project – I		7	2
7.	WI-IT707	Winter Internship		7	1

Semester – VIII

Sr.No	Code No.	Subject		Semester	Credits
1.	PCC-IT801	Machine Learning		8	5
2.	PCC-IT802	Cloud Computing		8	5
3.	PCE-IT803	Elective -II	Enterprise Resource Planning	8	4
			Information Retrieval		
			Business Intelligence		
4.	PCE-IT804	Elective -III	Software Testing	8	4
			Artificial Intelligence		
			Project Management		
5.	PCC-IT805	Advance Web Technology		8	5
6.	PW-IT806	Project - II		8	2
7.	WI-IT807	Winter Internship		8	0

B.Y.B.Tech (INFORMATION TECHNOLOGY) Sem – VII

PCC- IT701 – Distributed Computing

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - 4Hr/week	**Term work:** -50
Tutorial:-	**Theory:-** ESE 70 Marks CIE 30 Marks
Practical: -2Hr/Week	**Credits:-** 5

Prerequisite:

1. Distributed System and Computing
2. Basic knowledge of Operating system and Cloud computing

Course Objectives:

1. To expose students to both the abstraction and details of file systems.
2. To introduce concepts related to distributed computing systems.
3. To focus on performance and flexibility issues related to systems design decisions
4. To prepare students for life-long learning.
5. To understand why and not just thememorize the details.
6. To expose students to current literature in distributed systems.
7. To prepare students for an industrial programming environment

Course Outcomes:

1. Upon Completion of the course, the students will be able to
2. List the principles of distributed systems and describe the problems and challenges associated with these principles.
3. Understand Distributed Computing techniques, Synchronous and Processes.
4. Apply Shared Data access and Files concepts.
5. Design a distributed system that fulfills requirements with regards to key distributed systems properties.
6. Understand Distributed File Systems and Distributed Shared Memory.
7. Apply Distributed web-based system.
8. Understand the importance of security in distributed systems

Unit no.	Course Content	No. of lectures required
1	**Fundamentals** Fundamentals Evolution of Distributed Computing Systems, System models, issues in design of Distributed Systems, Distributed computing environment, web based distributed model, computer networks related to distributed systems and web based protocols.	05
2.	**Message Passing** Inter process Communication, Desirable Features of Good Message-Passing Systems, and Issues in IPC by Message, Synchronization, Buffering, Multidatagram Messages, Encoding and Decoding of Message Data, Process Addressing, Failure Handling, Group Communication.	06
3.	**Remote Procedure Calls** Remote Procedure Calls The RPC Model, Transparency of RPC, Implementing RPC Mechanism, Stub Generation, RPC Messages, Marshaling Arguments and Results, Server Management, Communication Protocols for RPCs, Complicated RPCs, Client-Server Binding, Exception Handling, Security, Some Special Types of RPCs, Lightweight RPC, Optimization for Better Performance	06
4	**Distributed Shared Memory** Distributed Shared Memory Design and Implementation issues of DSM, Granularity, Structure of Shared memory Space, Consistency Models, replacement Strategy, Thrashing, Other Approaches to DSM, Advantages of DSM.	06
5	**Synchronization** Synchronization Clock Synchronization, Event Ordering, Mutual Exclusion, Election Algorithms	06
6	**Resource and Process Management** Resource and Process Management Desirable Features of a good global scheduling algorithm, Task assignment approach, Load	06

TEXT BOOKS:

1. A S Tanenbaum, Martin Steen,"Distributed Systems: Principles and Paradigms", 2/E,PHI, 2006
2. Nancy A. Lynch, "Distributed Algorithms", Morgan Kaufmann, 1996
3. W Richard Stevens, "Unix Network Programming: Vol 1, Networking APIS: Sockets & XTI",2/E, Pearson Education,1998
4. Colouris,Dollimore,Kindberg, "Distributed Systems Concepts & Design", 4/E,Pearson Ed. 2005
5. MukeshSinghal, Niranjan G. Shivaratri, "Advanced concepts in operating systems: distributed, database, and multiprocessor operating systems", MGH, 1/E, 1994.

REFERENCE BOOKS:

1. Distributed OS by Pradeep K. Sinha (PHI)
2. Tanenbaum S.: Distributed Operating Systems, Pearson Education
3. Tanenbaum S. Maarten V.S.: Distributed Systems Principles and Paradigms, (Pearson Education)
4. George Coulouris, Jean Dollimore. Tim Kindberg: Distributed Systems concepts and design.

TERMWORK:

Experiment List

1. To study Client Server based program using RPC
2. To study Client Server based program using RMI
3. To Study Implementation of Clock Synchronization (logical/physical)
4. To Study Implementation of Election algorithm
5. To study Implementation of Mutual Exclusion algorithms
6. To write Program multi-threaded client/server processes.
7. To write Program to demonstrate process/code migration.
8. Write a distributed application using EJB
9. Write a program using CORBA to demonstrate object brokering
10. Use .Net framework to deploy a distributed application.
11. Implement concurrent echo client-server application
12. Implement concurrent day-time client-server application.
13. Configure following options on server socket and tests them: SO_KEEPALIVE, SO_LINGER, SO_SNDBUF, SO_RCVBUF, TCP_NODELAY
14. Design XML Schema and XML instance document
15. Test open source ESB using web service.

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VII

PCC-IT702– Mobile Computing

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - 3 Hrs/week	**Term work:** -50 marks
Tutorial:- 1 hr /week	**Theory:-** ESE 70 Marks CIE 30 Marks
Practical: -	**Credits:-** 4

Prerequisite:
Basic Knowledge of Data Communication (PCC- IT303) and Computer Networks (PCC-IT402).

Course Objectives:

This course aims at giving students knowledge of Mobile Computing along with its applications in terms of the following

1. Define Mobile Computing , study its applications and look at current trends
2. Distinguish between different types of Mobility.
3. Analyze the performance of MAC protocols used for wired network and wireless networks.
4. Explore Theory and Research areas related to Mobile Computing
5. Acquire solid knowledge about mobile networks and mobile computing.

Course Outcomes:
Upon successful completion of this course, the student will be able to –

1. Understand basics of wireless communications.
2. Analyze the applications that are mobile-device specific and express current practice in mobile computing contexts.
3. Understand and recognize the GSM, GPRS and Bluetooth software model for mobile computing.

Unit no.	Course Content	No. of lectures required
1	**Introduction to wireless communication** Need and Application of wireless communication. Wireless Data Technologies Market for mobile.	03
2	**Wireless transmission and Medium access Control** Frequency for radio transmission signal antennas, signal propagation Multiplexing Modulation, Spread and Cellular systems. Medium access control: Specialized MAC, SDMA, FDMA, TDMA & CDMA.	07

3	**Telecommunications systems** GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, New data services. UMTS and IMT-2000: UMTS releases and standardization, UMTS system architecture.	07
4	**Wireless LAN** Introduction, Infrared v/s Radio transmission, Infrastructure and ad-hoc Network, IEEE 802.11, Bluetooth.	06
5	**Mobile Network Layer and Transport Layer** Mobile IP, DHCP, Mobile ad-hoc networks, Traditional TCP, Classical TCP improvements, TCP over 2.5/3G wireless networks.	06
6	**Wireless application protocol** Architecture, Wireless datagram protocol, Wireless transport layer, security Wireless transaction protocol,, Wireless session protocol, Wireless application environment , Wireless markup language, WMLScript, Mobile communications, Wireless telephony application, Push architecture, Push/pull services, Example stacks with WAP 1.x 429	07

TEXT BOOKS :

1. Mobile Communications - Jochen Schiller - 2nd edition, Publication-Pearson Education.

REFERENCE BOOKS :

1. Introduction to Wireless Telecommunications systems and Networks - Gary J. Mulett. Publications- Cengage Learning (India Edition).
2. Mobile Computing – Ashok K Talukdar, Roopa R Yavagal, Publication-TATA McGRAW HILL

TERMWORK :

Tutorial work to be considered for awarding term work marks. It should consist of 8-10 assignments based on above topics.

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VII

PCC-IT 703 – Advance Database Systems

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - 3 Hr/week	**Term work: -** 50 Marks
Tutorial:- --	**Theory:-** ESE 70 Marks CIE 30 Marks
Practical: - 2 Hr/week	**POE:-** 50 Marks

Prerequisite: Database Engineering.

