MAHANT BACHITTAR SINGH

College of Engineering & Technology

A Constituent of Sant Manjit Singh Trust

Department of Computer Science & Engineering

COURSE SCHEME & SYLLABUS

Bachelor of Engineering

CURRICULUM COURSE

DEPARTMENT OF
COMPUTER SCIENCE AND ENGINEERING

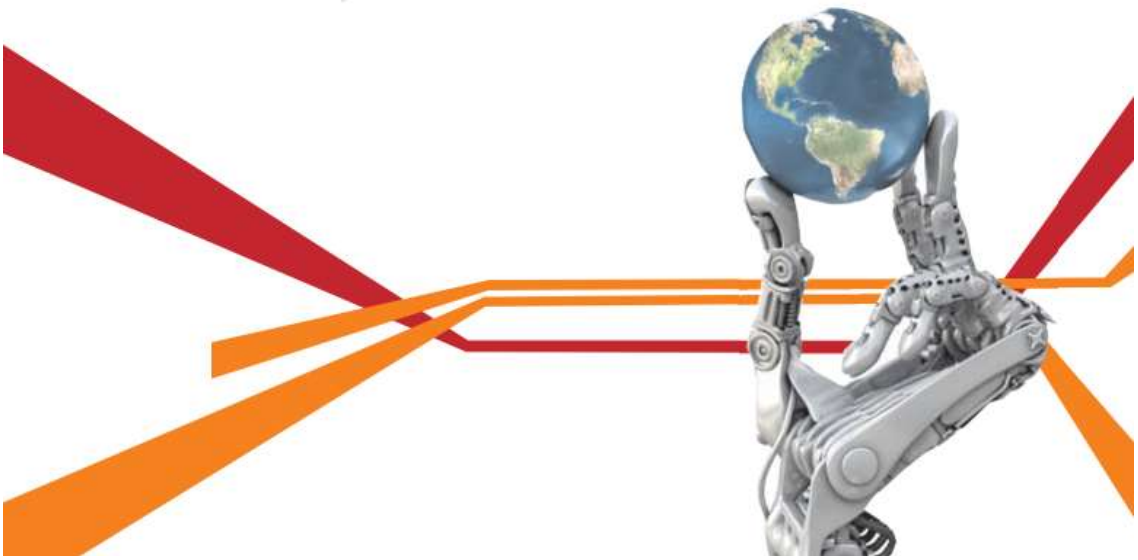
Session 2018 onwards

Vision of the Institute

To be globally acclaimed technical institution for aspiring technocrats and continuously striving to explore new vistas of opportunities.

Mission of the Institute

- Providing contemporary and advanced knowledge of engineering & sciences among students in coordinated and integrated manner.
- Developing culture of excellence in teaching, learning and innovation to provide opportunity to the students to become critical thinker and problem solvers.
- Producing competent skilled manpower based on demand of industry, society and corporate world.
- Promoting design & research culture by adopting latest technology and diverse resources for the benefit of society.



Vision of the CSE Department

To develop **competent professionals** in the field of Computer Science & Engineering to meet the **challenges of Industry & Society.**

Mission of the CSE Department

- Providing contextual and advance knowledge to students in line with industrial trends.
- Promoting **effective Teaching and Learning Practices** using modern tools and techniques.
- Promoting **research and design environment** by providing training in emerging softwares and technologies for fostering student's growth.
- Encouraging **comprehensive development** of the students by **inculcating soft skills and ethics** in their personality.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Our graduates will have **professional competency** built with strong foundation in Computer Science and Engineering for global acceptance in industries, higher studies and research.

PEO2: Our graduates will develop **computing systems**, which enables them to **analyze, evaluate and provide intelligent elucidation** to meet industry challenges.

PEO3: Our graduates will compete with the **challenges of social** and **professional** concern by use of modern tools and softwares.

PEO4: Our graduates will exhibit **leadership quality, ethics, communication and lifelong learning** skills.

PROGRAM COUTCOMES (PO)

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

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

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

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

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

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

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

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

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

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

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

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

PROGRAM SPECIFIC OUTCOME'S (PSO's)

PSO1: To analyze and design hardware / software systems using various architectural / design patterns, standard notations, procedures and algorithms.

PSO2: To design and develop solutions for real world problems by applying computer and communication network technologies.

DEPARTMENT OF
COMPUTER SCIENCE & ENGINEERING

Course Scheme – B. E. 1st Semester

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATIONS			MARKS DISTRIBUTION		TOTAL MARKS	CREDITS	% CHANGE
			L	T	P	INTERNAL	EXTERNAL			
BSC-101	Basic Science course	Engineering Mathematics -I	3	2	0	50	100	150	5	100
BSC-102	Basic Science course	Engineering Physics	3	1	-	50	100	150	4	100
BSC-112	Basic Science course	Engineering Physics (Lab)	-	-	3	50	-	50	1.5	100
ESC-101	Engineering Science Course	Computer Programming	3	1	-	50	100	150	4	100
ESC-111	Engineering Science Course	Computer Programming (Lab)	-	-	2	50	-	50	1	100
ESC-102	Engineering Science Course	Engineering Graphics	1	-	3	50	100	150	2.5	100
NCC-101	Non-Credit Course	Mentoring & Professional Development	-	-	2	Satisfactory/ Unsatisfactory			Non-Credit	100
NCC-102		Environmental Sciences								
NCC-103		Indian Constitution								
TOTAL			**10**	**4**	**10**	**300**	**400**	**700**	**18**	

CLASS: B.E. 1TH SEMESTER **CREDITS: 5**

BRANCH: COMMON TO ALL BRANCHES

COURSE NO. BSC-101

COURSE TITLE: ENGINEERING MATHEMATICS-I

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
3	**2**	**0**	**100**	**50**

Course Outcomes	At the end of the course student will be able to:-	BT Level
CO1	Compute nth derivative of a function, asymptote, double point, curvature of a curve .	3
CO2	Apply concepts such as Indeterminate forms, Partial differentiation, Taylor's & Maclaurin's series expansion, maximize & minimize value of any function with more than one variable, Rolle's theorem and Mean value theorem to solve mathematical problems..	3
CO3	Solve differential equations of first order & higher order and their applications.	3
CO4	Apply definite integrals, double and triple integrals in solving problems related to arc length of a curve, area bounded by a curve and volume and surfaces of solids of revolution.	3
CO5	Apply the concept of complex number to hyperbolic functions and summation of infinite series using C+iSmethod .	3
CO6	Determine gradient, divergence and curl of a vector.	3
CO7	Apply the concept of line integral, surface integral and volume integrals to verify Green's theorem, Stoke's theorem and Gauss theorem.	3

UNIT - I Differential Calculus – I **(07 hrs)**

Leibnitz theorem (without proof), Partial differentiation, Euler's theorem on homogeneous functions, Asymptotes, Double points, curvature, Curve tracing in Cartesian, polar and parametric forms**.**

UNIT – II Differential Calculus – II **(07 hrs)**

Rolle's theorem, Mean value theorem, Taylor's and Maclaurin's series with remainder, Indeterminate forms, Taylor's series in two variables, Maxima and Minima of functions of two variables, Method of Lagrange's multiplier's.

UNIT – III Integral Calculus **(08 hrs)**

Definite integrals with important properties, differentiation under the integral sign, Gamma, Beta and error functions with simple problems, applications of definite integrals to find length, area,

volume and surface area of revolutions, transformation of coordinates, double and triple integrals with simple problems.

UNIT –IV Vector Calculus (06 hrs)

Scalar and vector product of vectors, Derivatives of vectors, Partial derivatives of vectors, Directional derivatives and Gradient, Divergence and Curl of a vector, Vector Integration ; Gauss's Divergence theorem,Green's theorem, Stoke's theorem,

UNIT – V Complex Trigonometry (05 hrs)

Hyperbolic functions of a complex variable, Inverse Hyperbolic functions, Logarithmic function of a complex variable; Summation of series by C+ iS method.

UNIT – VI Ordinary Differential Equations (08 hrs)

Differential equations of first order and first degree: Exact and non-exact differential equations, Linear and Bernoulli's differential equations. Higher order linear differential equations: Complementary solution, particular integral and general solution of these equations, variation of parameters technique to find particular integral of second order differential equations, Cauchy's and Lagrange's differential equations. Applications of ordinary differential equations to simple Electrical and Mechanical Engg. Problems.

BOOKS RECOMMENDED:

1. Calculus and Analytic Geometry — Thomas and Finney, 9th Edition, Pearson, 2002.
2. Differential Calculus — S. Narayan and P.K. Mittal, S.Chand, New Delhi.
3. Vector Calculus — S. Narayan and P.K. Mittal, S.Chand, New Delhi.
4. Higher Engineering Mathematics — B.S Grewal, Khanna Publishers, New Delhi
5. Engineering Mathematics-I — Dr.Bhopinder Singh

NOTE: (I) There shall be total seven questions. Question no.1 is compulsory and short answer/ objective type. It will consists of 10 questions each of 01 mark (Total: 10 marks)

(II) There will be two questions from each unit. Attempt one question from each unit. Each question carry 15 marks.

CLASS: B.E. 1TH SEMESTER **CREDITS: 4**

BRANCH: COMPUTER/E&C/IT ENGINEERING

COURSE NO. BSC-102

COURSE TITLE: ENGINEERING PHYSICS

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
3	**1**	**0**	**100**	**50**

Course Outcomes	At the end of the course student will be able to:-	BT Level
CO1	Apply principles of Maxwell's equation of Electromagnetic theory to solve the given problems.	3
CO2	Apply vector calculus to solve problems of divergence curl and gradient.	3
CO3	Explain the working principles and applications of lasers and optical fiber in engineering applications.	2
CO4	Classify solids on the basis of band theory.	2
CO5	Find conductivity of semiconductors.	4
CO6	Explain the principles and applications of optical phenomena.	2
CO7	Explain the basic concepts of Quantum mechanics.	2
CO8	Describe the behavior of damped and forced harmonic oscillations.	2

SECTION-A

Module -I: ELECTROMAGNETIC FIELDS AND WAVES

Concepts of Del Operator- gradient, divergence, curl and their physical significances, Displacement Current. Maxwell's equations in vacuum and non conducting medium, Electromagnetic wave propagation in free space (e.m wave equations for electric & magnetic fields for free space) & their solutions (plane wave solution) , velocity of E.M. waves, Relation between E_o& B_o , definition of Poynting vector, Poynting theorem. **8hrs, Weightage = 20%**

Module –II :QUANTUM MECHANICS

Inadequacies of Classical Mechanics ,De-broglie's concept of Matter waves, Wave-packet (Wavegroup), Phase and Group velocity, Heisenberg's uncertainty Principle, Experimental illustration of Uncertainty principle using single slit, Wave-function definition, interpretation and significance of wave-function, Schrodinger's wave equation (Steady-state and Time dependent) for one- dimensional case, Concept of Operators and Expectation values, Applications of Schrodinger's equation (Time independent) to ; i) Particle in a one-dimensional box of infinite height, ii) Single step potential barrier, iii) Tunnel effect. **9hrs, Weightage = 20%**

Module-III :OSCILLATIONS

Damped and Forced oscillations and their differential equations, Logarithmic decrement, Relaxation time & Quality factor, Ultrasonic waves and their production by Piezoelectric method and general applications. **4hrs, Weightage = 10%**

SECTION – B

Module –IV:SEMICONDUCTOR PHYSICS

Structure of Atoms, Energy Band diagram, Metal, Insulator and Semiconductor, Intrinsic and Extrinsic semiconductors. Direct & Indirect semiconductors, Bond in semiconductor & effect of temperature on semiconductors, Hole & Electron description, Charge densities in semiconductor, Generation & Recombination of charge carrier, Law of mobility & conductivity, Current densities in semiconductors, Fermi levels, Mass action law, Drift & Diffusion currents, Hall effect, Hall co-efficient & its applications. **9hrs, Weightage = 20%**

Module –V :APPLIED OPTICS

Interference in thin films (by reflection and transmission of light), Theory of Newton's rings by reflected light, Determination of wavelength and refractive index of monochromatic light by Newton's rings theory.

Fraunhoffer& Fresnel's diffractions, Fresnel's half period zones and rectilinear propagation of light, Fraunhoffer diffraction due to a single slit, Plane diffraction grating& its theory for secondary maxima & minima.

Unpolarised and polarised light, Double refraction phenomenon, Nicol Prism, Mathematical representation of elliptically and circularly polarized light, Quarter and Half wave plates.

7hrs, Weightage = 20%

Module VI :LASERS AND FIBRE OPTICS

Principal of Laser action , Einstein's co-efficients, Ruby & Co_2 Lasers, Holography, Propagation of Light in Optical fibres, Acceptance angle & acceptance cone, Numerical Aperture, Single mode & Multimode fibres, Characteristics and General applications of Lasers & Optical fibres.

5hrs, Weightage = 10%

NOTE: There shall be a total of eight questions, four from Each Section A& Section B selecting at least one question from each module. Each question carries 20 marks. Five questions will have to be attempted. Selecting at least two from each section. Use of Scientific calculator is allowed.

BOOKS RECOMMENDED:

1. Physics	Reisnick& Halliday
2. Fundamentals of Electricity & Magnetism	Duggal &Chabbra
3. Modern Physics	Beiser
4. Modern Physics	Blatt
5. Modern Physics	Gupta & Gupta
6. Sound	Subramaniam
7. Basic Electronics	Millman&Halkias
8. Semi conductor Physics and Devices: Basic Principles	Donald A.Neamen
9. Optics	Brijlal&Subramaniam
10. Fibre Optics	Ghatak, Tyagrajan
11. Lasers	K.R. Nambiyar
12. Modern Engineering Physics	A.S. Vasudeva

CLASS: B.E. 1TH SEMESTER **CREDITS: 1.5**

BRANCH: COMPUTER/E&C/IT ENGINEERING

COURSE NO. BSC-112

COURSE TITLE: ENGINEERING PHYSICS LAB

DURATION OF EXAM: 3 HOURS

L	T	P	Marks	
			Theory	Sessional
0	0	3	0	50

Course Outcomes	At the end of the course student will be able to:-	BT Level
CO1	Demonstrate the frequency of AC mains using an electrical vibrator.	4
CO2	Demonstrate the value of Planck's constant using a photocell.	4
CO3	Illustrate the characteristics of PN Junction and Zener diode.	4
CO4	Illustrate the characteristics of various configurations of BJT.	4
CO5	Determine the wavelength of monochromatic light using Newtons ring apparatus and plan transmission grating.	4
CO6	Determine the wavelength of light using helium neon He-Ne laser.	4

List of Experiments

Exp No.	Experiment Detail
1.	To find the frequency of A.C. mains using an electrical vibrator.
2.	To study the variation of magnetic field.
3.	To verify the Faraday's laws.
4.	To find the co-efficient of self-induction of a coil by Anderson's bridge using head phone.
5.	To find the impedance of LCR circuit.
6.	To evaluate the value of Planck's constant using a photo-cell.
7.	To study the characteristics of a Solar cell.
8.	To draw the V-I characteristics of a P-N junction diode.
9.	To study the common base/ common emitter characteristics of PNP/NPN junction transistor.
10.	To study the Zener diode characteristics.
11.	To find the dispersive power of a given prism using a spectrometer.
12.	To find the wavelength of monochromatic light using Newton's rings apparatus
13.	To determine the wavelength of sodium light using a plane transmission grating.
14.	To determine the specific rotation of sugar/glucose using Laurent's Half shade Polarimeter.
15.	To find the wavelength of He-Ne laser.

Note: A minimum of eight experiments is to be performed covering the diverse aspects of engineering physics.

CLASS: B.E. 1TH SEMESTER **CREDITS: 4**

BRANCH:
COMPUTER/ELECTRICAL/E&C/IT ENGINEERING
COURSE NO. BSC-101
COURSE TITLE: COMPUTER PROGRAMMING
DURATION OF EXAM: 3 HOURS

L	T	P	Marks	
			Theory	Sessional
3	1	0	100	50

Course Outcomes	At the end of the course student will be able to:-	BT Level
CO1	Design and represent a solution for the given problem using basic constructs, algorithms and flowchart.	3
CO2	Apply various control statements in C to solve the given problems.	3
CO3	Design a modular programs to solve the given problem in C language.	3
CO4	Develop aprogram to solve the given problems using various derived data types such as array, pointer, structure and union in C language.	3
CO5	Write a program to solve the given problems using file handling features in C language.	3

SECTION-A

Introduction to Programming (Flow chart/pseudocode, compilation etc.

Evolution of programming languages, structured programming, the compilation process,object code, source code, executable code, operating systems, fundamentals of algorithms, flow charts.

Introduction to C, Data Types, Constants, Variables, Expressions, Statements, Operators, Data Input and Output.

Character set, Identifiers, Keywords, Data Types, Constant and Variables, Statements, Expressions, Operators, Precedence of operators, Input-output Assignments.

Control Statements, Storage Classes, Library Functions.

Control structures, Decision making and Branching, Decision making & looping.

Storage Classes: Types of storage class, Scoping rules.

Standard Library Functions, advantages and use of various library functions (I/O functions, String, Character, Mathematics, Time and Date, functions)

SECTION-B

Functions, Arrays, Recursion, User Defined Data Types, Structures, Unions, Passing Structure to Functions.

User defined and standard functions, Formal and Actual arguments, Functions category, function prototypes, parameter passing, Call-by-value, Call-by-reference, Nested functions.

One dimensional Array, Multidimensional Array declaration and their applications, String Manipulation, Recursion, Passing array to a function. Declaration of structures, declaration of unions, pointer to structure & unions.