Course Objectives:

1. Introduce the basics of query optimization and its cost estimation.
2. Understand the different types of database systems and their silent features.
3. Understand the concept of data warehousing.
4. Understand the concept of data mining and Web mining

Course Outcomes:

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

1. Implement a database management system in a complex domain, making the best use of the available tools and techniques.
2. Learn and experiment advanced database techniques, models and products, and to provide them with the knowledge to take decisions concerning implementation issues.
3.

Unit no.	Course Contents	No. of lectures required
1	**Query Processing and Optimization :** Overview, Catalog Information for cost estimation, Measures of Query cost, Selection operation, Sorting, Join operation, Selection size estimation, Join size estimation, Transformation of relational expression**.**	06
2	**Object Relational Databases:** Motivating example, Structured data types, Operations on structured data, Encapsulation and ADTs, Inheritance, Objects, OIDS and Reference types, Database design for an ORDBMS, Object identity, Nested collections, Storage and access methods, Query processing and optimization, Comparison of RDBMS and ORDBMS.	05
4	**Decision Support** : Introduction to decision support, Data Warehousing, OLAP, Implementation Techniques for OLAP, Views and decision support, View materialization, Maintaining materialized views.	05

5	**Data Mining and Information Retrieval** : Introduction, Counting Co-occurrences, Mining for rules, Tree structured rules, Clustering: K-means algorithm and BIRCH algorithm, Similarity search over sequences, Introduction to Information Retrieval: Vector space model, TF/IDF weighting of terms, indexing for text search, Web Mining: Web content mining- Crawlers, Web structure mining- Page Rank and HITS algorithm & Web usage mining (only introduction).	09
6	**Advanced Transaction Processing:** Transaction-processing monitors, transactional workflows, main-memory databases, real-time transaction systems, long-duration transactions, transaction management in multi-databases.	05

TEXT BOOKS :

1. Database System Concepts – Silberschatz, Korth, Sudarshan, 4th edition onwards [McGraw Hill] – Unit No. 1, 6. 2
2. Database Management Systems - Raghu Ram Krishnan, 3rd edition [McGraw Hill] Unit No. 2, 3, 4, 5.
3. Data Mining – Introductory & Advanced Topics -M. H. Dunham [Pearson Education] Unit No. 5 (For Web Mining)

REFERENCE BOOKS :

1. Fundamentals of Database Systems -Elmasri and Navathe, 5th edition [Pearson Education]
2. Database Systems – A Practical Approach to Design, Implementation and Management-Thomas Conolly, Carolyn Begg, Fourth Edition [Pearson].
3. Decision Support and Data Warehouse Systems -Mallach [TMH]
4. Data Mining Techniques- Linoff, Berry, 3rd edition [WILEY].

TERMWORK :

It should consist of minimum 10 to 12 experiments based on the syllabus and experiment list mentioned below should be implemented using JAVA and any RDBMS like ORACLE / MySQL /IBM-DB2 / MSSQL SERVER , etc.

1 Implement merge join.
4. Implement hash join.
5. Create structured data types of ORDBMS and perform operations- create table using structured data types, insert data and solve queries.
6. Implement parallel joins, sorting and aggregates.
7. Implement vertical and horizontal fragmentation in distributed DBMS.
8. Implement semi join in distributed DBMS.
9. Implement bloom join in distributed DBMS.
10. Implement two phase commit in distributed DBMS.

11. Implementation of concurrency control in distributed DBMS.
12. Implementation of OLAP queries.
13. Implementation of cube operator in OLAP queries in data warehousing and decision support System.
14. Implement bitmap indexes.
15. Implement Apriori algorithm in data mining.
16. Implement K-Means clustering algorithm.
17. Implement Decision Tree of Data Mining problem.
18. Installation & Configuration - Case Study of IBM-DB2 database/MS-SQL server/Oracle/ MySQL or any open source RDBMS

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VII

PCE-IT704 – IMAGE PROCESSING

TEACHING SCHEME	EXAMINATION SCHEME
Theory:- 3 Hr/week	**Term work:- 25 marks**
Tutorial:-1 Hr/week	**Theory:-** ESE 70 Marks CIE 30 Marks
Practical:- -----	**Credits:- 4**

Prerequisite:

Engineering Mathematics and Digital System.

Course Objectives:

- To become familiar with digital image fundamentals.
- To get exposed to different image transforms as well as filtering techniques.
- To learn concepts of different Morphological operations and segmentation techniques.
- To become familiar with different color image processing techniques.

Course Outcomes:

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

- Know and understand the basics and fundamentals of digital image processing such as digitization, sampling, quantization and 2D-transforms.
- Operate on images using different image transforms and filtering techniques.
- Understand the image enhancement techniques.
- Learn the basics of color image processing.
- Demonstrate an application based on image processing.

Unit No.	Course Contents	No. of lectures required
1	**Digital Image Fundamentals:** Fundamentals steps in DIP, Components of image processing system, lements of Visual Perception, Image sensing and acquisition, image Sampling and quantization, basic relations between pixels.	5
2	**Image Transforms:** Basic intensity transformation: image negation, Log transformation, Power law transformation, Piecewise linear transformation functions, arithmetic and Logic operation, Histogram processing (equalization and matching) , sine cosine, Hadamard , Haar, Slant transform.	6

3	**Image Filtering:** Fundamentals of spatial filtering, smoothening and Sharpening in spatial domain, smoothening and Sharpening in frequency domain.	7
4	**Morphological Image Processing:** Dilation & erosion, opening and closing operation, Hit- or –miss Transformation, Basic morphological algorithms: Boundary extraction, region filling, thinning and thickening, skeletons.	5
5	**Image Segmentation:** Detection of discontinuities: Point detection, line detection, edge detection, (Sobel, Prewitt, Laplacian), global and adaptive thresholding, Region based segmentation (region growing, region splitting and merging).	6
6	**Image Compression and Color Image Processing:** Fundamentals, Coding redundancy , Inter pixel redundancy,fidelity criteria ,image compression model, lossless predictive coding, Lossy predictive coding.Color fundamentals, Color models , pseudo color, image processing , full color image processing, Color transformations.	7

TEXT BOOKS:

1. Rafael C. Gonzalez, Richard E. Woods, Digital Image Processing, Pearson, Third Edition, 2010.
2. Anil K. Jain, Fundamentals of Digital Image Processing, Pearson, 2002.

REFERENCE BOOKS:

1. Kenneth R. Castleman, Digital Image Processing, Pearson, 2006.
2. Rafael C. Gonzalez, Richard E. Woods, Steven Eddins, Digital Image Processing using MATLAB, Pearson Education, Inc., 2011.
3. D. E. Dudgeon and RM, Mersereau, Multidimensional Digital Signal Processing, Prentice Hall Professional Technical Reference, 1990.
4. William K. Pratt, Digital Image Processing, John Wiley, New York, 2002.
5. Milan Sonka et al Image processing, analysis and machine vision, Brookes/Cole, Vikas Publishing House, 2nd edition, 1999.

TERMWORK: Minimum Eight Tutorials based on above syllabus.

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VII

PCE-IT704 – SOFT COMPUTING

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - 3 Hr/week	**Term work: -** 25
Tutorial:- 1 Hr/week	**Theory:-** ESE 70 Marks CIE 30 Marks
Practical: - NIL	**Credits:-** 4

Prerequisite:

Basic Knowledge.

Course Objectives:

1. Soft Computing is a consortia of methodologies which collectively provide a body of concepts and techniques for designing intelligent systems.

Course Outcomes:

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

1. Understand basic concept of Soft Computing.
2. Know different Soft Computing Techniques.
3. Understand Concept related Neural Networks and Fuzzy Systems.

Unit no.	Course Contents	No. of lectures required
1	**Introduction:** What is Soft Computing? Difference between Hard and Soft computing, Requirement of Soft computing, Major Areas of Soft Computing, Applications of Soft Computing.	05
2	**Neural Networks:** What is Neural Network, Learning rules and various activation functions, Single layer Perceptrons , Back Propagation networks, Architecture of Back propagation (BP) Networks, Back propagation Learning, Variation of Standard Back propagation Neural Network, Recent Applications.	07
3	**Fuzzy Systems:** Fuzzy Set theory, Fuzzy versus Crisp set, Fuzzy Relation, Fuzzification, Minmax Composition, Defuzzification Method, Fuzzy Logic, Fuzzy Rule based systems, Predicate logic, Fuzzy Decision Making, Fuzzy Control Systems, Fuzzy Classification.	06
4	**Fuzzy Backpropagation Networks:** LR type Fuzzy numbers, Fuzzy Neuron, Fuzzy BP Architecture, Learning in Fuzzy BP, Application of Fuzzy BP Networks.	06

5	**Hybrid Systems:** Sequential Hybrid Systems, Auxiliary Hybrid Systems,Embedded Hybrid Systems, Neuro-Fuzzy Hybrid Systems, Neuro-Genetic Hybrid Systems, Fuzzy-Genetic Hybrid Systems.	06
6	**Genetic Algorithms** Introduction, Basic GA framework and different GA architectures, GA based Weight Determination, K - factor determination in Columns.	06

TEXT BOOKS :

1. Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis & Applications, S.Rajasekaran, G. A. Vijayalakshami, PHI.

REFERENCE BOOKS :

1. Genetic Algorithms: Search and Optimization, E. Goldberg.
2. Neuro-Fuzzy Systems, Chin Teng Lin, C. S. George Lee, PHI.
3. Build_Neural_Network_With_MS_Excel_sample by Joe choong.

TERMWORK :

B. Y.B.Tech (INFORMATION TECHNOLOGY) Sem – VII

PCE-IT704– Data Science

TEACHING SCHEME	EXAMINATION SCHEME
Theory: -3Hr/week	**Term work:** -25
Tutorial:- 1Hr/Week	**Theory:-** ESE 70 Marks CIE 30 Marks
Practical: -___	**Credits:-** 4

Prerequisite:

1. Programming concepts, Statistical and numerical methods

Course Objectives:

1. To acquire programming skills in core Python
2. To acquire Object Oriented Skills in Python
3. To develop the skill of designing Graphical user Interfaces in Python
4. To develop the ability to write database applications in Python

Course Outcomes:

1. Apply various Python data structures to effectively manage various types of data.
2. Explore various steps of data science pipeline with role of Python.
3. Design applications applying various operations for data cleansing and transformation.
4. Use various data visualization tools for effective interpretations and insights of data.
5. Perform data Wrangling with Scikit-learn applying exploratory data analysis.
6. Apply various Python data structures to effectively manage various types of data.

Unit no.	Course Contents	No. of lectures required
1	**Overview of Python and Data Structures** Basics of Python including data types, variables, expressions, objects and functions. Python data structures including String, Array, List, Tuple, Set, Dictionary and operations them.	06
2.	**Data Science and Python** Discovering the match between data science and python: Considering the emergence of data science, Outlining the core competencies of a data scientist, Linking data science, big data, and AI , Understanding the role of programming, Creating the Data Science Pipeline, Preparing the data,	04

3.	**Getting Your Hands Dirty With Data** Using the Jupyter Console, Interacting with screen text, Changing the window appearance, Getting Python help, Getting IPython help, Using magic functions, Discovering objects, Using Jupyter Notebook, Working with styles, Restarting the kernel, Restoring a checkpoint, Performing Multimedia and Graphic Integration, Embedding plots and other images, Loading examples from online sites, Obtaining online graphics and multimedia.	10
4	**Data Visualization** Visualizing Information: Starting with a Graph, Defining the plot, Drawing multiple lines and plots, Saving your work to disk, Setting the Axis, Ticks, Grids, Getting the axes, Formatting the axes, Adding grids, Defining the Line Appearance, Working with line style, Using colors, Adding markers, Using Labels, Annotations, and Legends, Adding labels, Annotating the chart, Creating a legend. Visualizing the Data: Choosing the Right Graph, Showing parts of a whole with pie charts, Creating comparisons with bar charts, Showing distributions using histograms, Depicting groups using boxplots, Seeing data patterns using scatterplots, Creating Advanced Scatterplotssss, Depicting groups, Showing correlations, Plotting Time Series, Representing time on axes, Plotting trends over time, Plotting Geographical Data, Using an environment in Notebook, Getting the Basemap toolkit, Dealing with deprecated library issues, Using Basemap to plot geographic data, Visualizing Graphs, Developing undirected graphs, Developing directed graphs	06
5	**Data Wrangling** Wrangling Data: Playing with Scikit-learn, Understanding classes in Scikit-learn, Defining applications for data science, Performing the Hashing Trick, Using hash functions, Demonstrating the hashing trick, Working with deterministic selection, Considering Timing and Performance, Benchmarkin, with,timeit,.	06
6	**Data Measure** Working with the memory profiler, Running in Parallel on Multiple Cores, Performing multicore parallelism, Demonstrating multiprocessing. Exploring Data Analysis: The EDA Approach, Defining Descriptive Statistics for Numeric Data, Measuring central tendency, Measuring variance and range ,Working with percentiles, Defining measures of normality, Counting for Categorical Data, Understanding frequencies, Creating contingency tables, Creating Applied Visualization for EDA ,Inspecting boxplots	06

TEXT BOOKS:

1 Python for data science for dummies John Paul Mueller, Luca Massaron Wiley
2 Programming through Python M. T. Savaliya, R. K. Maurya, G. M. Magar STAREDU Solutions
3. Pandas for everyone: Python Data Analysis Daniel Y. Chen Pearson

REFERENCE BOOKS:

1. Introducing Data Science: Big Data, Machine Learning, and More, Using Python Tools Davy Cielen, Arno D.B. Meysman, Mohamed Ali
2. Applied Data Science with Python and Jupyter Alex Galea Packt
3. Data Analytics Paperback Anil Maheshwari McGrawHill
4. Data Science From Scratch: First Principles with Python Joel Grus O'REILLY
5. Star Data Science Specialist STAR CERTIFICATION

TERMWORK:

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VII

PCC-IT705 – WEB TECHNILOGY-I

TEACHING SCHEME	EXAMINATION SCHEME
Theory: -3 Hr/week	**Term work:** -50
Tutorial:- --	**POE:-** 50
Practical: - 4 Hr/week	**Credits:- 05**

Prerequisite:

Basic Knowledge of OOP.

Course Objectives:

1. To introduce students to HTML/CSS for front end design .
2. To introduce students to perform client side form validation
3. Understand emerging Web technologies concepts and tools.
4. To enable students to write web applications/services using different technologies

Course Outcomes:

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

1. Apply knowledge of different HTML/CSS elements for designing web pages
2. Construct client side scripts for validating HTML form data using Javascript technology
3. Develop web applications using HTML/CSS/JavaScript/Server side technologies

Unit no.	Course Contents	No. of lectures required
1	**HTML5 and CSS** HTML Structure, XHTML, DOCTYPE, Header Elements, Conditional Style Sheet, Structural Block Elements, Terminal Block Elements, Multipurpose Block Elements, Inline Elements, Class and ID Attributes,	05
2	**CSS Selector and Inheritance:** Type, Class and ID Selector, Position and Group Selectors, Attribute Selectors, Pseudo-element Selectors, Pseudo-class Selectors, Subclass Selector, Inheritance, Visual Inheritance **Box Model :** Display, Box Model, Inline Box, Inline-Block Box, Block Box, Table Box, Absolute Box, Floated Box, Box Extends: Width, Height, Sized, Shrink, wrapped, Stretched, Box Margin, Border, Padding, Background, Overflow, Visibility, Page Break Positioning Models, Closest Positioned Ancestor, Stacking Context, Atomic, Static, Absolute, Fixed Relative, Float and Clear, Relative Float	04
3	**JavaScript** Introduction to javascript ,Basic program of javascript ,Function & Some data types like array, object , Event In Javascript ,Validating HTML form data using javascript ,Jquery Introduction ,Selectors in Jquery	05