Pointers, Operation on Pointers, Passing Pointers to Functions, Data Files – Opening, Closing, Creating Data Files

Pointer variable and its importance, Pointer Arithmetic, passing parameters by reference, pointer to pointer, pointers to functions, Dangling pointer, dynamic memory allocation.

Console input output functions, Disk input output functions, opening closing and creating Data files.

NOTE: There shall be total eight questions, four from each section. Five questions will have to be attempted selecting at least two from each section. Use of calculator is allowed.

BOOKS RECOMMENDED

1. C How to Program, 7/e - Paul J. Deitel
2. Programming With C - Byron Gottfried.
3. Programming With C - E. Balaguruswamy.
4. C The Complete Reference - Herbert Schildt.
5. Let us C - YashwantKanitkar.
6. Programming in C : A Practical Approach - Ajay Mittal

CLASS: B.E. 1TH SEMESTER **CREDITS: 1**

BRANCH:
COMPUTER/ELECTRICAL/E&C/IT ENGINEERING
COURSE NO. ESC-111
COURSE TITLE: COMPUTER PROGRAMMING LAB
DURATION OF EXAM: 3 HOURS

L	T	P	Marks: Theory	Marks: Sessional
0	0	2	0	50

Course Outcomes	At the end of the course student will be able to:-	BT Level
CO1	Write a program to solve the given problems using control statements in C language.	3
CO2	Write a program to solve the given problems using functions.	3
CO3	Write a program to solve the given problems using arrays in C language.	3
CO4	Write a program to solve the given problems using structure and union in C language.	3
CO5	Write a program to solve the given problems using pointers in C language.	3
CO6	Write a program to solve the given problems using the concept of flat files in C language.	3

Lab Experiments

Exp No.	Experiment Detail
1.	Problem solving using computers: Familiarization with programming Environment.
2.	Variable types and type conversions: Simple computational problems using arithmetic expressions.
3.	Branching and logical expressions: Problems involving if-then-else Structures.
4.	Loops, while and for loops: Iterative problems e.g., sum of series
5.	1D Arrays: searching, sorting: 1D Array manipulation
6.	2D arrays and Strings, memory structure: Matrix problems, String Operations
7.	Functions, call by value: Simple functions
8.	Recursion, structure of recursive calls: Recursive functions
9.	Pointers, structures and dynamic memory allocation: Pointers and Structures
10.	File handling: File creation, writing and reading a file, File manipulation Operations

CLASS: B.E. 1TH SEMESTER **CREDITS: 2.5**

BRANCH:
COMPUTER/ELECTRICAL/E&C/IT ENGINEERING
COURSE NO. ESC-102
COURSE TITLE: ENGINEERING GRAPHICS
DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
1	**0**	**3**	**100**	**50**

Course Outcomes	At the end of the course student will be able to:-	BT Level
CO1	Demonstrate the use of Drawing standards and the basics of CAD.	2
CO2	Construct the Curves i.e, cycloidal, involute, spiral etc.	3
CO3	Draw projection of Planes.	3
CO4	Draw the projection of Prisms, Pyramid, Cylinder, Cone, section and intersection of solids.	3
CO5	Develop the lateral surfaces of Prism, Pyramids, Cylinder and Cone.	3
CO6	Draw the Isometric and Orthographic Projection of solids and simple blocks.	3

SECTION - A

Engineering Curves: Conventional lines and signs used in Engineering Drawing, Dimension and Tolerances, Printing and Lettering, Curves used in Engineering Practice: Cycloidal, Involutes, Spirals and Helices,

Loci-Conic section: Terms used in conic-conic curves curved defined as Loci, Practical application of conics, Ellipse, Parabola ,Hyperbola

Projection of Planes: Projections of a plane w.r.t. the principle planes in simple and inclined positions. Rotation method and the Auxiliary plane method. Space relation of a plane. To locate a point on a plane given its projections. Parallel relation of planes. Projection of planes inclined to different principal plane.

Projection of Solids: Classification and main features-Prisms and Pyramids. Projection of solids inclined to both the reference planes by (1) Rotation Method, and (II) Auxiliary plane method. Projection of solids in combination (Co-axial) in simple and inclined positions.

Sectioning of Solids: Object of sectioning, Types of cutting planes, True shape of section, Auxiliary views of sections of multiple co-axial solids in simple and titled conditions.

SECTION - B

Interpenetration of Solids and Intersection of Surface: Intersection of geometrical solids/hollow sections, Tracing of lines of intersection by line method and by section method.

Development of Surfaces: Classification of surfaces, Methods of development-Straight line method and Radial line method, Development of solids and hollow sections in full or part development of transition pieces. To draw projections from given development.

Isometric Projection: Isometric scale, Isometric axes and Isometric planes, Isometric projection of solids and simple machine blocks**.**

Overview of Computer Graphics covering:

Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.

Orthographic Projections: Orthographic projection of simple blocks (First & Third angles), to draw the third view from given two views. Missing lines in projection.

Text/Reference Books

1. Engineering Drawing by P.S GILL
2. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
3. Shah, M.B. &Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
4. Agrawal B. &Agrawal C. M. (2012), Engineering Graphics, TMH Publication
5. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers 5.
6. (Corresponding set of) CAD Software Theory and User Manuals

NOTE: There shall be total eight questions, four from each section. Five questions will have to be attempted selecting at least two from each section. Use of calculator is allowed.

CLASS: B.E. 1TH SEMESTER **CREDITS: Non-Credit**
BRANCH:
COMPUTER/ELECTRICAL/E&C/IT ENGINEERING

L	T	P
0	0	3

COURSE NO. NCC-101
COURSE TITLE: MENTORING & PROFESSIONAL DEVELOPMENT
DURATION OF EXAM: 3 HOURS

Detailed Syllabus

1. **Mentoring:-**Meaning and importance of mentoring, Stress management, Conflict management, Time management. Role of mentor in: mitigating stress and conflict in time management, in confidence building, in overall personality development, in developing life skills and emotional intelligence. ***(7)***

2. Meaning and components of personality, Personality development models-Johari Window and Transactional analysis, Motivation-meaning and approaches Leadership-meaning and style. ***(8)***

Note:-

i. There shall be a case study, viva-voce of the students by internal examiner consisting of 42 marks each.

ii. There will be an internal MCQ/Objective type Questions based examination of 40 marks.

iii. Evaluation: Satisfactory>= 40%: Unsatisfactory < 40%.

CLASS: B.E. 1TH SEMESTER **CREDITS: Non-Credit**

BRANCH:
COMPUTER/ELECTRICAL/E&C/IT ENGINEERING

L	T	P
0	0	3

COURSE NO. NCC-102
COURSE TITLE: ENVIRONMENTAL SCIENCES
DURATION OF EXAM: 3 HOURS

Course Outcomes	At the end of the course student will be able to:-
CO1	Interpret the knowledge of natural resources, ecosystem and environmental pollution.
CO2	Survey the social issues.
CO3	Discuss human population and its effect on the environment.

Detailed Syllabus

1. Introduction

Definition and scope and importance of multidisciplinary nature of environment. Need for public awareness. **(2)**

2. Natural Resources

Natural Resources and associated problems, use and over exploitation. **(2)**

3. Ecosystems

Concept of Ecosystem, Structure, Interrelationship, producers, consumers and decomposers, biodiversity and importance. **(2)**

4. Environmental Pollution

Definition, Causes, effects and control measures of air pollution, Water pollution, Soil pollution, Noise pollution, Thermal pollution, nuclear hazards, Solid waste Management: Causes, effects and control measure of urban and industrial wastes. Disaster Management Floods, earthquake, cyclone and landslides. **(4)**

5. Social Issues

Water conservation, rain water harvesting, Climate change, global warming, acid rain. Environment Protection Act: Air (Prevention and Control of Pollution) Act, Water (Prevention and control of pollution) Act, Wildlife Protection Act, Forest Conservation Act. **(3)**

6. Human Population and the Environment

Population growth, Population explosion, Environment and human health, Human Rights, Pole of Information Technology in Environment and human health. **(2)**

Note:

i. There will be an internal MCQ/Objective type Questions based examination of 40 marks.

ii. Evaluation: Satisfactory>= 40%: Unsatisfactory < 40%.

iii. A field visit of students to make them aware about the environmental issues is compulsory.

BOOKS RECOMMENDED:

1. Environmental Sciences — Basak, A
2. Environmental Studies — Benny Joseph
3. Perspectives in Environmental Studies — Rao, C.S.
4. Perspectives in Environmental Studies — Kaushik,A.
5. Elements of Environment Science & Engineering — Meenakshi
6. Elements of Environment Engineering — Duggal.

CLASS: B.E. 1TH SEMESTER **CREDITS: Non-Credit**

BRANCH:
COMPUTER/ELECTRICAL/E&C/IT ENGINEERING

L	T	P
0	0	2

COURSE NO. NCC-103
COURSE TITLE: INDIAN CONSTITUTION
DURATION OF EXAM: 3 HOURS

Detailed Syllabus

1. Indian Constitution-Sources and Features, Preamble **(2)**
2. Fundamental Rights, Fundamental Duties **(2)**
3. Directive Principles of state policy **(2)**
4. Structure of State and Central Government **(4)**
5. Judiciary-Supreme court, High court, Judicial Review and Judicial Activism **(5)**

Note:

i. There will be an internal MCQ/Objective type Questions based examination of 40 marks.

ii. Evaluation: Satisfactory>= 40%: Unsatisfactory < 40%.

DEPARTMENT OF
COMPUTER SCIENCE & ENGINEERING

Course Scheme - B.E. 2nd Semester

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATIONS			MARKS DISTRIBUTION		TOTAL MARKS	CREDITS
			L	T	P	INTERNAL	EXTERNAL		
BSC-201	Basic Science Course	Engineering Mathematics-II	3	2	-	50	100	150	5
BSC-203	Basic Science Course	Engineering Chemistry	3	1	-	50	100	150	4
BSC-213	Basic Science Course	Engineering Chemistry (Lab)	-	-	3	50	-	50	1.5
HMC-201	Engineering Science Course	Communication Skill	2	-	-	25	50	75	2
HMC-211	Engineering Science Course	Communication Skill (Lab)	-	-	2	25	-	25	1
ESC-203	Engineering Science Course	Basic Electrical Engineering	3	1	-	50	100	150	4
ESC-213	Engineering Science Course	Basic Electrical Engineering (Lab)	-	-	2	50	-	50	1
ESC-214	Engineering Science Course	Workshop Technology	1	-	3	50	-	50	2.5
TOTAL			**12**	**4**	**10**	**350**	**350**	**700**	**21**

CLASS: B.E. 2nd SEMESTER **CREDITS: 5**

BRANCH: COMMON TO ALL BRANCHES

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
3	**2**	**0**	**100**	**50**

COURSE NO. BSC-201
COURSE TITLE: ENGINEERING MATHEMATICS-II
DURATION OF EXAM: 3 HOURS

Course Outcomes	At the end of the course student will be able to:-	BT Level
CO1	Apply the concept of matrices to find the solution of the system of linear equations, rank, eigenvalue&eigen vector of a matrix and verify Cayley's-Hamilton theorem.	3
CO2	Identify the convergence and divergence of the series using p-test, Comparison test, Cauchy's root test, D'Alembert ratio test, Raabe's test, Logarthmic test, Gauss test &Lebnitz's test.	4
CO3	Solve problems using Fourier series.	3
CO4	Apply power series to find solution of second order differential equations on applicable problems.	3
CO5	Apply concept of Partial differential equation to solve Wave Equation, Heat Equation and Laplace Equation.	3
CO6	Evaluate basis, dimensions of a vector space, Range and Kernel of a linear transformation, Rank, Nullity, Rank-Nullity theorem.	5

UNIT- I Introduction to infinite series & sequences (06 hrs)

Convergence and divergence of a series, p-test, comparison test, Cauchy's root test, D' Alembert Ratio Test, Raabe's Test, Gauss test, Logarithmic test, Leibnitz test on alternating series.

UNIT- II Fourier series and Power Series Solutions of Second order O.d.e (10 hrs)

i) Fourier series: Euler's formula, sufficient conditions for a Fourier expansion, functions having points of discontinuity, change of intervals. Odd and even functions, Fourier expansion of Odd and even periodic functions, half range series, typical wave forms, Parseval's formula, complex form of Fourier -series.

ii) Power series: Analytic function, ordinary point, singular point, regular and irregular singular points of o.d.e. $Y'' + P(x)\,Y' + Q(x)\,Y = 0$, Series solution of differential equations about an ordinary point, Frobenius series solution about a regular singular point. Examples of Legendre and Bessel's differential equations.

Unit – III First Order partial differential equations (05 hrs)

Formation of p.d.e, First order linear p.d.e, Non-Linear p.d.e. of 1st order, solution by Charpit's method, Four Standard forms of non-linear p.d.e with reference to Charpit's technique: $f(p,q) = 0$, $f(z,p,q) = 0$, $f(x,p) = g(y,q)$ and Clauraut's form.

Unit – IV Higher Order Linear p.d.e (07 hrs)

Homogenous and Non-homogenous higher order linear partial differential with constant coefficients Rules for finding P.I and C.F, Non-Linear equations of 2^{nd} order. Application of p.d.e, method of separation of variables to solve equations of vibrations of strings (or one dim wave equation), one dim heat flow equations, Laplace equations.

Unit – V Matrices (08 hrs)

Introduction, Rank of matrix, Elementary transformations, Elementary matrices, Inverse using elementary transformation, Normal form of a matrix, Linear dependence and independence of vectors, consistency of linear system of equations, Guass Jordan method, Gauss elimination method, Eigen values and Eigen vector, Properties of Eigen value, Cayley Hamilton Theorem, Reduction to diagonal form, Reduction of quadratic form to canonical form.

Unit – VI Vector Spaces (5 hrs)

Definition, Linear transformation, basis, dimensions of a vector space, Range and Kernel of a linear transformation, Rank, Nullity, Rank-Nullity theorem, Matrix associated with a linear transformation.

BOOKS RECOMMENDED:

1. Advanced Engineering Mathematics — E. Kreyszig, 2006
2. Higher Engineering Mathematics — Dr. B.S. Grewal, Khanna Publication, New Delhi
3. Engineering Mathematics -II — Dr. Bhopinder Singh
4. Partial differential equations — M.D.RaiSinghania
5. Linear Algebra — D.Poole, 2^{nd} Edition, 2005

NOTE: (I) There shall be total seven questions. Question no.1 is compulsory and short answer/ objective type. It will consist of 10 questions each of 1 mark (Total: 10 marks)

(II) There will be two questions from each unit. Attempt one question from each unit. Each question carry 15 marks.

CLASS: B.E. 2nd SEMESTER **CREDITS: 4**

BRANCH: COMPUTER/E&C/IT ENGINEERING

COURSE NO. BSC-203

COURSE TITLE: ENGINEERING CHEMISTRY

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
3	**1**	**0**	**100**	**50**

Course Outcomes	At the end of the course student will be able to:-	BT Level
CO1	Explain the principles and applications of stereochemistry.	2
CO2	Explain the properties and applications of polymers and paints.	2
CO3	Explain the properties and applications of cementing materials and alloys.	2
CO4	Classify drugs based on mode of action.	2
CO5	Identify the structure of compounds with the help of spectroscopy.	2
CO6	Identify the problems and suggest strategies to control environmental pollution.	2
CO7	Identify the problems and explain the procedure associated with water and its treatment.	3

SECTION - A

Module – I STEREOCHEMISTRY AND DRUGS 6hrs

Optical isomerism, enantiomerism and diastereoisomerism, racemisation, Methods for resolution of racemic mixture, asymmetric synthesis.

Definition and synthesis of a drug, structure and applications of following drugs:-

(a) Antipyretic (b) Narcotics (c) Tranquilizers (d) Antibiotics

Module – II PLASTICS, RUBBER AND PAINTS 9hrs

Plastics: Introduction, importance and uses of plastics, classification of plastics, moulding constituents of a plastic, moulding of plastic into articles (compression, injection, transfer and extraction mouldings).

Rubber: Introduction, types of rubber, treatment of latex, vulcanization of rubber.

Paints : Introduction, requisites of a good paint, constituents of a paint, manufacture of paint, a brief idea of manufacture, properties and uses of white pigments such as white lead and lithopone

Module – III SPECTROSCOPIC TECHNIQUES AND APPLICATIONS 8hrs

UV Spectroscopy: Principle, Laws of absorption, Band nature of UV Spectrum, types of electronic transitions, applications.

I R Spectroscopy: Principle, molecular vibrations, applications.
NMR Spectroscope: Principle and applications.

SECTION – B

Module – IV ENVIRONMENTAL SCIENCE 8hrs

Concepts of Environmental Chemistry, Segments of environment (a brief idea about atmosphere, hydrosphere and Lithosphere).

Air Pollution : Types and control of Air Pollution.
Water Pollution: Classification and control of Water Pollution.
Chemical Toxicology :Biochemical effects of Pb, Hg, As, Zn & CN.

Module – V ALLOYS AND CEMENT 5hrs

Alloys : Introduction, purpose of making alloys, preparation of alloys, classification of alloys (Ferrous & Non-Ferrous alloys), alloy steels and copper alloys (Brass & Bronze).

Cement & its types, manufacture of Portland cement, setting and hardening of cement.

Module – VI WATER TREATMENT 6hrs

Introduction, softening of water by Lime-Soda, zeolite & ion-exchange processes, priming and foaming, sludge & scale formation, determination of hardness of water by EDTA method, Numerical on hardness and softening of water.