4	**Introducing PHP And PHP Functions** History, General Language Feature PHP Basics : Embedding PHP code in Your Web Pages, Outputting Data to the Browser, PHP supported Data Types, Identifiers, Variables, Constants, Expressions, String Interpolation, and Control Structures **Functions:** Invoking a Function, Creating a Function, Function Libraries, Array: Creating an array, outputting a Array, Merging, slicing, splicing and Dissecting Arrays,Other useful Array Functions	05
5	**Object-Oriented PHP, Advanced OOP Features, Strings and Regular Expressions, Working with HTML Forms.** **Object-Oriented PHP:** The benefits of OOP, Key OOP Concepts, Constructor and Destructors, Helper Functions. **Advanced OOP Features:** Object Cloning, Inheritance, Interfaces, Abstract classes, and Introducing namespaces. **Strings and Regular Expressions:** Regular Expressions, Other String-Specific Functions, Alternatives for Regular Expression Functions **Working with HTML Forms:** PHP and Web Forms, Validating Form Data Handling File ,Uploads: Uploading Files with PHP	08
6	**Using PHP with MySQL, Session Handlers** **Using PHP with MySQL:** Installation Prerequisites, Using the mysqli Extension, Interacting with the Database, Executing Database Transactions. **Session Handlers:** What Is Session Handling, Configuration Directives, Working with Sessions, Practical Session-Handling Examples, Creating Custom Session Handlers	08

TEXT BOOKS :

1. Pro HTML5 and CSS3 Design Patterns by Michael Bowers, Dionysios Synodinos and Victor Sumner, Apress edition
2. Beginning PHP and MySQL: From Novice to Professional, Fourth Edition - W. Jason Gilmore (Unit 4, 5, 6)

REFERENCE BOOKS :

1. Teach Yourself PHP, MYSQL, Apache - Julie C Meloni [SAMS Publication]
2. PHP5 and MySQL Bible Tim Converse, Joyce Park, Clark Morgan

TERMWORK :

1. Create html pages for website like login, registration and about us pages.
2. Design created pages using CSS
   Construct client side scripts to validate HTML form data using Javascript technology
3. Develop a convertor using JavaScript and HTML[e.g. length, area convertor]
4. Installing Apache and PHP on Linux, Configuring PHP at Build Time on Linux. Or
5. Installation of XAMPP.
6. Hello world Program-Embedded HTML with PHP.
7. Program based on PHP variables, Expression, arrays, control structure
8. Experiment Based on OOP and Advance OOP PHP.
9. Experiment based on form validation using PHP using regular expressions etc.
10. Experiment based on upload various types file.
11. Experiment based on send Mail using PHP.
12. Experiment based on database handling using PHP through HTML Forms.(Insert, delete, update records)
13. Experiment based on session Management (create Login Application).
14. Installation of CMS-Joomla/ Drupal/WordPress- Install different modules, plug-ins and learn how to customize it etc.

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VII

PCC-IT706 – Project-I

TEACHING SCHEME	EXAMINATION SCHEME
Theory: -	**Term work:** -25
Tutorial:-	**Practical:-** 50
Practical: - 4Hr/Week	**Credits:-** 2

Prerequisite: Basic Knowledge.
Course Objectives:

1. Identify the area of project work
2. Recognize the need and ability to engage in lifelong learning
3. Function effectively on teams and to communicate effectively
4. Able to prepare the technical report

Course Outcomes:

On completion of the course, student will be able to-
1. Explain the need of a software project for the society.
2. Identify requirement analysis like functional and technical requirements for the Project.
3. Come up with design documents for the project consisting of Architecture, Dataflow diagram, class diagram, Algorithmic descriptions of various modules, collaboration diagram, ER Diagrams, Database Design Documents, Sequence Diagram, Use Case diagram.
4. Able to demonstrate analysis and design of project
5. Prepare the technical report consisting of Requirement specification, Analysis and design of Project

Course Content
The project work is to be carried out in two semesters of Final Year Information Technology. The project should be undertaken preferably by group of 4-5 students who will jointly work and implement the project in the two semesters. In Semester VII, the group will select a project with the approval of the Guide (staff member) and submit the name of the project with a synopsis of the proposed work of not more than 02 to 08 pages before second week of August in the academic year. The group is expected to complete detailed system design, analysis, data flow design, procurement of hardware and/or software, implementation of a few modules of the proposed work at the end of semester –VIII as a part of the term work submission in the form of a joint report. The term work assessment will be done jointly by teachers appointed by Head of the Institution. The oral examination will be conducted by an internal and external examiner as appointed by the University.

Note:

1. Project work should be continually evaluated based on the contributions of the group members, originality of the work, innovations brought in, research and developmental efforts, depth and applicability, etc.
2. Two mid-term evaluations should be done, which includes presentations and demos of the work done.
3. Care should be taken to avoid copying and outsourcing of the project work.

TEXT BOOKS :

1. Data

REFERENCE BOOKS :

1. Data

TERMWORK :

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem –VII

WI-IT 707 –Winter Internship

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - Null	**Term work: -** Null
Tutorial:- Null	**Theory:-** Null
Practical: - 2 Hr./Week	**Credits:-** 1

Prerequisite: Interested professional language

Course Objectives:

1) Identify the ethical standard of behavior for professional and interns within the industry

2) Understand the observation; documentation and assessment are used in industry

3) Develop applied professional skills and technique to get place in MNC Company

Course Outcomes:

1. Students build applicable skills through a variety of internship opportunities, and our graduates find positions in public and private organizations
2. Assess and improve upon their, own cultural competency skills.

Course Content
Internship / Industrial training is a very vital part of professional engineering education. All B. Tech. students are required to undergo internship / training during summer / winter vacation for the period of four to eight weeks. Training and Placement Department take various initiatives and interacts with industries. To get the maximum benefits from these rare opportunities, industrial internship/training is very carefully planned. The training program has following components. **1) Allotment of internship/Training organizations** **2) Orientation Lecture:** During Orientation Lecture students are taught techniques of learning what to learn, how to learn, etc.

3) Internship / Industrial Training Schedule: B. Tech. = 04 Weeks.

4) Daily Diary: Students undergoing training are required to maintain daily diary regularly in systematic manner.

Note:

1. The students shall undergo 6-8 week internship during summer/winter vacation at industry/R&D organization / Academic Institutes
2. The internship evaluation shall be done in the VIII semester of study and hence the students shall complete the prescribed period of internship before start of VIII semester.
3. The internship evaluation shall be done by Departmental Project Evaluation Committee (DPEC) based on the report submitted by student and oral presentation on VIII semester

B. Tech (INFORMATION TECHNOLOGY) Sem – VIII

PCE-IT801 – MACHINE LEARNING

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - 4 Hr/week	**Term work: -**50 Marks
Tutorial:-NA	**Theory:-** ESE 70 Marks CIE 30 Marks
	Credits:- 05
Practical: 2 Hr/week	**POE :-** 50 Marks

Prerequisite: Probability Theory, Computer Programming, Computer Algorithm, Data structures Python Programming.

Course Objectives:

1. To understand the concept of supervised and unsupervised machine learning techniques.
2. To introduce various machine learning algorithms.
3. To understand nature of problems solved with Machine Learning.

Course Outcomes:

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

1. Explain Machine Learning concepts
2. Distinguish various machine learning algorithms
3. Apply appropriate learning methods for problems
4. Design solution using Machine Learning techniques.

Unit no.	Course Contents	No. of lectures required
1	**Introduction to Machine Learning:** Machine Learning: Definition, Terminology, Types of learning, Applications of Machine Learning, Supervised v/s Unsupervised Learning, Machine Learning Problem categories, Machine learning architecture, process, Lifecycle, Performance Measures, tools and framework, data visualization techniques	08
2	**Regression Techniques in Machine Learning:** Simple regression – hypothesis, cost function, parameter learning with gradient descent, learning rate, Gradient Descent for linear regression, examples, simple regression in matrix form. Multivariate Linear Regression – Multiple features, hypothesis functions, Gradient Descent for multiple variables, Feature scaling, polynomial regression, Linear Regression, Non-linear Regression, Model evaluation methods: Bias/Variance trade off, Error Analysis Ensemble methods, Precision/Recall trade off	10
3	**Classification- logistic regression & Naïve Bayes :** Logistic Regression – Definition, Hypothesis representation, decision boundary, cost function, Gradient Descent for Logistic Regression. Multiclass Classification, Regularization - Over fitting &Under fitting, cost function,	08

	Regularized Linear Regression, Regularized Logistic Regression, Conditional probability and Naïve Bayes Classifier, Instance-based classifier – K- Nearest Neighbour Classifier, Bayesian Network, Hidden Markov Model	
4	**Classification Techniques in Machine Learning** : Classification- Decision trees and Support Vector Machine: Decision trees: definition, terminology, the need, advantages, and limitations. Constructing and understanding Decision trees, common problems with Decision trees, Decision tree algorithms, random forest, examples, Support Vector Machine: What is SVM, Kernel Trick, Cost Function, Decision Trees vs. Support Vector Machine	08
5	**Unsupervised Learning Techniques in Machine Learning:** Clustering, K Means clustering, Hierarchical clustering, Association Rule mining	06
6	**Neural Networks:** Use cases based on supervised ML, unsupervised ML, reinforcement, Shopping mall, recommendation engine, IPL prediction, weather forecast prediction, house price prediction, Market Basket Analysis, classifying emails as spam or not, sentiment analysis, forecast product demand and inventory.	08

TEXT BOOKS :

1. Machine Learning With Python by Abhishek Vijayvargia,BPB Publications
2. Aurelien Geron , " Hands-On Machine Learning with Scikit-Learn, Keras and Tensor Flow: Concepts, Tools and Techniques to Build Intelligent Systems", O'Reilly, 2nd Edition, 2019

REFERENCE BOOKS :

1. Tom Mitchell, "Machine Learning", McGraw-Hill, 2nd Edition, 1997
2. Machine Learning for dummies by John Paul Muller,Willey Publication

TERMWORK :

- Minimum of 12 Experiments to be performed from the list given below.
- 25 marks for performance in practical and experiments as part of continuous evaluation
- 25 marks for Practical Test and oral to be conducted.

Experiment List

Software/Tools required to perform the below experiments –

a. Anaconda
b. Python v3.8+
c. Spyder/Jupyter Notebook
d. Google Colaboratory **(Optional)**

1. Study and prepare a report on different tools, framework and data visualization techniques in Machine Learning
2. Write a program to perform –
    a. The hypothesis and cost function
    b. Gradient descent for linear regression
3. Write a program to perform linear regression and multivariate regression using multiple features. Display the results using the different data visualization techniques (Perform this using a data set)
4. Write a program to perform multiclass classification using a data set and display the results using different data visualization techniques
5. Study and prepare a report on overfitting and underfitting in Machine Learning
6. Write a program to perform Naïve Bayes classifier with the help of a data set and display the result/s using different data visualization techniques
7. Write a program to perform KNN (k-Nearest Neighbor) classifier with the help of a data set, and display the result/s using different data visualization techniques
8. Write a program to perform decision trees with the help of a data set and display the result using the different visualization techniques
9. Write a program to perform SVM (Support Vector Machines) with the help of a data set and display the result/s using different data visualization techniques
10. Write a program to perform k-means clustering with the hep of a data set and display the result/s using different visualization techniques
11. Write a program to perform the association rule mining (Apriori algorithm) using a data set and display the associated results in a tabular form and using different data visualization techniques
12. Write a program to show case the IPL prediction (use different scenarios such as team winning, ground match, stadium, etc…). prepare the summary and report for IPL prediction
13. Write a program to show case weather forecast prediction using different countries data set and display the results using different data visualization techniques
14. Write a program to perform the classification of emails as “spam” or “not spam”
15. Write a program to perform sentiment analysis and display the results using different data visualization techniques (Use of atleast 5 different emotions is mandatory to perform this experiment)

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VIII

PCC-IT802 – Cloud Computing

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - 4 Hr/week	**Term work: -** 25
Tutorial:- 1 Hr/week	**Theory:-** ESE 70 Marks CIE 30 Marks
Practical: -	**Credits:-** 5

Prerequisite: Computer Networks, Operating System-I, Information Security

Course Objectives:

This course aims at giving students knowledge of Cloud computing along with its applications in terms of the following

1. Understanding the systems, protocols and mechanisms to support cloud computing.
2. Understanding the architecture of cloud computing
3. Discuss Cloud Platforms in Industry
4. Understanding cloud computing applications.
5. Discuss Cloud Security and various challenges

Course Outcomes:

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

1. Understanding and familiar with the basic concepts of cloud computing
2. Demonstration of different virtualization techniques
3. Illustrates different cloud applications
4. Understand resent trends in cloud computing
5. Comprehend the importance of cloud security

Unit no.	Course Contents	No. of lectures required
1	**Introduction:** Definition, Historical Developments, Computing Platforms and Technologies. Building cloud computing environments, Principles of Parallel and Distributed Computing: Parallel versus Distributed Computing, Elements of Parallel Computing, Elements of Distributed Computing, and Technologies for Distributed Computing.	06
2	**Virtualization** Characteristics, Virtualization Techniques, Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples.	06

3	**Cloud Computing Architecture** Cloud Reference Model, Types of Clouds, And Economics of Clouds, Open Challenges, Cloud Platforms in Industry: Amazon Web Services, Google App Engine, And Microsoft Azure.	07
4	**Cloud Applications** Scientific Applications in – Healthcare, Biology, Geo-Science; Business Applications in– CRM and ERP, Productivity, Social Networking, Media Applications, Multiplayer Online Gaming.	07
5	**Advanced Topics in Cloud Computing:** Energy Efficiency in Clouds, Market Based Management of Clouds, Federated Clouds / InterCloud, Third Party Cloud Services.	05
6	**Understanding Cloud Security:** Securing the Cloud, The security boundary, Security service boundary, Security mapping, Securing Data, Brokered cloud storage access, Storage location and tenancy, Encryption, Auditing and compliance, Establishing Identity and Presence, Identity protocol standards	07

TEXT BOOKS :

1. Mastering Cloud Computing, Buyya R, Vecchiola C, Selvi S T, McGraw Hill Education (India), 2013.
2. Cloud Computing Bible, Barrie Sosinsky ,Wiley Publishing Inc. 2011(Unit,VI)

REFERENCE BOOKS :

1. Buyya R, Broberg J, Goscinski A, "Cloud Computing - Principles and Paradigms", Wiley, 2011.

TERMWORK :

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VIII

PCE-IT 704– Enterprise Resource Planning

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - 3 Hr/week	**Term work: -25**
Tutorial:- 1 Hr/Week	**Theory:-** ESE 70 Marks CIE 30 Marks
Practical: - ----------	**Credits:- 4**

Prerequisite: Fundaments of Economic & Management

Course Objectives:

1. To provide overview of ERP.

Course Outcomes:

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

1. To impart knowledge about different facets of ERP Systems
2. To impart knowledge of ERP implementation process and get familiar with the common pitfalls.
3. Explain the challenges associated with implementing enterprise systems and their impacts on organizations •
4. Describe the selection, acquisition and implementation of enterprise systems
5. Use one of the popular ERP packages to support business operations and decision-making,
6. Communicate and assess an organization's readiness for enterprise system implementation with a professional approach in written form, •

Unit no.	Course Contents	No. of lectures required
1	**Introduction** **Overview of enterprise systems:** Introduction, What is ERP, Why ERP, Need for Enterprise Resource Planning , Definition of ERP. **Evolution of Enterprise Resource Planning:** Pre material requirement planning (MRP stage), Material requirement planning, MRP- II ,ERP ,Extended ERP , ERP Planning –II , ERP-A manufacturing perspective **Risks and benefits –** Risk implementation, Fundamental technology of ERP, Issues to be consider in planning design and implementation of cross functional integrated ERP systems	07
2	**ERP SOLUTIONS AND FUNCTIONAL MODULE** Overview of ERP software solutions**,** Small, medium and large enterprise vendor solutions, Business process Reengineering, Business process Management, Steps of BPM **Functional Modules:** ERP Production planning module, ERP purchasing module, ERP Inventory control module, ERP Sales module, ERP Marketing module, ERP Financial module, ERP HR module	05

3	**ERP IMPLEMENTATION** Planning Evaluation and selection of ERP systems, **ERP Implementation life cycle:** Pre-evaluation Screening, Package Evaluation, Project Planning Phase, Gap-Analysis, Reengineering, Configuration **ERP Implementation:** Implementation Team Training, Testing, Going Live, End-user training Post – implementation ERP implementation Methodology and Frame work Training, Data Migration, People Organization in implementation, Consultants and Vendors, Employees.	07
4	**POST IMPLEMENTATION** ERP Implementation, Maintenance of ERP, Organizational and Industrial impact; Success factors of ERP Implementation, Key success factors, Failure factors of ERP Implementation.	06
5	**EMERGING TRENDS ON ERP** Extended ERP systems and ERP add-ons, CRM, Benefits of ERP Module, Supply Chain Management (SCM), Business analytics & Intelligence, Wireless Technology used in ERP, Future trends in ERP	05
6	**ERP market and case studies:** Brief account of ERP market, various ERP packages like SAPAG,Oracle, PeopleSoft, etc, Case studies based on implementation of ERP for various industries in mfg., marketing and other business.	06

TEXT BOOKS :

1. Alexis Leon, ERP demystified, second Edition Tata McGraw-Hill, 2006
2. Enterprise Resource planning, Alexis Leon, Tata McGraw Hill Publication, ISBN 0-07- 463712-6

REFERENCE BOOKS :

1. Jagan Nathan Vaman, ERP in Practice, Tata McGraw-Hill, 2008
2. Alexis Leon, Enterprise Resource Planning, second edition, Tata McGraw-Hill, 2008.
3. Mahadeo Jaiswal and Ganesh Vanapalli, ERP Macmillan India, 2006.
4. Vinod Kumar Grag and N.K. Venkitakrishnan, ERP- Concepts and Practice, Prentice Hall of India, 2006.
5. Summer, ERP, Pearson Education, 2008.