Books Recommended:

1.	Engineering Chemistry	Jain & Jain,
2.	Engineering Chemistry	Sharma, B.K.
3.	Engineering Chemistry	Dara, S.S.
4.	Engineering Chemistry	Shashi Chawla
5.	Organic Chemistry	Bahl, B.S.
6.	Environmental Chemistry	De, A.K.
7.	Spectroscopy of Organic Compounds	Silverstein
8.	Spectroscopy of Organic Compounds	Kalsi, P.S.
9.	Polymer Science	Gowrikar, V.R. etal
10.	Engineering Chemistry	Dr.Rajinder Kumar

NOTE: The paper will be divided into two sections. There shall be a total of eight questions, four from each section A and B, selecting at least one question from each module. Each question carries 20 marks. Five questions will have to be attempted, selecting at least two questions from each section. Use of calculator is allowed.

CLASS: B.E. 2nd SEMESTER **CREDITS: 1.5**

BRANCH: COMPUTER /E&C/IT ENGINEERING

COURSE NO. BSC-213

COURSE TITLE: ENGINEERING CHEMISTERY LAB

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
0	**0**	**3**	**0**	**50**

Course Outcomes	At the end of the course student will be able to:-	BT Level
CO1	Determine the alkali content in antacid tablets.	2
CO2	Determine the percentage of cu in CuSO4 titration.	2
CO3	Determine the percentage of CaCO3 in precipitated chalk.	2
CO4	Estimate the hardness of water by EDTA complexometric method.	2
CO5	Determine volumetrically no of moles of water of crystallization in sample of Mohr's salt.	2
CO6	Synthesize the organic compound.	2
CO7	Identify the organic compound using qualitative analysis technique.	2
CO8	Apply analytical techniques to evaluate chemical components related to fluid and practical mechanics.	2

List of Experiments

Exp. No.	Experiment Detail
1.	Determine the percentage of $CaCO_3$ in precipitated chalk. You are provided with IN HCI and 0.IN NaOH.
2.	To analyze the given antacid tablets.
3.	Determine Volumetrically the number of molecules of water of crystallization present in the given sample of Mohr's salt, x gms. of which have been dissolved per litre provided N/10 $K_2Cr_2O_7$ (using an external indicator).
4.	Determine Volumetrically the percentage of Cu in a sample of $CuSO_4$ crystals, Z gms of which have been dissolved per litre, provided 0.IN $Na_2S_2O_3$.
5.	To determine the coefficient of viscosity of an unknown liquid using Ostwald Viscometer.
6.	Determine the surface tension of a unknown liquid Stalagmometer.

7.	To prepare a pure and dry sample of Aspirin.
8.	To prepare a pure and dry sample of Glucosazone.
9.	Determine the method of purification of organic compounds by column chromatography.
10.	Organic Analysis: Identify the following organic compounds (preparation of at least one derivative).
11.	Determine the total hardness of a sample of water by complexometric method (using EDTA).
12.	Determine the percentage of calcium oxide in cement.

Note:- A minimum of ten experiments to be performed.

BOOKS RECOMMENDED

1. A manual of practical Engineering Chemistry — Dr. Rajinder Kumar
2. A manual of practical Engineering Chemistry — Dr. Aran Kumar & Dr. SumitSanotra Kumar
3. Experimental Engineering chemistry — Shashi Chawla

CLASS: B.E. 2nd SEMESTER **CREDITS: 2**

BRANCH:
COMPUTER/ELECTRICAL/E&C/IT ENGINEERING
COURSE NO. HMC-201
COURSE TITLE: COMMUNICATION SKILLS
DURATION OF EXAM: 3 HOURS

L	T	P	Marks: Theory	Marks: Sessional
2	0	0	50	25

Course Outcomes	At the end of the course student will be able to:-	BT Level
CO 1	Comprehend a given passage.	1
CO 2	Write a business report on the topic.	1
CO3	Demonstrate communication skills required for effective business communication.	2
CO 4	Exhibit professional etiquettes.	3
CO 5	Use Linguistic capabilities for Group discussion and public speaking.	3

SECTION - A

UNIT - I **(05 hrs)**

Writing Practice: Comprehension, Notices, Memos, Précis writing, Types of Letter-Enquiry letter, Reply to enquiry, Claims letter, Adjustment and sales letter, Job letter, E-mail writing.

UNIT – II **(06 hrs)**

Introduction to grammar: Use of phrase and clauses in sentences, use of proper punctuation, Concept of word formation, Synonyms, Antonyms, Prefix, Suffix, Articles, Prepositions, Clichés, Subject-verb Agreement.

SECTION - B

UNIT – III **(05 hrs)**

Communication: Introduction, Elements of Business Communication, Media of verbal communication (oral & written), Barriers of Communication, Guidelines to improve Business communication.

UNIT –IV **(05 hrs)**

Professional Etiquettes : Meaning and types.

Listening Skills : Process of listening, types of listening, techniques to improve listening ability, skills of effective listening.

Group Discussion : Advantages, Purpose, Group Dynamics and Guidelines for Effective Group Discussion.

UNIT – V **(05 hrs)**

Speaking Skills : Skills of Effective speaking, Components of Effective talk and body language;

Interviews : Meaning, Types of interview, tips for giving an interview and handling questions.

Meeting Skills : Purpose of meeting- procedures, notices, agenda, venue of meeting, minutes of meeting.

Brain Storming : Purpose and techniques.

BOOKS RECOMMENDED:

- Communication Skills by Dr. NageshwarRao& Dr. Rajendra Prasad.
- Functional Aspects of Communication Skills by Dr. Prajapati Prasad, Published by S.K. Kataria& Sons.
- An Approach to Communication Skills by Indrajit Bhattacharya, Published by DhanpatRai& Co. Ltd.
- Communication Skills by Varinder Kumar and Bodh Raj, Published by Kalyani Publishers.
- An Approach to Communication Skills by BhanuRanjan.
- Communication Skills and Functional Grammar by Sadhna Gupta.
- Remedial English Grammar by F.T. Wood. Macmillian.
- On Writing Well William Zinsser, Harper resource Book.

NOTE: The question paper shall consist of two questions from each unit (total 10 questions). Students have to attempt one question from each unit (total no. of questions to be attempted shall be five) i.e. there shall be internal choice within each unit. Students have to attempt two questions from Section-A and three questions from Section-B. Each question carries equal marks (10 marks).

CLASS: B.E. 2nd SEMESTER
BRANCH: COMPUTER /ELECTRICAL/E&C/IT ENGINEERING
COURSE NO. HMC-211
COURSE TITLE: COMMUNICATION SKILLS LAB
DURATION OF EXAM: 3 HOURS

CREDITS: 1

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
0	**0**	**2**	**0**	**25**

Course Outcomes	At the end of the course student will be able to:-	BT Level
CO 1	Demonstrate the use of writing and listening skills by using audio-visual aids proficiently.	3
CO 2	Demonstrate communication skills required for the competence in business communication.	3
CO 3	Analyze and demonstrate personal attributes.	2
CO4	Demonstrate proficiently in interview and group discussion.	3

List of Experiments

Exp. No.	Experiment Detail
1.	Listening Comprehension.
2.	Pronunciation. Intonation, Stress & Rhythm.
3.	Common everyday situations and conversations &Dialouges.
4.	Power Point presentation.
5.	Resume/Bio data preparation including SWOT analysis.
6.	Vocabulary improvement programs, Role play
7.	Mock interviews
8.	Group discussions.
9.	Minutes of Meeting.
10.	Annual Reports.

CLASS: B.E. 2nd SEMESTER **CREDITS: 4**

BRANCH:
COMPUTER/ELECTRICAL/E&C/IT ENGINEERING
COURSE NO. ESC-203
COURSE TITLE: BASIC ELECTRICAL ENGINEERING
DURATION OF EXAM: 3 HOURS

L	T	P	Marks: Theory	Marks: Sessional
3	1	0	100	50

Course Outcomes	At the end of the course student will be able to:-	BT Level
CO1	Apply the concept of KVL/KCL and various network theorem in solving DC circuits.	3
CO2	Describe the steady state behavior of single phase and three phase AC electrical circuits.	2
CO3	Illustrate the construction and working principle of single-phase transformers and calculate the efficiency.	2
CO4	Illustrate the working principle of Induction machine, synchronous machine as well as DC machine and employ them in different areas of applications.	2
CO5	Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption.	3

SECTION-A

Module 1: DC Circuits **(8 hours)**

Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current and voltage laws, analysis of simple circuits with dc excitation. Mesh and Nodal analysis, Superposition, Maximum Power Transfer theorem, Thevenin and Norton Theorems.

Module 2: AC Circuits **(8 hours)**

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel) and resonance.

Module 3: Three-phase Circuits **(6 hours)**

Concept of three phase voltage, voltage and current relations in star and delta connections. Measurement of power in three-phase balanced circuits.

SECTION-B

Module 4: Transformers **(6 hours)**

Principle of operation, ideal and practical transformer(no-load & on-load pahsor diagrams), equivalent circuit, losses in transformers, Transformer test (open circuit & short circuit), regulation and efficiency.

Module 5: Electrical Machines **(8 hours)**

DC Machines- Principle of operation, emf equation, torque production. AC Machines- Three-phase induction motor, principle of operation, slip and rotor frequency, Synchronous machines- Principle of operation and emf equation.

Module 6: Electrical Installations **(6 hours)**

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

Text / References:

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill.
3. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press.
4. E. Hughes, "Electrical and Electronics Technology", Pearson.
5. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India.

NOTE: 1. The question paper shall comprise of total eight questions, four from each section and atleast one question from each module.

2. Students are required to attempt five questions selecting at least two questions from each section. Use of scientific calculator is allowed.

CLASS: B.E. 2nd SEMESTER **CREDITS: 1**

BRANCH: COMPUTER /ELECTRICAL/E&C/IT ENGINEERING

COURSE NO. ESC-213

COURSE TITLE: BASIC ELECTRICAL ENGINEERING LAB

DURATION OF EXAM: 3 HOURS

L	T	P	Marks: Theory	Marks: Sessional
0	0	2	0	50

Course Outcomes	At the end of the course student will be able to:-	BT Level
CO1	The basic concept of various measuring instruments (voltmeter, ammeter, multi-meter, oscilloscope) along with electrical circuit elements like resistors, capacitors and inductors with safety taken in the electrical laboratory.	1
CO2	Experimentally verify the basic electric circuit laws (Kirchhoff's current law and Kirchhoff's voltage law).	4
CO3	Experimentally verify the basic circuit theorems (Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer Theorem).	4
CO4	Explain the steady state behaviour of series and Parallel RLC circuits.	2
CO5	Calculate power and power factor in three phase ac circuits.	3
CO6	Determine the efficiency and Regulation of single-phase transformer by open circuit and short circuit test, polarity test.	3
CO7	Demonstrate working principle and construction of DC and AC Machines using their cut-out sections.	3
CO8	Study of wires, cables, fuses and MCBs and Calculate energy consumption.	2

List of Experiments

Exp. No.	Experiment Detail
1.	Basic safety precautions. Introduction and use of measuring instruments – voltmeter, Ammeter, multi-meter, oscilloscope. Components-Resistors, capacitors and inductors.
2.	Verification of Kirchoff's Laws.
3.	Verification of Superposition Theorem.
4.	Verification of Thevenin's Theorem.
5.	Verification of Norton Theorem.
6.	Verification of Maximum Power Transfer Theorem.
7.	Measurement of current in various branches of RLC series-parallel circuit.
8.	Measurement of three-phase power using Wattmeter.
9.	Study of single phase transformers. Determination of Polarity Test of given single phase transformer.
10.	To perform open and short circuit test on single phase transformer.
11.	Demonstration of cut-out sections of machines: dc machine and ac machines.
12.	Study of wires, cables, fuses and MCBs.
13.	To perform calculations for energy consumption.

Note: A minimum of eight experiments is to be performed by each student

CLASS: B.E. 2nd SEMESTER **CREDITS: 2.5**

BRANCH: MECHANICAL ENGINEERING

COURSE NO. : ESC-212

COURSE TITLE: WORKSHOP TECH.

DURATION OF EXAM: 3 HOURS

L	T	P	Marks	
			Theory	Sessional
1	0	3	0	50

Course Outcomes	At the end of the course student will be able to:-	BT Level
CO1	Prepare different joints, wooden pattern by using carpentry tools and assemble flat pieces using fitting tools.	3
CO2	Perform different machining operations on lathe machine.	3
CO3	Perform smith forging operations and fabricate different joints by using welding processes.	3
CO4	Prepare the moulds using natural foundry sands and different regular geometrical shapes using sheet metal tools.	3

Shop Practice:

Unit I CARPENTRY: -

1. Different joints :- a) Middle/cross lap joint b) Mortise and Tenon T –joint
2. Pattern making of open bearing

Unit II CASTING: -

1. Casting of open bearing (single piece pattern)
2. Casting of split piece pattern

Unit III SMITHY:-

1. Cubical block from a cylindrical section
2. L – shaped hook from cylindrical section

Unit IV WELDING :-

1. Preparation of single V – Butt joint by gas and arc welding processes
2. Preparation of Double V-Butt joint , T-joint and corner joint by gas and arc welding

Unit V FITTING :-

1. Assembly of snap fitting of MS-Flat pieces (Male and Female)
2. Assembly and fitting of two L- shaped rectangular MS flat pieces

Unit VI MACHINE SHOP :-

1. Operation like turning, step turning on MS round
2. Operation like taper turning , Knurling on MS round
3. Introduction to CNC machines

BOOKS RECOMMENDED:

- Workshop Technology by Hajra and Chowdhary
- Manufacturing Technology Vol I& II by Rao. P.N
- Manufacturing Technology byGowri .P. Hariharan and A. Suresh Babu

DEPARTMENT OF
COMPUTER SCIENCE & ENGINEERING

Course Scheme - B.E. 3rd Semester

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits
			L	T	P	Internal	External		
PCS-301	Professional Core Course	Object Oriented Programming using C++	3	1	0	50	100	150	4
PCS-302	Professional Core Course	PC Hardware& Maintenance	2	1	0	50	100	150	3
EEC-301	Engineering Science Course	Analog Electronics	2	1	0	50	100	150	3
BSC-302	Basic Science Course	Numerical Methods	2	1	0	25	75	100	3
HMC-302	Humanities & Social Science Course	Entrepreneurship and Business Strategies	2	1	0	50	100	150	3
PCS-311	Professional Core Course	Object Oriented Programming using C++ Lab	0	0	2	50	-	50	1
PCS-312	Professional Core Course	PC Hardware& Maintenance Lab	0	0	2	50	-	50	1
EEC-311	Engineering Science Course	Analog Electronics Lab	0	0	2	50	-	50	1
PCS-313	Professional Core Course	Numerical Methods using C-Programming Lab	0	0	2	50	-	50	1
MOC-314	Massive Open Online Course	MooC							
NCC-301	Non-Credit Course	Cyber Ethics & Laws	2	0	0	Satisfactory/ Un-Satisfactory			Non-Credit
TOTAL			**13**	**5**	**8**	**425**	**475**	**900**	**20**

CLASS: B.E. 3RD SEMESTER **CREDITS: 4**

BRANCH: COMPUTER SCIENCE ENGG.

COURSE NO: PCS-301

COURSE TITLE: OBJECT ORIENTED PROGRAMMING USING C++

DURATION OF EXAM: 3 HOURS

				Marks	
L	**T**	**P**		**Theory**	**Sessional**
3	**1**	**0**		**100**	**50**

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Discuss the characteristics of structured and object oriented programming approach	2
CO2	Explain the concept of objects , classes , constructors and distructors to solve the given problem	3
CO3	Apply the concept of inheritance and polymorphism to solve the given problem	3
CO4	Implement generic classes with C++ templates and exception handling	3
CO5	Implement the file handling function using C++	3

SECTION-A

Review of Pointers: Passing parameters, Array of Pointers, Character Pointers. **(2 Hrs)**

Programming Techniques: Unstructured, Procedural, Modular. Introduction to Objects, Object & Cohesion **(3 Hrs)**

Overview of C++: Object Oriented programming, Encapsulation, Polymorphism, Inheritance, Console I/O, C++ Comments. **(3Hrs)**

Classes& Objects: Metaclass, Abstract class, Public and Private variables, Constructor and Destructor Functions, Constructors taking parameters, Object Pointers, In-Line Functions, Automatic Inlining, Friend Functions, This Pointer, New & Delete, Array of Objects. **(12Hrs)**

SECTION- B

Overloading: Function Overloading, Overloading Constructor Functions, Operator overloading, Overloading Binary and Unary Operators, Overloading Relational & Logical Operators. **(8Hrs)**

Inheritance: Using Protected Members, Multiple Inheritance, Virtual Base Classes, Introduction to Virtual Functions. **(6 Hrs)**

Templates & Exception Handling: Use of Templates, Function Templates, Class Templates, Handling Exception. **(4 Hrs)**

File Handling: I/O Basics, Ifstream, Ofstream, Fstream, Open(), Close(), EOF(), Binary I/O, Get(), Put(), Read(), Write(), Random Access, Seekg(), Seekp(), Tellg(), Tellp(). **(4 Hrs)**

BOOKS RECOMMENDED:

1.	Programming in C++	Balaguruswamy
2.	C++ the Complete Reference	Herbert Schildt.
3.	Mastering C++	K.R. Venugopal& T. Ravishankar& Raj Kumar**.**
4.	Turbo C++	Robert Lafore**.**

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

CLASS: B.E. 3RD SEMESTER **CREDITS: 3**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO: PCS-302

COURSE TITLE: PC HARDWARE AND MAINTENANCE

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Explain the technological developments in PC Hardware & its I/O Peripherals.	1
CO2	Describe architecture and working principles of various memory devices and their uses	2
CO3	Explain the different types of malwares and their preventive measures	2
CO4	Detect fault in the PC and apply proper correction & maintenance mechanisms.	3
CO5	Explain the working principle of SMPS, CVT, UPS and criteria for selecting right UPS.	4