TERMWORK :

7-8 Tutorials based on each chapter

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VIII

PCE-IT803 – INFORMATION RETRIEVAL

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - 3 Hrs/week	**Term work: -** 25
Tutorial:- 1 Hr/week	**Theory:- ESE-70** **CIE-30**
Practical: - ----	**Credits:- 4**

Prerequisite:

1. Advance Database Systems
2. Web-Technology-I

Course Objectives:

1. To understand the need of Information Retrieval
2. To use IR system in Information Search
3. To learn Information Retrieval Modeling and Evaluation
4. To understand Preprocessing in IR Systems
5. To study Text based and Web Based Retrieval Systems

Course Outcomes:

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

1. To apply Information Retrieval system to search information.
2. To design and develop Retrieval systems.

Unit no.	Course Contents	No. of lectures required
1	**Introduction to Information Retrieval** Information Retrieval in Libraries and Digital Libraries, The IR Problem, The IR System, How the Web Changed Search. User Interfaces for Search, Search Interfaces Today, Visualization in Search Interfaces	05
2	**Information Retrieval Modeling** IR Models: Modeling and Ranking, Characterization of an IR Model, A Taxonomy of IR Models, Classic Information Retrieval:Basic Concepts, The Boolean Model, Term Weighting, TF-IDF Weights, Document Length Normalization, The Vector Model, Set-Based Model, Extended Boolean Model, Generalized Vector Space Model , Latent Semantic Indexing Model, The Hypertext Model, Web based Models, Structured Text Retrieval	07
3	**Information Retrieval Evaluation** Retrieval Metrics: Precision and Recall, Single Value Summaries: P@n, MAP, MRR, F, User-Oriented Measures, DCG: Discounted Cumulated Gain, BPREF: Binary Preferences, Rank Correlation Metrics	06

4	**Documents: Languages & Properties** Metadata, Text Document Format, Markup Languages, RDF: Resource Description Framework, Text Properties, Information Theory, Text Similarity, Document Preprocessing , Lexical Analysis of the Text , Elimination of Stopwords, Stemming , Keyword Selection, Queries: Languages & Properties, Query Languages: Keyword-Based Querying, Structural Queries, Query Protocols, Query Properties	07
5	**Text Classification and Indexing** A Characterization of Text Classification, Unsupervised Algorithms, Supervised Algorithms, Feature Selection or Dimensionality Reduction, Evaluation Metrics, Inverted Indexes	06
6	**Web Retrieval** The Web ,Characteristics , Structure of the Web , Modeling the Web , Link Analysis, Search Engine Architectures, Search Engine Ranking, Managing Web Data, Search Engine User Interaction, Browsing, Beyond Browsing	05

TEXT BOOKS :

1. Modern Information Retrieval The Concepts and Technology behind Search by Ricardo Baeza-Yates Berthier Ribeiro-Neto Second edition Addison-Wesley 2011

REFERENCE BOOKS :

1. Introduction to Information Retrieval by C.D. Manning, P. Raghavan, H. Schütze. Cambridge UP, 2008.
2. 2.Search Engines: Information Retrieval in Practice by Bruce Croft, Donald Metzler, Trevor StrohmanPearson 2010

TERMWORK :

Tutorial work to be considered for awarding term work marks. It should consist of 8-10 assignments based on above topics.

B. Y. B. Tech (INFORMATION TECHNOLOGY) SEM – VIII

PCE-IT803 – Business Intelligence

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - 3Hr/week	**Term work:** -25
Tutorial:- 1Hr/week	**Theory:-** ESE 70 Marks CIE 30 Marks
Practical: -	**Credits:-** 4

Prerequisite: Advance Database Systems.

Course Objectives:

1. To introduce the students limitations of transaction processing systems and benefits of Analytical processing systems.
2. Business Intelligence systems, its architecture and to use it as a decision making systems.
3. Designing Dimensional model, Fact table and dimension tables and correlate them using various models like star schema, snow flack schema.
4. Design and development of Business Intelligent Applications.

Course Outcomes:

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

1. Describe the concepts and components of Business Intelligence (BI).
2. Evaluate use of BI for supporting decision making in an organization.
3. Understand and use the technologies and tools that make up Business Intelligent.
5. Design and development of Business Intelligent Applications.
4. Plan the implementation of a BI system.

Unit no.	Course Contents	No. of lectures required
1	**Introducing the Technical Architecture:** The value of architecture, Technical Architecture overview, Back room Architecture, Presentation Server Architecture, Front room Architecture, Infrastructure, Metadata, and Security.	07
2	**Introducing Dimensional Modeling:** Making the Case for Dimensional Modeling, Dimensional Modeling primer, Enterprise Data Warehouse Bus Architecture, More on Dimensions & Facts. Architecture, Presentation Server Architecture, Front room Architecture, Infrastructure, Metadata, and Security.	06
3	**Designing the Dimensional Modeling:** Modeling Process overview, Getting Organized, Four Step Modeling Process, Design the Dimensional Model.	05

4	**Introducing Extract, Transformation & Load** Round up the requirements, the 34 subsystems of ETL, Extracting Data, Cleaning & Conforming data, Delivering Data for Presentation.	06
5	**Introducing Business Intelligence Applications:** Importance of B.I. Applications, Analytical cycle for B.I., Types of B.I. Applications, Navigating Applications via the B.I. portal.	06
6	**BI Application Development & Big data analytics overview :** B.I. Application Development, B.I. Application maintenance, Big data overview, Recommended best practices for Big Data.	06

TEXT BOOKS:

1. The Data Warehouse Lifecycle Toolkit, by Ralph Kimball, Margy Ross, Warren Thornthwaite, Joy Mundy, Bob Becker 2nd edition, Wiley Publication (Unit 1-6).
2. The Data Warehouse Toolkit, by Ralph Kimball, Margy Ross, 3rd edition, Wiley Publication (Unit-6).

REFERENCE BOOKS:

1. Fundamentals of Business Analytics by R.N. Prasad, Seema Acharya Wiley Publication
2. Data Warehousing in the Real World By Anahory & Murray, Pearson Education.
3. Data Warehousing Fundamentals By Ponniah Wiley Publication.

TERMWORK :

- For term work of 25 marks, batch wise tutorials are to be conducted.
- Number of tutorials should be at least 6-8, covering all the above mentioned topics.

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VIII

PCE-IT804- SOFTWARE TESTING

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - 3 Hrs/week	**Term work: -** 25
Tutorial:- 1 Hr/week	**Theory:-** ESE- 70 CIE-30
Practical: - ----	**Credits:-** 4

Prerequisite: Basic Knowledge of Software Engineering.

Course Objectives:

1. To understand fundamentals concepts of Software Testing.
2. To learn different levels of testing
3. To design the Test cases.
4. To understand test management and test automation techniques.
5. To apply test metrics and measurements.

Course Outcomes:

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

1. Design the test cases and apply for software testing.
2. Identify different levels of Testing to be carried out.
3. Develop and validate a test plan.
4. Prepare test planning based on the document.
5. Use automatic testing tools in Software testing.

Unit no.	Course Contents	No. of lectures required
1	**Introduction:** Testing as an Engineering Activity, Testing as a Process, Testing axioms, Basic definitions, Software Testing Principles, The Tester‘s Role in a Software Development Organization, Origins of Defects, Cost of defects, Defect Classes.	06
2	**Test Case Design Strategies:** Test case Design Strategies, Using Black Box Approach to Test Case Design, Boundary Value Analysis, Equivalence Class Partitioning, State based testing, Cause-effect graphing, Compatibility testing, user documentation testing, Using White Box Approach to Test design, Test Adequacy Criteria, static testing vs. structural testing, code functional testing – Coverage and Control Flow Graphs, Covering Code Logic, Paths, code complexity testing.	07

3	**Types of Testing:** White Box Testing, Black Box Testing, Integration Testing, System and Acceptance Testing, Performance Testing, Regression Testing, Internationalization Testing, Ad hoc Testing, Testing of OO Systems, Usability and Accessibility testing	07
4	**Test Planning And Management:** People and organizational issues in testing, Organization structures for testing teams, testing services, Test Planning, test management, test process, Test Reporting.	06
5	**Test Metrics And Measurements:** What are Test metrics and measurements?, Types of Metrics, project Metrics, productivity metrics.	04
6	**Test Automation:** Software test automation, skills needed for automation, scope of automation, design and architecture for automation, requirements for a test tool, challenges in automation. **Automation Testing Tools:** Selenium, Cucumber, Zephyr, Silk test etc.	06

TEXT BOOKS :

1. Srinivasan Desikan and Gopalaswamy Ramesh, ―Software Testing – Principles and Practices, Pearson Education, 2006.
2. Ron Patton, ―Software Testing, Second Edition, Sams Publishing, Pearson Education, 2007. AU Library.com

REFERENCE BOOKS :

1. Ilene Burnstein, ―Practical Software Testing‖, Springer International Edition, 2003.
2. Edward Kit Software Testing in the Real World – Improving the Process, Pearson Education, 1995.
3. Boris Beizer, Software Testing Techniques – 2nd Edition, Van Nostrand Reinhold, New York, 1990.
4. Aditya P. Mathur, ―Foundations of Software Testing _ Fundamental Algorithms and Techniques, Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008.

TERM WORK :

Tutorial work to be considered for awarding term work marks. It should consist of 8-10 assignments based on above topics. In tutorial section students should have to prepare Test cases for different types of Testing. They should prepare Test plan to perform software testing.

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VIII

PCE-IT804– Artificial Intelligence

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - 3 Hr/week	**Term work: -** 25 Marks
Tutorial:- 1 Hr/week	**Theory:-** ESE 70 Marks CIE 30 Marks
Practical: --	**Credits:-** 4

Prerequisite: Knowledge of data structure and algorithm.

Course Objectives:

1. To Learn fundamentals of Artificial Intelligence, agents, problem solving approaches & searching techniques
2. To analyze local search algorithms, Game playing, solution searching using min-max and CSP problems
3. To understand prepositional logic syntax & semantics, inference procedure, first order logic, augmented grammar rules and machine translation systems
4. To learn decision theory, making simple & complex decisions and robot hardware, software motion, and applications

Course Outcomes:

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

1. Apply fundamentals of AI in various problem-solving approaches for engineering problems
2. Analyze search algorithms, game playing and constraint satisfying problem &solutions.
3. Develop prepositional logic, Fist Order Logic and apply the augmented grammar solutions for machine translation
4. Apply decision theory for simple & Complex problems and illustrate the software & hardware used in robotics.

Unit no.	Course Contents	No. of lectures required
1	Introduction: Introduction to AI, The foundations &history of AI Intelligent Agents: Agents and environments, Nature of environments, Structure of agents Problem Solving: Problem-solving agents,	06
2	Example on problems searching for solutions, Uninformed and informed search strategies, Heuristic functions Classical Search: Local search algorithms &optimization problems, Local search in continuous space, searching in nondeterministic actions,	06

3	Partial observations Adversarial Search:Game playing, The Mini-max search procedure, Alpha-Beta pruning, cutoffs and Additional refinements Constraint Satisfaction Problems(CSP):Constraint propagation, Backtracking search for CSPs	06
4	Logical Agents: Knowledge based agents, Wumpus world, Propositional logic First Order Logic (FOL): Syntax & Semantics, Using FOL, Knowledge engineering Inference in FOL, Forward chaining, Backward chaining	06
5	Resolution Natural Language for Communication: Phrase structure grammars, Syntactic analysis, Augmented grammars, Machine translation Quantifying Uncertainty: Acting under uncertainty, Bayes rule Probabilistic Reasoning Over Time: Time and uncertainty, Inference in temporal models	06
6	Hidden markov models Making Simple and Complex Decisions: Combining beliefs and desires under uncertainty, The basis of utility theory, Utility functions, Sequential decision problems, Value iteration and Policy iteration Robotics: Robotic hardware, Perception, Planning and control, Application domains	06

TEXT BOOKS

1. Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, 3rd ed.New Delhi: Prentice Hall Series in AI, 2010

REFERENCE BOOKS :

2. Elaine Rich, Kevin Knight, Shivashankar B Nair, " Artificial Intelligence" third edition, McGraw Hill
3. Introduction to Knowledge Systems,San Francisco: Morgan Kaufman, 1995.
4. Winston,Patrick Henry, Artificial Intelligence, 3rded. California: Addison Wesley, 1995.
5. Dan W. Patterson, Introduction to Artificial Intelligence and Expert Systems, 2nded.New Delhi, Prentice Hall of India, 1997

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VIII

PCC-IT804 – PROJECT MANAGEMENT

TEACHING SCHEME	EXAMINATION SCHEME
Theory: -3 Hr/week	**Term work: -25**
Tutorial:- 1 Hr/week	**Theory:-** ESE 70 Marks CIE 30 Marks
Practical: -	**Credits:- 4**

Prerequisite: 1. Fundamentals of Economics and Management
2. Software Engineering
3. Software Testing and Quality Assurance

Course Objectives:

1. Understand the fundamental concepts of project management
2. Understand the nine project management knowledge areas
3. Understand the processes in the knowledge areas and inter dependencies between them
4. Understand the documents required for actual projects
5. Understand the commonly used tools and techniques for project management

Course Outcomes:

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

1. Understand the selection and initiation of individual projects and of portfolios of projects in the enterprise.
2. Conduct project planning activities that accurately forecast project costs, timelines, and quality. Implement processes for successful resource, communication, and risk and change management.
3. Demonstrate effective project execution and control techniques that result in successful projects.
4. Conduct project closure activities and obtain formal project acceptance.
5. Demonstrate a strong working knowledge of ethics and professional responsibility and effective organizational leadership and change skills for managing projects, project teams, and stakeholders.

Unit no.	Course Contents	No. of lectures required
1	**Introduction to Project Management** Project, project management(PM), role of project manager, project management profession, system view of PM, organization, stakeholders, project phases and lifecycle, context of IT projects, process groups, mapping process groups to knowledge areas.	06

2	**Project Integration and Scope Management** Strategic planning and project selection, preliminary scope statements, project management plans, project execution, monitoring and controlling project work, integrated change control, closing project, software assistance scope planning and scope management plan, scope definition and project scope statement, creating the work breakdown structure,	08
3	**Project Time and Cost Management** Importance of project schedules, activity - definition, sequencing, resource estimating, duration estimating; schedule development and control, software assistance Importance, basic principles, cost estimating, budgeting and control, software assistance	06
4	**Project Quality and Human Resource Management** Importance, quality – planning, assurance and control, tools and techniques, modern quality management and improving IT project quality, software assistance Importance, keys to managing people, human resource planning, acquiring, developing and managing project team, software assistance	08
5	**Project Communication and Risk Management** Importance, communication planning, information distribution, performance reporting, managing stakeholders, suggestions for improving project communication, software assistance Importance, risk management planning, sources of risk, risk identification, qualitative and quantitative risk analysis, risk response planning, risk monitoring and control, software assistance	08
6	**Project Procurement Management** Importance, planning purchases and acquisitions, planning contracting, requesting seller responses, selecting sellers, administering the contract, closing the contract, software assistance	04

TEXT BOOKS :

1. Information Technology Project Management (4th Edition) – Kathy Schwalbe, (Cengage Learning – India Edition)

REFERENCE BOOKS :

1. Project Management Core Textbook – Mantel Jr., Meredith, Shafer, Sutton with Gopalan
2. (Wiley India Edition)
3. 2. A Guide to the Project Management Body of Knowledge (Third Edition)- Newtown Square,
4. PA, Project Management Institute, 2005
5. 3. Effective Project Management: Traditional, Agile, Extreme – Robert K Wyosaki (Seventh
6. Edition) Wiley India

TERMWORK :

Tutorial work to be considered for awarding of term work marks

Guidelines for tutorials

Divide the batches into groups as per BE Project batches and ask them to complete tutorials based on your final year project using any of the open source project management tool or Microsoft Project Management 2010 or above trial version available. 8-10 tutorials from the sample list below should be allocated to the project groups. Faculty will evaluate the performance of the students in the tutorials and assign the term work marks

1. Survey of common project management tools and techniques by knowledge area and write a report on same.
2. Develop the project charter for project
3. Collect requirement using different techniques and develop scope of selected project
4. Creating WBS structure of selected project using different approaches
5. Develop project schedule network diagram for project
6. Develop entire schedule of project by estimating activity resources and duration
7. Problems on network diagram and critical path methods
8. Prepare the cost estimate by using any of the cost estimate types
9. Develop the project quality document
10. List and analysis different types of tools and techniques for quality control
11. Application of motivational theories to the group of students to study psychology of students
12. Develop communication management plan for selected project
13. Identify risk involved in project and prepare risk document
14. Develop the SOW (Statement of work) for the procurement of selected project.