SECTION- A

Computer Assembling: – Introduction – Overview of Parts of PC, Cabinet, Motherboard-components, function and form factor, Types of Buses, Disk drives, Network Card – Interfaces, CPU Main Memory, IO peripherals. **(8 Hrs)**

BIOS and CMOS Setup:– Introduction – Features , Developers, Identification, Interrupts , BIOS Upgrade , Troubleshooting. Standard CMOS Setup, Power Management, Setup Password Settings, Auto Configuration, BIOS Optimization, Power OnSelf Test (POST) **(4 Hrs)**

Display Adapters and Device Drivers:–Introduction, Types of display adapters (VGA,SVGA) Accelerated Graphic Ports – 3D Cards , Device Drivers – IO drivers, Sound Drivers, LAN Drivers etc, Role of device drivers in a PC. **(6 Hrs)**

SECTION- B

PC Power Supplies:-SMPS- Types of SMPS, principle working, SMPS form factor, CVT, UPS- its types and working, criteria for selecting right UPS for PCs. **(6 Hrs)**

Preventive Maintenance :– Introduction ,Need ,Tools , Procedures – Active Hardware Maintenance ,Active Software Maintenance – Passive Maintenance Procedures ,Preventive Maintenance Schedule, Virus-types, Detection and Precaution. **(8 Hrs)**

Troubleshooting :– Introduction , Types of PC Faults , Solid Faults , Intermittent Faults , Developing Strategy,Diagnostic and Repair Tools – Diagnostic Software Tools , Diagnostic Hardware Tools **(6 Hrs)**

BOOKS RECOMMENDED:-

1. IBM PC & Clones: Hardware, Govindarajalu.
2. Computer Installation & Troubleshooting M. Radhakrishan&Dr.Balasubramanian
3. Computer Hardware Installation, Interfacing, Trouble shooting and K. L. James
4. A+ Guide to Managing & Maintaining Your PC Jean Andrews

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

CLASS: B.E. 3RD SEMESTER **CREDITS: 3**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO: EEC-301

COURSE TITLE: ANALOG ELECTRONICS

DURATION OF EXAM: 3 HOURS

L	T	P	Marks: Theory	Marks: Sessional
2	1	0	100	50

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Explain the working principle of PN semiconductor diodes, special purpose diode.	2
CO2	Illustrate the working of rectifier filters circuits, concept of ripple, removal using filters and their applications.	2
CO3	Explain the fundamental concept of different types of bipolar transistors, FET's with its biasing conditions along with the concept of load line and operating point.	2
CO4	Analyze the frequency response of single stage and multistage amplifier using transistors.	4
CO5	Analyze the transistor circuits using hybrid models	4

SECTION - A

Semiconductor Devices: PN junction diode, Volt-ampere characteristics, diode capacitance, static and dynamic resistances, Zener diode, tunnel diode, schottky diode, photodiode, LED-their characteristics and analysis, Half wave, full wave and bridge rectifier with necessary derivations, Voltage regulation, Capacitor filter, Inductor filter, LC filter, Bleeder resistor, numerical problems.

(11 Hrs)

Transistors: Transistor and itscharacteristics in CE,CB,CC mode, Ebers-Moll model, generalized transistor equation, Base width modulation, types of biasing circuits, operating point and load line.

(10 Hrs)

SECTION-B

FET: Introduction, Construction and operation of JFET, Characteristics, JFET parameters and their relationship, MOSFET- depletion and enhancement type- characteristics and operation.

(8 Hrs)

Amplifiers: Principle of operation and classification of amplifiers (Single stage and multistage amplifiers) analysis and frequency response of amplifiers, multistage amplifiers- LC, RC, DC and transformer coupled. **(9 Hrs)**

Hybrid Parameters: Introduction, Two port network, Determination of h-parameters, h-parameter equivalent circuit, hybrid model for CE, CB, CC configuration with necessary derivations.

(4 Hrs)

BOOKS RECOMMENDED:

1.	Integrated Electronics	Millman&Halkias
2.	Basic Electronics	J.B Gupta
3.	Electronics Devices	Bolystead

NOTE:There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

CLASS: B.E. 3RD SEMESTER **CREDITS: 3**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO: BSC-302

COURSE TITLE: NUMERICAL METHODS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**75**	**25**

DURATION OF EXAM: 3 HOURS

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Find the exact real root of Bisection methods, Secant methods, Newton Raphson method.	4
CO2	Find the solution of simultaneous algebraic equations like partition method, power method and Eigen values.	4
CO3	Use Interpolation Methods to solve a given function.	3
CO4	Solve the given differentiation and integration problems.	3
CO5	Apply Numerical methods like Taylor's series, Euler's method, Rangakutta Method to solve given differential equations.	3

SECTION - A

Roots of algebraic equations: - Bisection methods, Secantmethods, Newton Raphson Method, Method for finding complex roots, Graeffe's Root squaring method, Regula Falsi method, iteration method. **(10 Hrs)**

Solution of simultaneous algebraic equations: - Partition method for linear system of equations, Power method for finding Eigen values, properties & bounds for Eigen values & Eigen vectors. **(10 Hrs)**

SECTION-B

Interpolation:- Newton's Forward, Backward & Divided difference interpolation, Central difference interpolation formula, Stirling's & Bessel's formula, Langrange's interpolation formula. **(6 Hrs)**

Numerical Differentiation &Integration:-Derivatives using Forward Difference Formula, Backward difference formula & Central difference formula, Numerical Integration using Trapezoidal Rule & Simpson's Rule. **(10 Hrs)**

Differential equations & their solutions: - Taylor's series method, Euler's method, Rangakutta method, Picard's method. **(4 Hrs)**

BOOKS RECOMMENDED:

1	Elementary Numerical Analysis	S.D. Conte & Carl De Boor., Macgraw hill
2	Numerical Method for Scientists & Engineers	M.R. Jain, S.R.K.Iynegar& R.K Jain.,WileyEastern
3	Elementary Numerical Methods	B.S.Grewal,KnannaPublishion
4	A textbook on complex analysis and Numerical methods	Bhopinder Singh, Kirti Publications.

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

CLASS: B.E. 3RD SEMESTER **CREDITS: 3**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO: HMC-302

COURSE TITLE: ENTREPRENEURSHIP & BUSINESS STRATEGIES

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	**Apply** entrepreneurial skills in managing a new venture and plays a significance role in the economic development.	2
CO2	**Discuss** the problems faced by Women/Social entrepreneur.	2
CO3	**Construct** effective competitive strategies for project initiation and implementation by using the concept of lean startups and business pitching.	3
CO4	**Choose** appropriate parameters to assess opportunities and constraints for new business idea using different managerial tools.	3
CO5	**Examine** the Ownership structure, legal aspects and government policies related to Small scale industries.	4

SECTION-A

Entrepreneurship: Definition and Types of entrepreneurs; Qualities of an entrepreneur; factors affecting entrepreneurship; Role of an entrepreneur in economic development; Difference between entrepreneur and manager; Barriers to entrepreneurship. **(6 Hrs)**

New Generations of Entrepreneurship: Women Entrepreneur: Classification of Women Entrepreneur in India, Problems of Women Entrepreneur, steps for promoting women entrepreneurship; Social Entrepreneur: Problems and steps for promoting social entrepreneurship. **(6 Hrs)**

Legal Forms of Industrial Ownership: Sole Proprietorship, Partnership, Joint Stock Company (Features, Merits and Demerits); Introduction to business models **(5 Hrs)**

SECTION-B

Lean Startups: Introduction to lean startups, Business pitching: Definition, types and importance. **(5Hrs)**

Starting a New project/ Venture: Scanning the environment, product development and selection, project report preparation, project resourcing, project planning and scheduling using networking techniques of PERT/CPM (concepts only). **(7 Hrs)**

Small Scale Industries and policies for entrepreneurship development:

Definition of small scale industries; objectives. Role of SSI in economic Development of India. SSI registration, NOC from pollution Board; Machinery and equipment selection; Schemes and Policies for entrepreneurship development. **(6 Hrs)**

BOOKS RECOMMENDED:

1.	Fundamentals of Entrepreneurship	H. Nandan.
2.	Business model generation	Alexander Osterwalder&YvesPigneur
3.	Small scale industries and Entrepreneurship	Vasant Desai.
4.	Management of small scale Industries	Vasant Desai.
5.	Entrepreneurial Development	S S Khanka
6.	Entrepreneur Revolution: How to Develop your Entrepreneurial Mindset and Start a Business that	Daniel Priestley

NOTE: There shall be total eight questions, four from each section. Each question carries 20 marks. Five questions will have to be attempted, selecting at least two from each section. Use of calculator is allowed.

CLASS: B.E. 3RD SEMESTER **CREDIT: 1**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO.: PCS-311

COURSE TITLE: OBJECT ORIENTED PROGRAMMING USING C++ LAB

L	T	P	Marks Practical
0	0	2	50

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Write a program for the given problem using Classes in C++ language.	3
CO2	Write a program for the given problem using Inheritance in C++ language.	3
CO3	Write a program for the given problem using Constructor and Destructor in C++ language.	3
CO4	Write a program for the given problem using Polymorphism in C++ language.	3
CO5	Write a program for the given problem usingTemplate and Exception handling in C++ language.	3
CO6	Write a program for the given problem using File handling in C++ language.	3

Lab Experiments:

Exp. No.	Experiment Detail
1.	Design and implement programs using Pointers.
2.	Design and implement programs using Classes and Objects.
3.	Design and implement programs using Constructors and Destructors.
4.	Design and implement programs using the concepts of Inheritance.
5.	Design and implement programs using Friend Function.
6.	Design and implement programs using New and Delete operator.
7.	Design and implement programs using the concepts of Overloading.
8.	Design and implement programs using the concepts of files.

NOTE: Additional Lab experiments/practicals will be performed based on the course contents requirements

CLASS: B.E. 3RD SEMESTER **CREDIT: 1**

BRANCH: COMPUTER SCIENCE ENGINEERING **Marks**

L	T	P	Practical
0	0	2	50

COURSE NO: PCS-312

COURSE TITLE: PC HARDWARE AND MAINTAINANCE LAB.

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Identify and analyze the existing configuration of the computers and peripherals.	2
CO2	Perform routine maintenance and upgrade of the computer system, SMPS.	2
CO3	Apply general diagnostic and troubleshooting procedures on a computer system.	3
CO4	Analyze input and output characteristics of different configurations of Computers and transformers.	3
CO5	Install, configure, optimize and upgrade the portable personal computer, Antivirus software.	3

Lab Experiments:

Exp. No.	Experiment Detail
1.	Study of keyboard- Mechanical Keyboard & Membrane Keyboards
2.	Study of Printers a)Dot-Matrix Printers b) Inkjet Printers
3.	Study of SMPS
4.	Assembling the Units of Computer
5.	Fault finding in the various units of Computer, Fault finding Codes & Beeps.
6.	Software loading at different platforms such DOS, Windows- 95/98/2000
7.	Use of Antivirus Software

NOTE: **Additional Lab experiments/ practical's will be performed based on the course contents requirements.**

CLASS: B.E. 3RD SEMESTER **CREDIT: 1**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO: EEC-311	**L**	**T**	**P**	**Marks Practical**
COURSE TITLE: ANALOG ELECTRONICS LAB	**0**	**0**	**2**	**50**

Course Outcome	**At the end of the course, the student will be able to:**	**BT Level**
CO 1	Demonstrate various electronic components- resistors, capacitors, Transistors, diodes, IC and Transformers	2
CO 2	Illustrate the operational Characteristics of PN junction Diode and special purpose diode.	2
CO 3	Demonstrate half and full wave rectifiers and evaluate their performance parameters.	2
CO 4	Design and Demonstrate the characteristics of biasing circuits of BJTs and FET.	4
CO 5	Apply the amplifier circuit to determine its H-parameters and frequency response.	3

Lab Experiments:

Exp. No.	**Experiment Detail**
1.	Familiarization with various Electronic Components- resistors, capacitors, Transistors, diodes, IC, Transformers
2.	Diode characteristics (Forward and reverse)
3.	Diode as a Rectifier with capacitor filter(Half & Full Bridge)
4.	Zener diode characteristics &Zener diode as voltage regulator
5.	Characteristics of Tunnel Diode, LED's, photodiode.
6.	Characteristics of transistors in CB, CE & CC mode.
7.	Design of self bias circuit using BJT.
8.	Characteristics of JFET, MOSFET.
9.	Determination of h-parameters from transistor characteristics.

NOTE: 1. Students should perform at least 7 out of 9 experiments.

2. Additional Lab experiments/practicals will be performed based on the course contents requirements.

CLASS: B.E. 3RD SEMESTER **CREDITS: 1**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO. PCS-313

COURSE TITLE: NUMERICAL METHODS USING C-PROGRAMMING LAB

L	T	P	Marks Practical
0	0	2	50

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Apply Bisection Method to find the root of a given algebraic equation to achieve desired accuracy using C.	3
CO2	Apply Newton-Raphson Method to find the root of a given algebraic equation to achieve desired accuracy using C	3
CO3	Solve a given problem using Simpson's Rule, Gauss Elimination method in C.	3
CO4	Apply Newton's interpolation formula to solve the given problem in C	3

Lab Experiments:

Exp. No.	Experiment Detail
1.	Newton's Forward Interpolation formula
2.	Newton's Backward Interpolation formula
3.	Lagrange's Interpolation formula
4.	Trapezoidal Rule
5.	Simpson's Rule
6.	Newton-Raphson's Method
7.	Eular Method
8.	Jordan Elimination Method

NOTE: Additional Lab experiments/practicals will be performed based on the course contents requirements.

CLASS: B.E. 3RD SEMESTER **CREDIT: 1**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO: MOC-314

COURSE TITLE: MooC

L	T	P	Marks Practical
0	0	2	50

MooC: A massive open online course (MooC) is a model for delivering learning content to any person who wants to take a course by means of the web. It has been incorporated in the 3rd semester. Here the students will have a choice to choose between Numerical Methods Lab and a MooC course.

To evaluate a MooCs course following is the scheme proposed:

Breakup of Marks:

- **Attendance- 10 marks**
  Students will have to visit the lab twice a week as per the time table and pursue their respective online course.

- **Report file-15 marks**
  A detailed report of about 20-25 pages has to be submitted to the department at the end of the semester. It should contain details about the course that was undertaken by the student. A copy of the assignments with solutions that have been uploaded on the MooC platform should also be included in the final report. A copy of the certificate if awarded should also be appended to the report.

- **Presentation- 15 marks.**
  The presentation should be given to the peers/students focusing on the key points of the course with an aim to share the knowledge.

- **Certification- 10 marks**
  The students awarded with the certificate will be given 10 marks. (Copy to be attached in the report.)

The students can opt for MooC from the list provided here under. The choice of course opted is not restricted to the list, provided the opted course is approved by the department.

1. C#
2. C Sharp
3. Web Development
4. Python
5. PHP
6. Mobile Computing
7. Android
8. Programming using MATLAB
9. JavaScript Basics
10. Client Server Communication
11. Web Security Fundamentals
12. SQL

CLASS: B.E. 3RD SEMESTER **CREDITS: 0**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE No: NCC-301

COURSE TITLE: CYBER ETHICS & LAWS

L	T	P	Marks
2	0	0	Theory Satisfactory/Unsatisfactory

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Understand the basic concepts and need of Cyber Ethics &Laws.	2
CO2	Understand about the constitutional and Human Rights Issues in Cyber space nationally and internationally.	2
CO3	Understand Cyber Crimes and Legal Framework.	2
CO4	Understand about the limitations and current issues in cyber ethics and cyber laws in the society.	2

Unit-I: Ethics in Cyber Space, Core Values and Virtues, Dimensions of Cyber Ethics in Cyber Society, Cyber Ethics by Norms, Laws and Relations, Principle & Significance of Cyber Ethics, Ethics in Information Society.

Unit-II: Computer and its impact in Society, Overview of Computer and Web Technology, what are Cyber Laws, Need for Cyber Laws, Cyber Jurisprudence at International and Indian Level

Unit-III: Objectives, Importance of Cyber Laws, Right to Access Cyberspace-Access to internet, Right to privacy, Right to data protection, Advantages and Disadvantages

Unit-IV: Cyber Crime against Individual, Institution and State, Types of Cyber Crimes, Cyber Crimes and Legal Framework

Unit-V: Limitations and Current Issues relating Cyber Ethics & Cyber Laws in the Society

BOOKS RECOMMENDED:

1. Cyber Laws — Justice Yatindra Singh
2. Cyber Laws and Crimes Simplified — Adv. Prasant Mali
3. Cyber Ethics 4.0 — Christoph Stuckelberger and Pavan Duggal

NOTE: This is a Mandatory Non-Credit Course. Two objective papers will be conducted internally by the department. The students are required to score at least 40% or above in totality to be considered qualified in the course.

DEPARTMENT OF
COMPUTER SCIENCE & ENGINEERING
Course Scheme – B.E. 4th Semester

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits
			L	T	P	Internal	External		
BSC-401	Basic Science Course	Discrete Mathematics	2	1	0	50	100	150	3
PCS-401	Professional Core Course	Data Structures	3	1	0	50	100	150	4
PCS-402	Professional Core Course	RDBMS	3	1	0	50	100	150	4
PCS-403	Professional Core Course	Computer Organization & Architecture	2	1	0	50	100	150	3
PCS-404	Professional Core Course	Java Programming	2	1	0	50	100	150	3
PCS-405	Professional Core Course	Digital Electronics	2	1	0	50	100	150	3
PCS-411	Professional Core Course	Data Structures Lab	0	0	2	50	-	50	1
PCS-412	Professional Core Course	RDBMS Lab	0	0	2	50	-	50	1
PCS-414	Professional Core Course	Java Programming Lab	0	0	2	50	-	50	1
PCS-415	Professional Core Course	Digital Electronics Lab	0	0	2	50	-	50	1
TOTAL			**14**	**6**	**8**	**500**	**600**	**1100**	**24**

CLASS: B.E. 4TH SEMESTER **CREDITS: 3**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO. BSC-401

COURSE TITLE: DISCRETE MATHEMATICS

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Solve problems by applying the concept of various types of graphs, walk, path , circuits & cycles.	3
CO2	Solve problems by applying the concept of Hamiltonian path, Hamiltonian circuits, Hamiltonian cycle, Hamiltonian graph, Eulerian path, Eulerian circuits & Eulerian graph, Euler's formula for planar graph.	3
CO3	Solve problems by applying the concept of Dijkstra's algorithm for finding shortest path in a weighted graphs in reference to standard termonology.	3
CO4	Solve problems by applying the concept of Trees, rooted trees, Spanning trees & Cut sets.	3
CO5	Solve problems by applying the concept of Sets, Relation, Functions , Principle of Mathematical induction & Pigeon-hole principle.	3
CO6	Explain the concept of Groups, Subgroups, Cyclic groups, Cosets , Normal Subgroup & Homomorphism.	3
CO7	Explain the concept of Rings, Integral domains & fields.	3

SECTION – A

Sets, Relation and Function: Operations and Laws of Sets, Cartesian Products, Finite and infinite sets, countable and uncountable sets, Binary Relation and its types, Functions and its types, Principles of Mathematical induction, Principle of inclusion and exclusion, pigeon-hole principle.

(12Hrs)

Algebraic Structure: Groups and sub groups, related theorems, Cosets, Normal subgroups and Group homomorphism. Rings, Integral domains and fields: examples and related results.

(10 Hrs)

SECTION – B

Graphs and Trees: Basic terminology, multi graphs and weighted graphs, connectivity, walk and path, circuits and cycles, shortest path in weighted graphs, Algorithm of shortest path. Hamiltonian and Eulerian paths and circuits, Eulerian graphs, Hamiltonian graphs, Konigsberg bridge problem, Chinese postman problem, Travelling salesperson problem, Planar graph and Euler's formula. Trees and cutsets: Trees, rooted trees, path lengths in rooted trees, Spanning trees and cut sets.

(20 Hrs)

BOOKS RECOMMENDED:

1. Discrete Mathematics and its Applications, Tata McGraw – Hill — Kenneth H. Rosen
2. Discrete Mathematics with Applications,4th edition, Wadsworth Publishing Co. Inc. — Susanna S. Epp
3. Elements of Discrete Mathematics A Computer Oriented Approach, 3rd Edition by, Tata McGraw – Hill — C L Liu and D P Mohapatra
4. Graph Theory — NarsinghDeo

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

CLASS: B.E. 4TH SEMESTER **CREDITS: 4**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO. PCS-401

COURSE TITLE: DATA STRUCTURES

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
3	**1**	**0**	**100**	**50**

Course Outcom	At the end of the course, the student will be able to:	BT Level
CO1	Apply time and space complexity analysis for a given algorithm	3
CO2	Write an algorithm to solve the given problems using Stacks, Queues & Linked List.	3
CO3	Write an algorithm to solve the given problems using Binary Trees and its traversal algorithms	3
CO4	Write an algorithm to solve the given problems using graph and its traversal	3
CO5	Write an algorithm to implement shortest path algorithm	3
CO6	Write an algorithm to solve the given problems using sorting and searching techniques	3

SECTION – A

Introduction to data structures: - Concepts of data and algorithm, Relation between Data Structure & Algorithm, Introduction to Time & Space complexity, Data types, Data Structures & Abstract data types, Representation of Arrays, Sparse matrices. **(2 Hrs)**

Stacks and Queues: - Concept of Stacks, Operation on Stacks, Multiple stacks, Application of stacks in Infix, Postfix, Prefix, Recursion, Concept of Queues, Operation on Queues, Multiple Queues, Priority Queues, Circular Queues. **(10Hrs)**

Linked Lists: - Insertion, Deletion and Traversal on Linear Linked Lists, Doubly Linked List, Circular Linked List, Linked List as Data Structure, Header nodes, Stacks & Queues using linked list, Dynamic memory management, Garbage Collection **(10Hrs)**

SECTION-B

Trees: -Binary trees and its representation using Linked list, Operations on Binary Trees, Traversal Algorithms, Applications, Threaded Binary Trees and its Traversal algorithms, Heterogeneous Binary Trees, List representation using Binary Trees, Optimum Search Trees, AVL trees. **(10Hrs)**

Graphs: -Representation of Graphs, Traversal methods, Applications Undirected Graphs, Directed Graph& their Traversal, Depth first, Breadth First, Shortest Path algorithms (Dijkstra and Floyd), Minimum Cost Spanning tree (Prim and Kruskal). **(8Hrs)**

Sorting &Searching:- **(5Hrs)**

1. Exchange Sort (Bubble, Quicksort)
2. Selection & Tree Sorting.
3. Insertion sort, Shell Sort, Address Calculation Sort
4. Merge & Radix Sort.
5. Sequential Searching, searching an Ordered Table, Index sequential search, Binary search, Interpolation search, Tree searching.

BOOKS RECOMMENDED:

1	Data Structure using C	Tenenbaum, Langsam, Augenstein
2	Fundamentals of data structures	Horowiz E. and Sahni S.
3	Data structures and Program Design	Robert L. Kruse.
4	Data Structures & Algorithm	Aho, Hopcraft and Ullman.
5	Data Structure with Applications	Sorenson.

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

CLASS: B.E. 4TH SEMESTER
BRANCH: COMPUTER SCIENCE ENGINEERING
COURSE NO. PCS-402
COURSE TITLE: RDBMS
DURATION OF EXAM: 3 HOURS

CREDITS: 4

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
3	**1**	**0**	**100**	**50**

Course Outcom	At the end of the course, the student will be able to:	BT Level
CO1	Explain simple DBMS with respect to traditional file system	2
CO2	Discuss DBMS architecture and its design.	2
CO3	Describe various data models like Physical, Object based and record based data models.	2
CO4	Explain file organization and different file access techniques.	2
CO5	Apply Relational Algebra and Relational Calculus for solving queries for a given scenarios	3
CO6	Write SQL commands for handling DBMS	3
CO7	Apply the concept of Normalization to maintain database consistency.	3
CO8	Create schedules for concurrency control system and understand locking techniques.	3

SECTION - A

Basic Concepts: - Data Modeling-Records and Files-Abstraction and data Integration-Views-Data Independence-Components of DBMS-Advantages and Disadvantages, Data Associations, Data Models Classification. **(4 Hrs)**

Entity Relationship Model: Basic concepts, constraints, design issues, Entity Relationship diagram, Week Entity sets, Extended ER features, Design of ER database schema, Reduction of ER schema to tables. **(6 Hrs)**

Relational Model:- Attributes and domains, Tuples, Relations and Schemas, Relation representation, keys, Integrity Rules, Relational algebra, Relational Calculus, Data Manipulation using SQL. **(8 Hrs)**

Relational Data-base Design:-Normalization using Functional Dependency, Normalization using Join dependencies, Normalization using Join Dependencies, Domain key normal form. **(6 Hrs)**

SECTION – B

Transactions: Transaction concept, transaction state, implementation of Atomicity and Durability, Concurrent executions, Serializability, Recoverability, implementation of isolation, transaction definition in SQL. **(8 Hrs)**

Concurrency Control: Lock based protocols, Timestamp based protocols, Validation based protocols, Multiple Granularity, Multiversion Schemes, Deadlock Handling, Inset and Delete operations **(6 Hrs)**

Recovery Systems: Failure classification, Storage Structure, Recovery and Atomicity, Log based recovery, Shadow Paging, Recovery with Concurrent Transitions, Buffer Management. **(4 Hrs)**

BOOKS RECOMMENDED:

1. Database System Concepts	Korth,Silberchatz–TMH
2. An introduction to Database Systems	Bipin C. Desai
3. Principles of Data Base Management Systems	Aho Ullman
4. Oracle	Ivan Bayross.

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

CLASS: B. E 4TH SEMESTER
BRANCH: COMPUTER SCIENCE ENGINEERING
COURSE NO. PCS-403
COURSE TITLE: COMPUTER ORGANISATION AND ARCHITECTURE.
DURATION OF EXAM: 3 HOURS

CREDIT: 3

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Explain the basics of computer architecture.	2
CO2	Discuss components and working of Central Processing Unit.	2
CO3	Discuss the memory management techniques for primary and secondary storage.	2
CO4	Explain I/O operations and methods of data transfer in the system.	2
CO5	Analyze the working of parallel, pipeline, vector, array and multicore processors.	4

SECTION - A

Introduction: - Basic structure of Computers, stored programme concept, Basic Operational concepts, Functional Units, Machine language, concept of memory locations, addresses, addressing modes. **(6 Hrs)**

Processing and execution: - Processing unit, execution of instructions, control step sequence, different types of instruction, ALU Design, Arithmetic Processes, Control Unit Design, Hardwired & Micro programmed Control Unit. **(6 Hrs)**

CPU: General Register Organization, Stack Organization, Instruction format, RISC, CISC. **(4Hrs)**

Input output organization: - I/O Systems–Programmed Control, Interrupt controlled & DMA Data Transfer Schemes, I/O Processors. Architecture (IOP). **(6 Hrs)**

SECTION – B

Memory Management: - Memory organization, Characteristics of memory size, Access time, Read/write cycle time, Sequential and Random access semiconductor memories, Virtual memory and its implementation, Cache memory and its types- Split and Unified, levels of Caches.

(8Hrs)

Parallel processing – Basic Concepts, Types of parallel Processors, Pipelined processors, Pipelined Structures, Pipeline Hazards. **(6 Hrs)**

Introduction to Vector Processors, Array Processors, Multicore processors. **(6 Hrs)**

BOOKS RECOMMENDED:

1.	Computer Architecture &Organization	John P. Hayes (Mc Graw Hill)
2.	Computer System Architecture	Morris Mano
3.	Computer System Architecture	V.K. Jain
3.	Computer Organization	Carl V. Hamacher.
4.	Digital Electronic	Malvino Brown.

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed

CLASS: B.E. 4TH SEMESTER **CREDIT-3**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO: PCS-404

COURSE TITLE: JAVA PROGRAMMING

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

DURATION OF EXAM: 3 HOURS

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Explain the concept of OOPS paradigm and platform portability in Java language.	2
CO2	Write a program for the given problem statement using Array and String processing in Java language.	3
CO3	Write a program for the given problem statement using Classes and Interfaces in Java language.	3
CO4	Write a program for the given problem statement using Inheritance in Java language.	3
CO5	Write a program for the given problem statement using Exception handling in Java language.	3
CO6	Write a program for the given problem statement using Applet and GUI Components in Java language.	3

SECTION - A

Java Evolution, And Overview of Java Language: Java History–Features of java, how java different from C and C++, Java and World Wide Web, Web Browser. Java Environment: Java Development kit (JDK), Application Programming Interface (API). Java Programming Structure, Java Tokens, Constants, Variables, Expressions, Decision Making Statements and Looping, Java Statements, Overview of Arrays and Strings, Machine Neutral, Java Virtual Machine (JVM), Command Line Arguments. **(6 Hrs)**

Arrays and Strings: Arrays, One-Dimensional arrays, Creating an Array, declaration of arrays, initialization of arrays, Two-Dimensional arrays, String arrays, String methods, String Buffer class, Vectors, Wrapper classes. **(4 Hrs)**

Classes, Objects and Methods: Introduction, defining a class, creating objects, accessing class members, constructors, methods overloading, static members. **(4 Hrs)**

Inheritance: Defining a sub class, sub class constructor, multilevel variables, Final classes, and Finalize methods, Abstract methods and classes, visibility control. **(4 Hrs)**

Managing Errors and Exceptions: Introduction, Types of Errors-Compile time and Run time errors, Exceptions, Types of Exceptions, Syntax of Exception handling code, Multiple catch statements, using finally statement, Throwing our own exceptions. **(4 Hrs)**

SECTION- B

Multithreaded Programming: Introduction to threads, Creating Threads, Extending the Thread Class, Implementing the Runnable interface, life cycle of a thread, priority of a thread, synchronization, Deadlock. **(6Hrs)**

Interfaces and Applet Programming: Introduction, defining interfaces, extending interfaces, implementing interfaces. Introduction, how applet differ from applications, building applet code, applet life cycle, About HTML, designing a web page, passing parameters to applets**,** getting input from the User. **(6Hrs)**

Graphics Programming: Introduction, the Abstract Windowing Toolkit (AWT), frames, event-driven programming, layout managers, panels, canvasses, drawing geometric figures. Creating User Interface: Introduction, describe various user interface Components: button, label, text field, text area, choice, list, check box check box group. **(8Hrs)**

BOOKS RECOMMENDED:

1	Programming with JAVA	Balagurusamy TMH
2	An Introduction to JAVA Programming	Y.DanielLiangTMH
3	The Complete Reference JAVA 2	Herbert Schield TMH

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed

CLASS: B.E. 4TH SEMESTER **CREDITS: 3**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO: PCS-405

COURSE TITLE: DIGITAL ELECTRONICS

L	T	P	Marks: Theory	Marks: Sessional
2	1	0	100	50

DURATION OF EXAM: 3 HOURS

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO 1	Interpret number system to be used in digital system with base conversion, data representation and code conversion.	2
CO 2	Solve the Boolean expression using Boolean algebra, K- map, Quine Mc-clusky Methods & implement using logic gates.	3
CO 3	Analyze different types of combinational circuits.	4
CO 4	Analyze different types of sequential logic circuits using flip flops.	4

SECTION - A

Digital Systems and Binary Numbers

Binary numbers, Number –Base Conversions, Arithmetic operations using number system, Data Representation - fixed and floating, Complements (1's and 2's), Binary codes – weighted/non-weighted codes, BCD codes, Excess- 3-code, Grey codes, Conversion between codes, Code convertors Codes for error detection and correction (Hamming code). **(12 Hrs)**

Boolean algebra and Logic Simplification:

Boolean Algebra, Logical gates, Simplification of Boolean function using Boolean algebra, Karnaugh map (up to five variables), Quine Mcclusky Methods, Combinational Logic design - Half and Full adders, Half and full Subtractor, BCD Adder, Comparators. **(11Hrs)**

SECTION - B

Combinational circuits: Decoders, Encoders, Multiplexers, De-Multiplexers, Programmed logic devices–Read only memory, Programmable Read only Memories (PROM) and Programmable Logic Arrays (PLA), Programmable Array Logic (PAL). **(10Hrs)**

Sequential logic design: Latches and Flip flops, conversion between flip flops, Shift Registers, Analysis of synchronous and asynchronous counters, Design of Sequential logic circuits, State Reduction and Assignment, ASM Charts. **(10Hrs)**

BOOKS RECOMMENDED:

1	Digital Design	Morris Mano
2	Digital Electronics	R.P Jain
3	Digital Logic Design	J.P. Hayes
4	Digital Logic Design	Brain Holdsworth
5	Digital Electronics & Circuits Design	Thomas Mac calla
6	Digital Electronics	R.K Gour

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

CLASS: B.E. 4TH SEMESTER **CREDIT: 1**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO: PCS-411

COURSE TITLE: DATA STRUCTURES LAB

L	T	P	Marks Practical
0	0	2	50

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Write a program to solve the given problems using Stacks, Queues and Linked List in C language	3
CO2	Write a program to solve the given problems using Binary Trees and its traversal algorithms in C language	3
CO3	Write a program to solve the given problems using graph programming in C language.	3
CO4	Write a program to solve the given problems using depth first search and breath first search algorithms in C language.	3
CO5	Write a program to implement shortest path algorithm in C language.	3
CO6	Write a program to solve the given problems using sorting and searching techniques in C language	3

Lab Experiments:

Exp. No.	Experiment Detail
1.	Write a program to check if expression is correctly parenthesized using Stacks
2.	Write a program to evaluate Postfix Expression using Stacks
3.	Write a program to convert Infix Expression to its corresponding Postfix and Prefix
4.	Write a program to convert Prefix Expression to Postfix
5.	Write a program to implement Circular Queue Operations
6.	Write a program to implement Priority Queue Operations
7.	Write a program to implement Ordered Linked List
8.	Write a program to add Polynomials using Single Linked List
9.	Write a program to implement operations on Doubly Linked List

10.	Write a program to find the duplicate numbers in a given list using Binary Tree
11.	Write a program to Sort a list of numbers using Binary Search Tree
12.	Write a program to implement operations on Threaded Binary Trees
13.	Write a program to implement Quick Sort algorithm
14.	Write a program to implement Shell Sort algorithm
15.	Write a program to implement Merge Sort algorithm

NOTE: Additional Lab experiments / practical's will be performed based on the course contents requirements.

CLASS: B.E. 4TH SEMESTER **CREDIT: 1**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO: PCS-412

COURSE TITLE: RDBMS LAB.