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VIII

PCC-IT805 – Advance Web Technology

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - 3Hr/week	**Term work:** -50
Tutorial:-	**Practical:-** 50
Practical: - 4Hr/Week	**Credits:-** 5

Prerequisite:

1. HTML/CSS
2. JavaScript
3. Web Technology - I

Course Objectives:

1. Develop modern, complex, responsive and scalable web applications with Angular Motivate.
2. Use their gained, deep understanding of the Angular fundamentals to quickly establish themselves as frontend developers.
3. Fully understand the architecture behind an Angular application and how to use it.

Course Outcomes:

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

1. Explain the concepts of advanced web development.
2. Design Front end using Angular technology
3. Develop a web application using back end technologies.

Unit no.	Course Contents	No. of lectures required
1	**AngularJS Introduction,** AngularJS Expressions, AngularJS Modules, AngularJS Directives, AngularJS ng-model Directive, AngularJS Data Binding, AngularJS Controllers, AngularJS Scope, AngularJS Filters, Form Validations, AJAX, Views, Services, Dependency Injection, Custom Directive	07
2.	**Angular** Introduction, Difference AngularJs and Angular, Angular Versions, Angular - Web Application architecture, MVC and MVVM design pattern, Angular architecture, Angular building b locks, Forms implementation, Filters, Services, Consuming, REST Web Services, Modules: Built-in and custom, Directives: Built-in and custom, Routing and Navigation, Animations, Testing Angular application	07

3.	**Bootstrap:** Bootstrap - Overview Environment Setup, Grid System ,Typography ,Code , Tables ,Forms, Buttons , Badges and Labels , Progress Bars , List Groups , Panels , Dropdowns ,Images , Helper Classes , Responsive utilities, navigation, modals, image carousels	04
4	**Node** Node , Difference between Angular Js and Node Js, NodeJs architecture ,Modules: Built-in and custom, Event loop, Asynchronous application , Testing node application	05
5	**Express** Introduction to ExpressJs, Routing, Template engines, Middleware, Web Application, components, Error handling, Testing application Express application	06
6.	**MongoDB** Relational vs NoSQL DB, MongoDB fundamentals, Data modeling, Aggregation pipeline, Grid FS, Performance optimization	05

TEXT BOOKS :

1. MEAN Web Development author Amos Q. Haviv published by PACKT PUBLISHING LTD
2. Pro MEAN Stack Development author Elrom, Elad published by Apress
3. Bootstrap: Responsive Web Development author Jake Spurlock published by O'REILLY

REFERENCE BOOKS :

1. Bootstrap in 24 hours, Sams Teach Yourself author Jennifer Kyrnin published by By Jennifer Kyrnin
2. Web Development withNode and Express author Ethan Brown Published by O'Reilly Media
3. Getting MEAN with Mongo, Express, Angular, and Node(Manning) author Simon Holmes, Clive Harber published by Simon Holmes
4. AngularJS in Action author Lukas Ruebbelke published by Martin Gontovnikas
5. Practical Node.JS author Azat Mardan published by Apress.

TERMWORK :

- Minimum of 15 Experiments to be performed from the list given below.
- 25 marks for performance in practical and experiments as part of continuous evaluation
- 25 marks for Practical Test and oral to be conducted.

Experiment List:

1. Create simple Testing Angular application.
2. Display the current value of the query model by adding a {{$ctrl.query}} binding into the phone-list.template.html template and see how it changes, when you type in the input box.
3. Angello: Creating controllers to manage views
4. AngularJS: Declaring properties and methods in a controller
5. Binding to properties and expressions in an AngularJS template, creating views and controllers and how to test them
6. Using $http to communicate with remote servers
7. Directives uses in Angello
8. Write a program demonstrating NodeJs application.
9. Error handling in NodeJs.
10. Express.js Installation
11. Develop Website : Saving Time with Express
12. Quality Assurance: Page Testing
13. Building a web server with Express
14. running NPM with -g and $ express -V
15. Proper Installation of MongoDB
16. simple MongoDB script with a native driver
17. Persistence With MongoDB and Mongoskin

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem – VIII

PCC-IT806 – Project-II

TEACHING SCHEME	EXAMINATION SCHEME
Theory: -	**Term work:** -25
Tutorial:-	**Practical:-** 50
Practical: - 4 Hr./week	**Credits:- 2**

Prerequisite: Project - I.
Course Objectives:

1. Students should learn to design and develop usable User Interface.
2. Students should learn to analyze and apply emerging technologies in development of a project.
3. Students should learn to test the modules in project.
4. Students should learn to demonstrate working of project.

Course Outcomes:

On completion of the course, student will be able to-
1. Design and develop usable User Interface
2. Analyze and apply emerging technologies in development of a project
3. Test the modules in Project
4. Demonstrate working of project

Course Contents

The group will continue to work on the project selected during the semester VII and submit the completed project work to the department at the end of semester VIII as mentioned below.
1. The workable project.
2. The project report in the bound journal complete in all respect with the following : -
   i. Problem specifications
   ii. System definition – requirement analysis.
   iii. System design – dataflow diagrams, database design
   iv. System implementation – algorithm, code documentation
   v. Test results and test report.
   vi. In case of object oriented approach – appropriate process be followed.

Term work will be jointly assessed by a panel of teachers appointed by head of the institution. Oral examination will be conducted by internal and external examiners as appointed by the University.

Note:

1. Project work should be continually evaluated based on the contributions of the group members, originality of the work, innovations brought in, research and developmental efforts, depth and applicability, etc.
2. Two mid-term evaluations should be done, which includes presentations and demos of the work done.
3. Care should be taken to avoid copying and outsourcing of the project work.

B. Y. B. Tech (INFORMATION TECHNOLOGY) Sem-VIII

WI-IT 807 –Winter Internship

TEACHING SCHEME	EXAMINATION SCHEME
Theory: - Null	**Term work: -** 50
Tutorial:- Null	**Theory:-** Null
Practical: - Null	**Credits:-** 0

Prerequisite: Interested professional language, Winter Internship semester VII

Course Objectives:

1) Identify the ethical standard of behavior for professional and interns within the industry

2) Understand the observation; documentation and assessment are used in industry

3) Develop applied professional skills and technique to get place in MNC Company

Course Outcomes:

1. Demonstrate understanding of therapeutic models of helping.
2. Understand the stages of helping, including exploration, insight, and action
3. Develop applied helping skills to facilitate change in individuals, families, and group

Course Content
Internship / Industrial training is a very vital part of professional engineering education. All B. Tech. students are required to undergo internship / training during summer / winter vacation for the period of four to eight weeks. Training and Placement Department take various initiatives and interacts with industries. To get the maximum benefits from these rare opportunities, industrial internship/training is very carefully planned. The training program has following components. **1) Allotment of internship/Training organizations** **2) Orientation Lecture:** During Orientation Lecture students are taught techniques of learning what to learn, how to learn, etc. **3) Internship / Industrial Training Schedule:** B. Tech. = 04 Weeks in the month of December.

4) Daily Diary: Daily Diary prepared for student. Students undergoing training are required to maintain daily diary regularly in systematic manner.

5) Evaluation: Evaluation of training performance is done in sem VIII.