L	T	P	Marks Practical
0	0	2	50

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Implement DDL, DML and DCL commands.	3
CO2	Create a database by applying various types of integrity rules and constraints.	3
CO3	Write the subqueries and co-related queries for given scenarios.	3
CO4	Write the triggers by using procedures in SQL.	3
CO5	Write PL/SQL code to solve the given problem.	3

Lab Experiments:

Exp. No.	Experiment Detail
1.	To create , insert and show the basic structure of a table emp with following specifications: Attribute:-emp_code (int), emp_name(varchar(50)), design(varchar), doj(date), basic_sal(int), dept_code(int).
2.	To show all entries of emp_name from table emp having and not having desig = admin and emp_code = 102.
3.	To show all design entries from table emp that are unique.
4.	To show all entries of emp_name from table emp having 'A' in them
5.	To show all entries of emp_name, basic_sal from table emp and show by computing pf = basic_sal * 0.1, hra = basic_sal * 0.1, da = basic_sal * 0.1 and gross = basic_sal + da + hra – pf for all values of basic_sal.
6.	To display the count value of emp_code and find average of basic _sal for each dept_code. count the value of emp_code for each dept_code and ordered by count emp_code.
7.	To display the emp_code, emp_name, desig, basic_sal from emp having basic_sal<= 9000 and design is sales.
8.	To show all entries of emp_name from table emp where emp_code is either of 102, 104, 105, 107 and 108. doj is between 01-jan-05 and 31-dec-12.
9.	To calculate the average, maximum and minimum of all entries of basic_sal.
10.	To add 200 to all values of basic_sal where design is sales.
11.	To display all values of basic_sal and basic_sal2 from table emp

NOTE: **Additional Lab experiments/practicals will be performed based on the course contents requirements.**

CLASS: B.E. 4TH SEMESTER **CREDIT: 1**

BRANCH: COMPUTER SCIENCE ENGINEERING
COURSE NO: PCS-414
COURSE TITLE: JAVA PROGRAMMING LAB.

L	T	P	Marks Practical
0	0	2	50

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Write a program for the given problem statement using Array and String processing in Java language.	3
CO2	Write a program for the given problem statement using Classes and Interfaces in Java language.	3
CO3	Write a program for the given problem statement using Inheritance in Java language.	3
CO4	Write a program for the given problem statements using Multithreading and Exception handling in java language.	3
CO5	Write a program for the given problem statement using Applet in Java language.	3
CO6	Write a program for the given problem statement using GUI Components in Java language.	3

Lab Experiments:

Exp. No.	Experiment Detail
1	WAP To use different arithmetic operation in java.
2.	WAP To demonstrate wrapper class in java.
3.	WAP to perform manipulation on strings in java.
4.	WAP to demonstrate single inheritance in java.
5.	WAP to demonstrate multiple inheritance using interface in java
6.	WAP to demonstrate Exception handling in java
7.	WAP to check whether the entered amount is is sufficient or not ,if not raise an exception in java
8.	WAP to demonstrate threads in java.
9.	WAP to demonstrate APPLET in java.
10.	WAP to demonstrate event handling in java.

\NOTE: Additional Lab experiments/practicals will be performed based on the course contents requirements.

CLASS: B.E. 4TH SEMESTER **CREDIT: 1**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO: PCS-415 **Marks**

L	T	P	Practical
0	0	2	50

COURSE TITLE: DIGITAL ELECTRONICS LAB.

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Verify the truth tables using logic gates.	2
CO2	Design and implement combinational circuits.	6
CO3	Design and implement sequential circuits.	6

Lab Experiments:

Exp. No.	Experiment Detail
1	Verification of truth table of basic gates.
2.	Verification of truth tables of ADDER/SUBTRACTER using IC-7483
3.	Verification of truth tables of MULTIPLEXER/DEMULTIPLEXER
4.	Verification of truth tables of BCD –7- Segment Display
5.	Verification of truth tables of Code Conversion.
6.	Design of Flip-Flops using IC chips
7.	Design of Two's complement circuits using shift registers
8.	Design and Implementation of Asynchronous MOD-12 counters.
9.	Design of a sequential circuit
10.	Study of PLA'S and PAL's.

NOTE: 1. Each student has to perform at least 8 experiments out of which 40% shall be simulation based.

2. Additional Lab experiments/practicals will be performed based on the course contents requirements.

DEPARTMENT OF
COMPUTER SCIENCE & ENGINEERING

Course Scheme - B.E. 5th Semester

Contact Hrs: 24

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits
			L	T	P	Internal	External		
PCS-501	Professional Core Course	Analysis & Design of Algorithms	3	1	0	50	100	150	4
PCS-502	Professional Core Course	Computer Networks	3	1	0	50	100	150	4
PCS-503	Professional Core Course	Microprocessor & Interfacing	3	1	0	50	100	150	4
PCS-504	Professional Core Course	Theory of Computation	2	1	0	50	100	150	3
*MOC-502	Massive Open Online course	SWAYAM /NPTEL	3	0	0	100	-	100	3
PCS-512	Professional Core Course	Computer Networks Lab	0	0	3	75	-	75	1.5
PCS-513	Professional Core Course	Microprocessor Lab	0	0	3	75	-	75	1.5
PIT-502	Summer Industry Internship	Industrial Training	-	-	-	50	-	50	1
TOTAL			**14**	**4**	**6**	**500**	**400**	**900**	**22**

NOTE:-The department shall offer the Swayam / NPTEL course out of the list of courses offered by Swayam around the time of commencement of the semester. However, the selected NPTEL course should not be similar to the regular courses offered as a part of the department curriculum.

CLASS: B.E. 5th SEMESTER **CREDITS: 4**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO: PCS-501

COURSE TITLE: ANALYSIS & DESIGN OF ALGORITHMS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
3	**1**	**0**	**100**	**50**

DURATION OF EXAM: 3 HOURS

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Analyse the complexity and performance of algorithm	2
CO2	Write algorithms for implementing operations on heap and collision resolution techniques using hashing	3
CO3	Evaluate the concepts of Polynomial(P) and Non-Polynomial(NP) problems	3
CO4	Implementing sorting and searching algorithms using Divide and Conquer Techniques	3
CO5	Write algorithms to solve problems using Greedy method	3
CO6	Write algorithms to solve problems using Dynamic Programming	3
CO7	Write algorithms to solve problems using Backtracking	3
CO8	Write algorithms to solve problems using Branch and Bound	3

SECTION-A

Introduction to Algorithms: Analysing the Performance of an Algorithm, Space/Time complexity, AsymptoticNotation, Recurrence Relations, Performance measurement, write Algorithms in SPARK's. **(04 hours)**

Heap & Hash Tables: - Representing a Heap, Operations on Heaps, Applications, building a Heap, Hash Table,Hashing Functions, Resolving Collision by separate Chaining, Open Addressing, Quadratic Probing, Double Hashing,Rehashing. **(06 hours)**

Lower Bound Theory: - Comparison Trees for searching & Sorting, Parallel Comparison trees, Oracle& Adversary Arguments, Lower Bounds through Reduction. **(04 hours)**

NP-Hard and NP-Complete Problems: -Basic concepts, Non-Deterministic Algorithms, Polynomial TimeAlgorithms, NP-hard & NP –complete classes, Cook's Theorem, Introduction to Approximation Algorithms. **(04 hours)**

SECTION- B

Design Techniques: -

Divide and Conquer: - General methods, Binary Search, Finding the Maximum & Minimum, Merge sort, Quick Sort & Selection sort, Strassen's Matrix, Multiplication. **(08 hours)**

Greedy Method: - General Methods, Optimal Storage on Tapes, Knapsack Problem, Job Sequencing with Deadlines, Optimal Merge Patterns, Single Source, shortest path. **(06 hours)**

Dynamic Programming: - General Methods, Multistage Graphs, I/O Knapsack, Reliability Design, Travelling Salesperson problem. **(04 hours)**

Back Tracking: - General Method, The 8- Queens Problem, Hamiltonian Cycles, Knapsack Problem. **(03 hours)**

Branch &Bound: - The method, I/O Knapsack Problem, Traveling Salesperson Problem. **(03 hours)**

BOOKS RECOMMENDED:

1.	Fundamentals of Computer Algorithms.	Ellis Horowitz, SartajSahni.
2.	Data Structure & Algorithm	J.M. Hopcraft , Ullman

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

CLASS: B.E. 5th SEMESTER **CREDITS:4**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO: PCS-502

COURSE TITLE: COMPUTER NETWORKS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
3	**1**	**0**	**100**	**50**

DURATION OF EXAM: 3 HOURS

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Discuss use of various devices and their working in computer network	1
CO2	Explain the layer-wise working of OSI and TCP/IP models in computer network	2
CO3	Understand the working of different protocols at different layers of TCP/IP model.	2
CO4	Apply state of art Ethernet (L2) Technology in various network scenario.	3
CO5	Use IPv4, IPv6 and L3 Protocols in analyzing a given network scenario	4
CO6	Design a network topology in a network simulator and analyze various related parameters.	5

SECTION- A

Introduction: Data Communication-communication system, synchronous and asynchronous systems, serial and parallel systems, dataflow-simplex, half-duplex, full-duplex, computer network-uses of computer network, categories of computer networks, protocol and standards, Reference Model-OSI and TCP/IP reference model, their comparison and critique, Network Topologies **(05 hours)**

Physical Layer: Data Transmission-Digital to Digital Conversion-Line Coding Scheme, Transmission Media, RS-232 Interface, Switching mechanisms and Comparison –circuit, packet, message, Modem and its types **(06 hours)**

Data Link Layer: Design Issues, Error Detection and Correction, Flow Control-Elementary of data-link protocol, Sliding Window Protocol, Example of Data Link Protocol (HDLC). **(06 hours)**

Medium Access Control Sub layer: Channel Allocation Problems, Multiple Access Protocol-ALOHA, Carrier Sense Multiple Access Protocols, Collision Free Protocols, IEEE standards-802.3, 802.4, 802.5. **(06 hours)**

SECTION- B

Network Layer - Design Issues, Routing Algorithms- The optimality principle, shortest path algorithm, flooding, distance vector routing, link state routing and hierarchical routing, Congestion Control- principles prevention policies, congestion control in virtual circuit subnet and datagram subnets, Traffic shaping algorithm - leaky bucket algorithm, token bucket algorithm, QOS, IP protocol, IP addresses, Internet Multicasting, Introduction to IPV6 ,IPV4 vs. IPV6, Internetworking devices –Repeaters, Hub, Bridges, Switches, Routers, Gateways. **(10 hours)**

Transport Layer: Transport Layer Services, Primitives, Issues, and elements of transport protocol, Introduction to TCP and UDP **(04 hours)**

Session and Presentation Layer- Design issues, services and primitives **(04 hours)**

Application Layer: FTP, DNS, E-Mail, Firewalls. **(04 hours)**

BOOKS RECOMMENDED:

1. Data Communication - William L. Schweber.
2. Computer Networks - Andrew S. TanenBaum.
3. Communication Network System for Computer - Davies &Barbq
4. Data Communication and networking - Behrouz A. Forouzan

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

CLASS: B.E. 5th SEMESTER **CREDITS: 4**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO: PCS-503

COURSE TITLE: MICROPROCESSOR & INTERFACING

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
3	**1**	**0**	**100**	**50**

Course Outcome	At the end of the course student will be able to:-	BT Level
CO 1	Explain the general architecture, pin diagram, organization along with interrupts of microprocessor 8085.	2
CO 2	Explain the general architecture, pin diagram,instruction set and concept of minimum and maximum mode of microprocessor 8086	2
CO 3	Illustrate the interfacing of memory and I/O devices with microprocessor.	3
CO 4	Illustrate architecture and operation of General Purpose Programmable Peripheral Devices amd their interfacing with, microprocessor	3
CO 5	Apply the knowledge of assembly language programming & develop algorithms for programs of microprocessor 8085 and 8086.	3

SECTION- A

Architecture of 8085: Block diagram, Pin Description of 8085, Instruction Set and Instruction Format, Addressing Modes, Looping, Counting and Indexing. 8085 Interrupts, Interrupt handling in 8085, Enabling, disabling and masking of interrupts. **(10 hours)**

Counters and Time Delay Programs, Stack and Subroutines, Conditional Call and Instructions & Code Return Conversions, Timing diagram for different machine cycles. **(4 hours)**

Parallel Input/Output& Interfacing: - Basic Interfacing Concepts, Interfacing memory and I/O devices, Addressing memory, Interfacing a keyboard, Interfacing LED and seven segment displays. **(6 hours)**

SECTION – B

Programmable Interface Devices: - Basics of Programmable I/O, General Purpose Programmable Peripheral Devices – 8255A, 8259A, Direct Memory Access Controller – 8237. **(8 hours)**

Architecture of 8086 : Memory Address space and data organization, segment registers and memory segmentation, Generating memory addresses, IO address space, addressing modes, Minimum mode and Maximum mode, system Timing, Instruction Set and Programming Structure of 8086. **(12 hours)**

BOOKS RECOMMENDED:

1. Microprocessor Architecture, Programming & Applications with 8085 - Ramesh S. Gaonkar.
2. Microprocessor and Interfacing - Douglas V. Hall
3. Introduction to Microprocessors - Aditya Mathur

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

CLASS: B.E. 5th SEMESTER **CREDIT-3**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO: PCS-504

COURSE TITLE: THEORY OF COMPUTATION

L	T	P	Marks Theory	Marks Sessional
2	1	0	100	50

DURATION OF EXAM: 3 HOURS

Course Outcom	At the end of the course, the student will be able to:	BT Level
CO1	Design Deterministic Finite Automata's for Regular Expressions and Languages	3
CO2	Design Non Deterministic Finite Automata's for Regular Expressions and Languages	3
CO3	Design Moore and Mealy machines to solve the given problems	3
CO4	Construct context free grammar, context free language and apply normal forms techniques to solve the given problems	3
CO5	Design Push Down automata to solve a given problem	3
CO6	Develop a computational model/machines using Turing machine for the given problem	3

SECTION- A

Introduction: -Symbols, string Concatenation, alphabet, Language, Tree, Mathematical Induction Proofs, States, Transition Tables, Finite Automata, Regular Expressions, Push- down Automata, Turing Machine, Context Free grammars**.** **(8 hours)**

Finite Automata: - Deterministic Finite Automata (DFA), Designing, Non- deterministic finite Automata (NFA) without E-moves, Conversions, Equivalence, NFA with E-moves, Regular expression designing, Finite machine with output assigned, Moore and mealy machines, Conversion and Equivalence. **(12 hours)**

SECTION- B

Turing Machines: -Turing Hypothesis, Turing Computability, Non- deterministic, Multitape and other versions of Turing machines, Churches Hypothesis, Primitive Recursive functions, Universal Turing machines, decidability, Halting problem, Stack Automata. **(10 hours)**

Regular Grammar & Context free Languages: -Context Free Grammar, Context free Languages, reduced form of Grammar, Ambiguous and Non- Ambiguous grammar, acceptors and generators, Relations between Classes of Languages, Pumping lemma of regular sets, Chomsky's hierarchy of languages, derivation Trees. **(10 hours)**

BOOKS RECOMMENDED:

1. Introduction to Automata Languages & Computation - A.V. AHO, J. E. Hopcreft& J.D. Ullman
2. Introduction Theory of Computer Science - E. V. Krishna Moorthy

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

CLASS: B.E. 5th SEMESTER **CREDITS: 3**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO: MOC-502

COURSE TITLE: SWAYAM / NPTEL

L	T	P	Marks Sessional
3	0	0	100

The department shall offer the SWAYAM / NPTEL course (12 weeks) out of the list of courses offered by SWAYAM around the time of commencement of the semester. However, the selected NPTEL course should not be similar to the regular courses offered as a part of the department curriculum.

The overall monitoring of the NPTEL course will be under the supervision of the teacher incharge of the department.

The NPTEL/SWAYAM certification course comprises of Assignments (25%) and Proctor Examination (Online examination MCQ's based = 75%) conducted at the end of the semester by IIT Madras as per the schedule.

The marks obtained by the student in the NPTEL/SWAYAM certification course will be tabulated by the concerned department.

Note :- In case the student does not pass the certification exam or remains absent in the proctor examination, no certificate will be given to the candidate by the NPTEL and the student will be deemed to have failed in the course. The examination of the said NPTEL course will be taken by the department concerned in the next semester under the supervision of Examination Cell of GCET Jammu. The paper will be of 75 marks and assignment marks will be carried forward from the previous semester.

CLASS: B.E. 5th SEMESTER **CREDITS:1.5**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO.: PCS-512

COURSE TITLE: COMPUTER NETWORKS LAB	**L**	**T**	**P**	**Marks Practical**
	0	**0**	**3**	**75**

Course Outcome	**At the end of the course, the student will be able to:**	**BT Level**
CO1	Discuss basic elements of a simple network topology.	1
CO2	Apply IP address configuration to a given network topology.	2
CO3	Design a network involving switching elements like switches, routers etc for a given scenario.	3
CO4	Analyze the working of various protocols like HTTP, DNS, DHCP, VOIP and RIP by simulation.	4
CO5	Apply troubleshooting in a given network topology.	3

Lab Experiments:

Exp. No.	**Experiment Details**
1.	To study different types of networking cables.
2.	To implement the cross-wired cable and straight through cable using crimping tool.
3.	To study about different networking devices.
4.	To connect two computers in a local area network and to share file between them.
5.	To study about IP addressing.
6.	To implement various topologies using the LAN trainer kit.
7.	To study the UDP protocol and TCP protocol using the LAN trainer software.
8.	WAP on bit stuffing and character stuffing using any language.

NOTE: **Additional Lab experiments/ practicals will be performed based on the course content requirements.**

CLASS: B.E. 5th SEMESTER **CREDITS:1.5**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO.: PCS-513				**Marks**
COURSE TITLE: MICROPROCESSOR & INTERFACING LAB	**L**	**T**	**P**	**Practical**
	0	**0**	**3**	**75**

Course Outcome	At the end of the course student will be able to	BT Level
CO 1	Apply the instruction set of 8085 and 8086 to execute single programs	3
CO 2	Implement advanced programming using programming model of microprocessors	3
CO3	Write program for code conversions in microprocessors	3

Lab Experiments:

Exp. No.	Experiment Details
1.	Block Transfer: - Data bytes are stored in memory locations from XX50H to XX5FH to insert an additional five bytes of data, it is necessary to shift the data string by five memory location. Write a program to store a data string from XX55H to XX64H. Use any 16 bytes of data to verify your program.
2.	Addition with Carry: Six bytes of data are stored in memory locations starting at XX50H. dd all the data bytes. Use register B to save any carry generated while adding the data bytes. Store the sum at two consecutive memory locations XX70H and XX71H.
3.	Checking for a particular data byte: A set of eight readings is stored in memory location starting at XX50H. Write a program to check whether a byte 40H exists in the set. If it does, stop checking, and display its memory location, otherwise output FFH.
4.	Write a program for BCD to Seven Segment LED code conversion.
5.	Write a program for Binary to ASCII code conversion.
6.	Write a program for BCD addition.
7.	Write a program for multiplication of Two 8 bit unsigned nos.
8.	Write a program to implement Stack operation.
9.	Write a program to implement procedures.
10.	Write a program to implement delay loops.

NOTE: **Additional Lab experiments/practicals will be performed based on the course content requirements.**

CLASS: B.E. 5th SEMESTER **CREDIT: 1**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO.: PIT-502

COURSE TITLE: INDUSTRIAL TRAINING

L	T	P	Marks Practical
-	-	-	50

Students are required to undertake 4 to 6 weeks Practical Training during the summer vacations in the field of Computer Engineering and applications in Govt./Semi-Govt./Private sector. Thereafter, each student shall be required to submit a report on the practical training to the concern department for evaluation.

Guidelines for evaluation of Practical Training: The evaluation shall be done by the departmental committee during 5thsemester. The committee shall have a convener and at least two members.

Distribution of Marks as per the University statues:

Total Marks for Evaluation		= 50 marks	
i)	Report	= 15	30%
ii)	Viva-Voce & Presentation	= 25	50%
iii)	Level of IT	= 10	20%

Due weight age will be given to those who have opted for Industrial Training outside the State as well as keeping in view the profile of that Industry.

Award of the Marks:

Marks under (i), (ii) & (iii) will be awarded by the departmental committee constituted for the purpose.

DEPARTMENT OF
COMPUTER SCIENCE & ENGINEERING

Course Scheme - B.E. 6th Semester

Contact Hrs: 24

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits
			L	T	P	Internal	External		
HMC-601	Humanities & Social Science Course	Managerial Economics	3	1	0	50	100	150	4
*MOC-602	Massive Open Online Course	SWAYAM/NPTEL	3	0	0	100	-	100	3
PCS-602	Professional Core Course	Operating System	2	1	0	50	100	150	3
PCS-603	Professional Core Course	Compiler Design	2	1	0	50	100	150	3
CSE-601	Professional Elective Course	Elective-I	2	1	0	50	100	150	3
CSE-611	Professional Elective Course	Elective-I Lab	0	0	3	75	-	75	1.5
PCS-612	Professional Core Course	Operating System Lab	0	0	3	75	-	75	1.5
PCS-613	Professional Core Course	Web Designing & Android Development Lab	0	0	2	50	-	50	1
	TOTAL		**12**	**4**	**8**	**500**	**400**	**900**	**20**

Elective-I

CSE -601 (A) Micro Controller & Embedded Systems
CSE -601 (B) Computer Graphics

Elective-I Lab

CSE -611 (A) Micro Controller & Embedded Systems Lab
CSE -611 (B) Computer Graphics Lab

NOTE:-The department shall offer the Swayam / NPTEL course out of the list of courses offered by Swayam around the time of commencement of the semester. However, the selected NPTEL course should not be similar to the regular courses offered as a part of the department curriculum.

CLASS: B.E. 6thSEMESTER **CREDITS: 4**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO: HMC-601

	L	T	P	Marks: Theory	Marks: Sessional
COURSE TITLE: MANAGERIAL ECONOMICS	**3**	**1**	**0**	**100**	**50**

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	**Explain** the basic concepts and application procedure of managerial economics in decision making.	2
CO2	**Apply** microeconomic concepts and procedures in decision making for the given business scenario from consumer perspective.	3
CO3	**Establish** the functional relationship between Production and associated cost of the product from producer perspective.	3
CO4	**Develop** competitive strategies by using the concept of price and output decisions of firm under various market structure.	3
CO5	**Apply** macroeconomics concepts and procedures for the given business scenario.	3

SECTION - A

Unit 1-Meaning and Importance of Managerial Economics: Introduction, Meaning, Scope of Managerial Economics ,,Role and responsibilities of managerial economist,Relationship of managerial economics with other disciplines: Importance of Managerial Economics in decision making, the basic process(steps) of decision making. **(5hrs)**

Unit 2-Demand Analysis: Introduction, Meaning of demand and Law of Demand, factors affecting demand; exceptions to the law of demand;Elasticity of Demand(Price,income and cross elasticity of demand) **(6hrs)**

Unit 3-Consumer Behaviour: Cardinal utility analysis: Concept:law of diminishing marginal utility: law of equimarginal utility, Ordinalutility analysis: meaning and properties ofIndifference curves and utility maximization(consumer equilibrium). **(5hrs)**

Unit 4- Demand Forecasting: Introduction, Meaning and importance of demand Forecasting : Methods orTechniques of Demand Forecasting, Survey Methods, Statistical Methods, Demand Forecasting for New Products**.** **(4hrs)**

SECTION - B

Unit 5- Production and cost Analysis: Meaning of Production function, Isoquants(meaning and properties)law of variable proportions, law of returns to scale, Cost Analysis: Concept of Fixed, Variable, Total, Average & Marginal Costs &their relationships in short run. **(6hrs)**

Unit 6- market structure and pricing decisions - Introduction, Perfect Competition, monopoly (Price-OutputDetermination under Perfect Competition and monopoly in short run and long run),; kinked demand curve analysis of price stability(Sweezy's model) **(5hrs)**

Unit 7-Macroeconomic environment

Index Numbers-Meaning, construction and difficulties in measurement of Index number and its uses: meaning and phases of Trade /business cycle. **(5hrs)**

Unit 8-Banking and inflation-Functions of central bank and methods of credit control: functions of Commercial bank and methods of credit creation, Inflation(Types, effects and methods to control inflation). **(6hrs)**

BOOKS RECOMMENDED :

1. K.K.Dewett : Modern Economic Theory
2. H.L Ahuja : Advanced Economic Theory
3. M.L. Jhingan : Macro Economic Theory
4. P.N Chopra : Business Economics/Advanced Eco. Theory
5. .D,N,Dwivedi :Managerial Economics
6. A. Koutsoyiannis : Modern microeconomics

NOTE: There shall be total eight questions, four from each section. Each question carries 20 marks. Five questions will have to be attempted, selecting at least two from each section. Use of calculator is allowed.

CLASS: B.E. 6th SEMESTER **CREDITS: 3**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO: MOC-602

COURSE TITLE: SWAYAM/NPTEL

L	T	P	Marks Sessional
3	0	0	100

The department shall offer the SWAYAM / NPTEL course (12 weeks) out of the list of courses offered by SWAYAM around the time of commencement of the semester. However, the selected NPTEL course should not be similar to the regular courses offered as a part of the department curriculum.

The overall monitoring of the NPTEL course will be under the supervision of the teacher incharge of the department.

The NPTEL/SWAYAM certification course comprises of Assignments (25%) and Proctor Examination (Online examination MCQ's based = 75%) conducted at the end of the semester by IIT Madras as per the schedule.

The marks obtained by the student in the NPTEL/SWAYAM certification course will be tabulated by the concerned department.

CLASS: B.E. 6th SEMESTER **CREDITS: 3**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO: PCS-602

	L	T	P	Marks: Theory	Marks: Sessional
COURSE TITLE: OPERATING SYSTEM	**2**	**1**	**0**	**100**	**50**

DURATION OF EXAM: 3 HOURS

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO-1	Explain the basic architecture of operating system	2
CO-2	Discuss process synchronization techniques	2
CO-3	Apply the scheduling algorithms for the given problem	3
CO-4	Discuss deadlock detection, avoidance, prevention and recovery mechanisms	2
CO-5	Describe memory management techniques of the operating system	2

SECTION – A

Introduction Concepts: - Operating System functions & Characteristics, Historical Evolution of O.S., O.S. Services, User O.S. Interface, Computer System Architecture, O.S. Design and Implementation and structure, System calls,System Programs, Virtual Machines, Spooling. **(4 hours)**

Process Management: - Study of state models, process Scheduling, Job Scheduling, Scheduling Criteria, SchedulingAlgorithms, Multiple Process Scheduling. **(6 hours)**

Process Coordination: -Synchronization : Race-Conditions, critical–Section problems, semaphores, Bounded-Buffer Problem, Readers-writers Problem, Dining –Philosophers Problem . **(6 hours)**

SECTION – B

Deadlocks: Characteristics, Deadlock Prevention, Avoidance, Detection, Recovery. **(6 hours)**

Memory Management: Logical & Physical Address space, Contiguous & Non-Contiguous Memory Allocation, Paging, Structure of Page Table, Segmentation, Demand paged memory management, Page replacement, Allocation of Frames, Thrashing, Swapping & Overlays, Cache Memory.

(12 hours)

File Systems& Disk Storage: Files - file concept, file structure, types, access methods, directory structure, allocationmethods (contiguous, linked, and indexed), free-space management (bit vector, linked list, grouping), Disk Structure, Disk Scheduling, Disk Management, Disk Formatting, Swap Space Management, RAID Structure.

(**6 hours)**

BOOKS RECOMMENDED:

1.	Operating System Concepts	Silberschatz and Galvin, Publisher Addison Wesley Inc.
2.	Operating System Design & Implementation	Tanenbaum A.S, Publisher Pearson Education.
3.	An Introduction to Operating Systems Concepts and Practice	Bhatt and Chandra, Publisher Prentice Hall of India Publication
4.	Operating Systems – Internals and Design Principles	William Stallings, Seventh Edition, Prentice Hall

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

BRANCH: COMPUTER SCIENCE ENGINEERING **CREDITS:3**

COURSE NO: PCS-603 **Marks**

COURSE TITLE: COMPILER DESIGN	**L**	**T**	**P**	**Theory**	**Sessional**
DURATION OF EXAM: 3 HOURS	**2**	**1**	**0**	**100**	**50**

Course Outcome	**At the end of the course, the student will be able to:**	**BT Level**
CO1	Explain the phases of a compiler design.	2
CO2	Explain the design of lexical analyzer and recognize the underlying formal models	2
CO3	Describe context free grammar and eliminate ambiguity from the given grammar	2
CO4	Apply Bottom-up and Top-down parsing techniques for the given programming construct	3
CO5	Describe the frameworks for syntax directed translation schemes and intermediate code generation.	2
CO6	Analyze the concepts of storage administration and explain error detection and recovery in different phases of compilation.	4
CO7	Analyze code optimization techniques and code generation algorithms.	4

SECTION- A

Introduction–Languages Processors, the typical structure of a Complier. **(03 hours)**

Lexical analysis –Role of Lexical Analyzer, Input buffering, A simple approach to Design of Lexical Analyzers, Regular Expressions, Finite Automata, Regular expression to Finite Automata, Conversion of NFA to DFA, Minimizing the number of states of a DFA. **(07 hours)**

The Syntactic Specification of Programming Languages –Definition of Grammars (Context free grammar),derivation, parse tree, ambiguity, non-context free language constructs. **(04 hours)**

Basics Parsing Techniques –Parsers- Shift reduce parsing, Operator precedence parsing, top -down parsing, Predicative parsers, LR parsers. **(08 hours)**

SECTION - B

Syntax directed translation- Syntax directed translation schemes. Implementation of syntax directed translators. **(04 hours)**

Intermediate code Generation - Intermediate code, postfix notation, three address code-quadruples triples,

translation of Assignment statement, Boolean Expression, Statements that alter the flow of control.

(04 Hours)

Symbol Table Organization –The content of symbol table, Data structure of symbol table Run- Time memory Allocation-Static and Dynamic memory allocation, Static allocation of space – Activation trees, activation records, Procedure calls, parameter passing. **(05 hours)**

Error Detection and Recovery-Errors, lexical phase errors, syntactic phase errors, semantic errors.

(04 hours)

Code optimization- Loop optimization, DAG Representation of basic blocks, Global data flow Analysis

(03hours)

Code generation- Issues in the design of code generator, Peephole optimization, a simple code generator Register Allocation & Assignment. **(03 hours)**

BOOKS RECOMMENDED:

1.	Principles of compiler design	Ravi Sethi, Jeffrey D Ullman
2.	Principles of compiler design	Alfred V.Aho, Jeffrey D Ullman
3.	Theory of parsing Translation & Compiling	Aho. Ullman
4.	Compiler construction	MunishJha
5.	Compilers Principles, Techniques & Tools	Alfred V. Aho, Monika S Lam,

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

CLASS: B.E. 6thSEMESTER
BRANCH: COMPUTER SCIENCE ENGINEERING **CREDITS:3**
COURSE NO: CSE- 601(A)(ELECTIVE-I) **Marks**
COURSE TITLE: MICROCONTROLLER & EMBEDDED SYSTEM

	L	T	P	Theory	Sessional
DURATION OF EXAM: 3 HOURS	**2**	**1**	**0**	**100**	**50**

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Understand the general architecture of microcontroller and operation of embedded system using Aurdino and Raspberry pie.	2
CO2	Classify and apply the instruction set of 8051 and AVR microcontrollers and the use of different instructions.	3
CO3	Create the interfacing of memory and various I/O devices with microcontrollers.	3

SECTION- A

8051 Microcontroller: Introduction to Microcontrollers, Evolution, Microprocessors vs. Microcontrollers, MCS-51 Family Overview, Important Features, Architecture. 8051 Pin Functions, Architecture, Addressing Modes, Interrupt Organization, Processing Interrupts, Serial Port Interrupts, External Interrupts, and Interrupt Service Routines. Memory Address Decoding, 8031/51 Interfacing with External ROM And RAM.

(10 hours)

Assembly programming and instruction of 8051: Introduction to 8051 assembly programming, Assembling andrunning an 8051 program, Data types and Assembler directives, Arithmetic, logic instructions and programs, Jump, loop and call instructions, IO port programming.

8051 interfacing with 8255- Programming the 8255, 8255 interfacing, C programming for 8255.

(12hours)

SECTION - B

Embedded system : concept - characteristic features - architecture - application areas - specialties - embedded operating system - types - activities of an embedded OS like task, task scheduling, context switching, mutual exclusions and inter task communications - memory management and timer services - general architecture of OS - kernel - categories of embedded OS - examples - concept of arduino and raspberry pie development boards.

(10 hours)

Introduction to AVR microcontroller: Overview of AVR family, AVR Microcontroller architecture, status register, Special function registers, RAM, ROM & EEPROM space, On-Chip peripherals, ATmega32 pin configuration & function of each pin, Fuse bits of AVR. **(05 hours)**

AVR assembly language programming: AVR data types and assembler directives, addressing modes of AVR, Data transfer, Arithmetic, Logic and Compare, Rotate and Shift, Branch and Call instructions, AVR studio setup for assembly language programming, AVR I/O Port Programming, Time delay loop, Look-up table. **(08 hours)**

BOOKS RECOMMENDED:

1. The 8051 Microcontroller and Embedded Systems, second edition, Pearson publications — Mazidi Muhammad Ali
2. The AVR Microcontroller and Embedded Systems using assembly and C - - Pearson Education. — Muhammad Ali Mazidi, SarmadNaimi and SepehrNaimi
3. Programming and Customizing the AVR Microcontroller — DhananjayGadre, McGraw Hill Education

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

CLASS: B.E. 6thSEMESTER

BRANCH: COMPUTER SCIENCE ENGINEERING **CREDITS:3**

COURSE NO: CSE-601(B)(ELECTIVE-I)

Marks

COURSE TITLE: COMPUTER GRAPHICS

	L	T	P	Theory	Sessional
DURATION OF EXAM: 3 HOURS	**2**	**1**	**0**	**100**	**50**

Course Outcome	At the end of the course, the student will be able to:	BTL
CO1	Describe various display techniques and working principles of input devices	1
CO2	Understand the concepts of points and lines and various algorithm around them.	2
CO3	Explain Geometric Transformations in 2D showing translation, scaling, reflection and rotation of an object.	2
CO4	Explain various 3D Transformations and viewing methods.	3
CO5	Apply clipping algorithm using various clipping operation: point, line and polygon	3
CO6	Compare parallel, perspective projections and Illumination, Shading models.	4

SECTION – A

Computer Graphic Systems:-Application areas of Computer Graphics, Overview of graphics systems,Video display devices, Raster scan displays, Video controller, Display Processors, Random Scan displays, Color CRT monitors, Graphics monitors and workstations, Direct View storage tubes, Flat Panel Displays. Three-dimensional viewing devices. Input devices:- Keyboards , Mouse, Trackball and space ball , Joysticks, Data glove, digitizers, image scanners, touch panels, Light pens, Voice systems, Hard copy Devices. Graphic software, Co-ordinate representations, Functions standards, PHIGS WORKSTATIONS**.** **(04 hours)**

Graphic Output primitives & their Attributes:- Points and lines, lines drawing algorithms : DDA algorithm,Bresenham's line algorithm, Circle generation algorithm, Midpoint circle Algorithm Ellipse Generating Algorithms: midpoint ellipse algorithm, Pixel Addressing and Object Geometry, Boundary Fill Algorithms, Flood Fill Algorithms, Character Generation, Line, Area-Fill and Character Attribute **(08 hours)**

Two Dimensional Geometric Transformations and Viewing :-Basic 2-D Transformation: Translation, Scaling,Rotation, Matrix Representation, Composite Transformations, Viewing pipeline, Window to Viewport coordinate Transformations, 2-D viewing functions. **(06hours)**

SECTION – B

Three Dimensional Transformations and Viewing :- Three Dimensional Concepts, Transformations and Viewing, Three Dimensional Display Methods, Three Dimensional Transformations; Three Dimensional Viewing Pipeline, Viewing Coordinates, Specifying the View Plane. **(06hours)**

Parallel and Perspective Projections: -Parallel projections, Perspective projections**.** **(06hours)**

Clipping: Clipping Operations, point clipping, line clipping procedures like Cohen -Sutherland line clipping, line clipping using non rectangular clip windows. Polygon clipping procedures: Sutherland Hodgeman polygon clipping**.** **(06 hours)**

Illumination Models and Shading: Light sources, Basic Illumination models, Shading models: Flat and Smooth Shading.

BOOKS RECOMMENDED:

1	Computer Graphics	Donald Hearn,M.pauline Baker-phi
2	Interactive Computer graphics	Newman and Sprowll-Tmh
3	Computer Graphics:A Programming approach	Stevan Harrington-Tata McGraw-Hill
4	Computer Graphics :Principles and practice	JD Foleyand A.V Dam,S.KFeiner, J.F Hughes –Pearson Education
5	Computer Graphics	Z. Xiang, R.A. Plastock:, Second Edition, Schaum's Outlines, TataMcGraw-Hill
6	Introduction to Computer Graphics	N. Krishnamurthy -Tata McGraw-Hill.

NOTE: There shall be total Eight Questions of 20 marks each; four questions from each section and students have to attempt five questions selecting at least two from each section. Use of Calculator is allowed

CLASS: B.E. 6th SEMESTER **CREDITS: 1.5**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO.: CSE -611 (A) (ELECTIVE-I)

COURSE TITLE: MICRO CONTROLLER & EMBEDDED SYSTEMS LAB

L	T	P	Marks Practical
0	0	3	75

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Design, code and debug Assembly Language programs to implement simple programs	
CO2	Interface peripherals like switches, LEDs, stepper motor, Traffic lights controller, etc.	
CO3	Apply programming language using AVR microcontroller kit.	

Lab Experiments:

Exp. No.	Experiment Detail
1.	Study and familiarization of 8051 Microcontroller trainer kit
2.	Assembly Language Program for addition of 8-bit numbers stored in an array
3.	Assembly Language Program for Multiplication by successive addition of two 8-bit numbers
4.	Assembly Language Program for finding largest no. from a given array of 8-bit numbers
5.	Assembly Language program to arrange 8-bit numbers stored in an array in ascending Order
6.	Stepper motor control by 8051 Microcontroller
7.	Interfacing of 8-bit ADC 0809 with 8051 Microcontroller
8.	Interfacing of 8-bit DAC 0800 with 8051 Microcontroller and Waveform generation using DAC
9.	Implementation of Serial Communication by using 8051 serial ports
10.	Study of AVR Controller.
11.	Assembly Language Programs using AVR.

NOTE: **Additional Lab experiments/practicals will be performed based on the course content requirements.**

CLASS: B.E. 6th SEMESTER **CREDITS: 1.5**

BRANCH: COMPUTER SCIENCE ENGINEERING **Marks**

COURSE NO.: CSE -611 (A) (ELECTIVE-I)

COURSE TITLE: COMPUTER GRAPHICS LAB	**L**	**T**	**P**	**Practical**
	0	**0**	**3**	**75**

Course Outcome	**At the end of the course, the student will be able to:**	**BTL**
CO1	Write a program to implement DDA and Bresenham line drawing algorithms.	2
CO2	Write a program to implement circle drawing algorithm.	3
CO3	Write a program to implement polygon filling algorithms	3
CO4	Write a program to implement composite transformation of 2D / 3D transformation.	4

List of Experiments

Exp. No.	**Experiment Details**
1.	Introduction to Borland Graphics Interface (BGI) and graphics libraries such as OPENGL, Cairo.
2.	Simple DDA line drawing program
3.	Bresenham's line drawing program.
4.	Bresenham's circle drawing algorithm
5.	Implement midpoint circle drawing algorithm
6.	Implement ellipse drawing algorithm
7.	Performing transformations in 2D space
8.	Performing 3D transformations
9.	Draw and fill shapes.
10.	Cohen Sutherland line clipping program

NOTE: **Additional Lab experiments/practicals will be performed based on the course content requirements. Implement these programs using C/C++**

CLASS: B.E. 6th SEMESTER **CREDITS: 1.5**

BRANCH: COMPUTER SCIENCE ENGINEERING **Marks**

COURSE NO.: PCS-612

COURSE TITLE: OPERATING SYSTEM LAB	**L**	**T**	**P**	**Practical**
	0	**0**	**3**	**75**

Course Outcome	**At the end of the course, the student will be able to:**	**BT Level**
CO1	Discuss UNIX operating system and its functions	3
CO2	Use various Unix Commands to solve a given problem	3
CO3	Write shell scripts for a given problem	3

Lab Experiments:

Exp. No.	**Experiment Details**
1.	Learning Basic Features and Operating Environment of UNIX and LINUX.
2.	Introduction to Shell and Shell Commands
3.	Designing Programs using the concept of Shell Programming.(at least 5 programs)
4.	Usage of Vi Editor of UNIX.
5.	Programming with Semaphores

NOTE: **Additional Lab experiments/ practicals will be performed based on the course content requirements.**

CLASS: B.E. 6th SEMESTER **CREDIT: 1**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO.: PCS-613

COURSE TITLE: WEB DESIGNING & ANDROID LAB	**L**	**T**	**P**	**Marks Practical**
	0	**0**	**2**	**50**

Course Outcome	**At the end of the course, the student will be able to:**	**BT Level**
CO1	Discuss basic HTML tags and use them in creating a static form	3
CO2	Apply styling methods to a static web page using different style sheets and selectors in CSS	3
CO3	Develop an interactive web page using JavaScript.	3
CO4	Develop mobile applications using Android.	3

Lab Experiments:

Exp. No.	**Experiment Details**
1.	HTML code for displaying name image and hyperlinks
2.	HTML code for displaying contents styled with CSS.
3.	HTML code for accepting a form.
4.	Program to create frame and table using HTML
5.	Program to create functions using Javscript.
6.	Program of form validation using Javascript.
7.	Design a website on your own using HTML,CSS, Javascript.
8.	Develop an android application representing a simple calculator
9.	Develop an android application for working with notification
10.	Develop an android application for connecting to internet and sending e-mail.
11.	Develop an android application for working with device camera

NOTE: **Additional Lab experiments/practicals will be performed based on the course content requirement.**

DEPARTMENT OF
COMPUTER SCIENCE & ENGINEERING
Course Scheme – B. E. 7th Semester

Contact Hrs: 24

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	CREDITS
			L	T	P	Internal	External		
PCS-701	Professional Core Course	Artificial Intelligence	2	1	0	50	100	150	4
PCS-702	Professional Core Course	Software Engineering	2	1	0	50	100	150	4
PCS-703	Professional Core Course	Machine Learning	2	1	0	50	100	150	3
CSE-701	Professional Elective Course	Elective-I	2	1	0	50	100	150	3
PCS-713	Professional Core Course	Machine Learning Lab	0	0	2	50	-	50	1
CSE-711	Professional Elective Course	Elective-I Lab	0	0	2	50	-	50	1
SII-703	Summer Industry Internship	Industrial Training	-	-	-	EW	-	50	1
SEM-703	Seminar	Seminar	0	0	4	50	-	50	1
ECO-711	Open Elective Course	Mat Lab Programming	0	0	2	50		50	1
EEO-712		Instrumentation & Non-Conventional Energy							
ITO-714		Linux Shell Programming							
MEO-715		Theory of Machine Lab							
CEO-716		Basic Civil Testing Lab							
NCC-703	Non-Credit Course	Essence of Indian Traditional Knowledge	2	0	0	Satisfactory/ Unsatisfactory			Non-Credit
TOTAL			**10**	**4**	**10**	**450**	**400**	**850**	**19**

Elective – I	
CSE -701 (A)	Digital Image Processing
CSE -701 (B)	Network Security
Elective-I Lab	
CSE -711 (A)	Digital Image Processing Lab
CSE -711 (B)	Network Security Lab

CLASS: B.E. 7th SEMESTER **CREDITS: 4**

BRANCH: COMPUTER ENGINEERING

COURSE NO: PCS-701

COURSE TITLE: ARTIFICIAL INTELLIGENCE

Hours/ Week			Marks Distribution	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

DURATION OF EXAM: 3 HOURS

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Explain the fundamentals of artificial intelligence (AI) and expert systems.	2
CO2	Explain the heuristic searching techniques in AI	2
CO3	Explain the role of agents and how it is related to environment.	2
CO4	Discuss the techniques in predicate logic representing Knowledge.	2
CO5	Analyze how uncertainty is being tackled in knowledge representation and reasoning process.	4
CO6	Discuss the fundamental theory and concept of Artificial Neural Networks and Fuzzy logic.	2

SECTION- A

Artificial Intelligence: - The AI problems, AI techniques, The level of the model, Criteria for success, AI tasks. Problems, Problem Spaces & Research: - Defining problem as a state space search, Production system, Problem characteristics, Production system characteristics, Issues in the design of search programs, Two path problems. **(10 hours)**

Symbolic Reasoning under Uncertainty: - Introduction to non-monotonic reasoning, Logics for non-monotonic reasoning, Implementation Issues, Augmenting a Problem Solver, Implementation by a) Depth - First Search b)Breadth - First Search. **(06 hours)**

Statistical reasoning: - Probability & Bayes Theorem, Certainty Factors & Rules Based Systems, Bayesian networks, Dempster Shafer Theory, Fuzzy logic, Introduction to Expert System development. **(04 hours)**

SECTION-B

Using Predicate Logic: - Representing simple facts in logic, Representing instances and Isa relationships,Computable functions and predicates, Resolution, Natural Deduction, Conversion to clause form. **(06 hours)**

Representing Knowledge using Rules: -Procedural Vs. declarative knowledge, Logic programming, Forward Vs.backward searching, Matching, Control knowledge, Heuristic search techniques: - Generate & test, Hill climbing,Best First Search, Problem reduction, Constraint satisfaction, Means and analysis.

(10hours)

Knowledge Representation Issues: - Representation and mappings, Approaches to knowledge representation, Issues of knowledge representation, The frame problem, Semantic networks. **(04 hours)**

BOOKS RECOMMENDED:

1. Artificial Intelligence — Elaine Rich Kevin Knight
2. Principles of A.I Expert system development — David W. Rolston.

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

CLASS: B.E. 7th SEMESTER **CREDITS: 4**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO: PCS-702

COURSE TITLE: SOFTWARE ENGINEERING

DURATION OF EXAM: 3 HOURS

	Hours/ Week			Marks Distribution	
	L	**T**	**P**	**Theory**	**Sessional**
	2	**1**	**0**	**100**	**50**

Course Outcome	At the end of the course student will be able to:-	BT Level
CO 1	Explain the Software Development lifecycle with its analysis, design and development.	2
CO 2	Apply knowledge of engineering approach to analyze requirements for software development	3
CO 3	Use techniques and tools necessary for developing quality software	3
CO 4	Engage in life-long software development, testing and its maintenance	3

SECTION- A

Introduction to Software Engineering: - Software: The Process and the product, Software characteristics, Legacy software and software crisis, Software myths, Software Engineering: A layered technology, Process framework, and Software Engg. Paradigms**:** Sequential, Incremental, Evolutionary and Specialized Process Models. **(08 hours)**

Software Planning and Project Management: - Software Project Management Process: Software scope,Resources, Software metrics, Software project estimation, Decomposition techniques, Empirical estimation model:COCOMO, Software project scheduling, Risk analysis, Software acquisition. **(08 hours)**

Software Requirements Analysis: Requirement analysis, Analysis principles, Analysis modelling**.** Design engineering, The design process and Concepts, Effective modular design, Data design, Architectural design, procedural design, Interface Design. **(06 hours)**

SECTION- B

Data Flow Oriented Design: Data Flow Diagrams transform analysis, Transaction analysis, Transform and transaction mapping. **(05 hours)**

Software Quality Assurance: - Software quality and software quality assurance, Formal technical reviews, Software quality metrics: McCall's quality factors, Software reliability. **(05 hours)**

Software Testing: - Software testing fundamentals, White box testing, Basic path testing, Control structure testing, Black box testing**.** Software testing strategies, Unit testing, Integration testing, Validation testing, System testing. **(08 hours)**

Software Maintenance: Definition, Maintenance characteristics, Reverse Engineering, Re-engineering.
(02 hours)

BOOKS RECOMMENDED:

1. Software Engineering, A practitioner's approach: R.S. Pressman
2. Integrated approach to Software Engineering Pankaj Jalote
3. Software Engineering: M.L. Shooman

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

CLASS: B.E. 7th SEMESTER **CREDITS: 3**

BRANCH: COMPUTER SCIENCE ENGINEERING	**Hours/ Week**			**Marks Distribution**	
COURSE NO: PCS-703	**L**	**T**	**P**	**Theory**	**Sessional**
COURSE TITLE: MACHINE LEARNING	**2**	**1**	**0**	**100**	**50**

DURATION OF EXAM: 3 HOURS

Course Outcome	At the end of the course student will be able to:-	BT Level
CO 1	Explain the basics of Machine Learning Approach with its implementation.	2
CO 2	Determine approach to use supervised and unsupervised machine learning Approach with examples.	2
CO 3	Apply different machine Learning models using primary and secondary datasets.	3
CO 4	Develop application for automation using machine learning algorithms	3
CO 5	Understand the concepts of Reinforcement Learning and ensemble methods	2

SECTION- A

Basics of Machine Learning: Definition of Machine learning, Applications, Feature set, Dataset divisionIntroduction to Machine Learning Techniques: Supervised Learning, Unsupervised Learning and ReinforcementLearning, bias-variance trade off, overfitting - under fitting **(5 Hrs)**

Supervised learning: Classification and Regression: K-Nearest neighbours, Linear Regression, Logistic Regression,gradient descent algorithm, Support Vector Machine (SVM), Evaluation Measures: SSE, MME, R^2, confusionmatrix, precision, recall, F-Score, ROC-Curve. **(9 Hrs)**

Unsupervised learning: Introduction to clustering, Hierarchical clustering, K-means clustering, Density basedclustering **(6 Hrs)**

SECTION B

Bayesian learning: Probability theory and Bayes rule, Naive Bayes learning algorithm, Bayes nets **(4 Hrs)**

Decision trees: Representing concepts as decision trees, Recursive induction of decision trees, best splitting attribute: entropy and information gain, Overfitting, noisy data, and pruning. **(8 Hrs)**

Reinforcement learning and ensemble methods: Reinforcement learning through feedback network, function approximation, Bagging, boosting, stacking and learning with ensembles, Random Forest **(8 Hrs)**

BOOKS RECOMMENDED:

1. Machine Learning: The New AI — EthemAlpaydin
2. Machine Learning — Tom M. Mitchell
3. Machine Learning: a Probabilistic Perspective — Kevin P. Murphy

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

CLASS: B.E. 7thSEMESTER **CREDITS: 3**

BRANCH: COMPUTER SCIENCE ENGINEERING

	Hours/ Week			Marks Distribution	
COURSE NO: CSE -701 (A) (ELECTIVE-I)	**L**	**T**	**P**	**Theory**	**Sessional**
COURSE TITLE: DIGITAL IMAGE PROCESSING	**2**	**1**	**0**	**100**	**50**

DURATION OF EXAM: 3 HOURS

Course Outcome	At the end of the course student will be able to:-	BT Level
CO 1	Remember the fundamental knowledge of Digital Image Processing.	1
CO 2	Understand frequency domain filters and spatial filters for image enhancement.	2
CO 3	Describe the image degradation models which include linear, position-invariant models.	2
CO 4	Apply various filtering techniques used to restore the image and analyze multi resolution view of wavelet transformation functions in 1D and 2D	3
CO5	Evaluate image compression and segmentation techniques.	3

SECTION- A

Introduction and Fundamentals to Digital Image Processing: What is Digital Image Processing, Origin of Digital Image processing, Examples that use Digital Image Processing, Fundamental steps in Digital Image Processing, Components of Digital Image Processing System, Image sensing and acquisition, Image sampling andquantization and representation, Basic relationship between pixels.

(07 hours)

Image Enhancement in the Spatial Domain and Frequency Domain: Background, Basic Intensity transformation functions, Basic grey level transformation, Histogram processing, Basics of spatial filtering: Smoothing, Sharpening filters (Convolution and Order Statistics). Introduction to Fourier transform, Frequencydomain filters: Smoothing, Sharpening filters (Band pass and Homomorphic).

(07 hours)

Image Restoration: Noise models, Image Restoration-Mean Filters (Arithmetic Mean, Contra Harmonic Mean, Geometric Mean, Harmonic Mean) Order statistics filters (Median, Maximum, Minimum, Midpoint, Alpha-Trimmed), Restoration techniques (Constrained method-Inverse filtering, Unconstrained method-Weiner filtering). **(07 hours)**

SECTION- B

Color Image Processing: Color fundamentals, Color models (RGB, CMY and CMYK, HSI and conversions), Psuedocolor image processing, Full color image processing, Color transformations (Formulation, Intensity modification, Color negative, Color slicing, Smoothing, Sharpening, Segmentation). **(06 hours)**

Image Compression: Redundancies (Coding, Psychovisual, and Inter-Pixel), Encoding-Mapping, Quantizer, Coder, and Compression (Lossless compression: Variable length coding – Run Length coding, LZW coding, Arithmetic coding, Huffman encoding), Lossy compression (Lossy predictive, Bit allocation), JPEG, MPEG. **(07 hours)**

Image Segmentation & Representation: Erosion, Dilation, Opening and closing, Thickening, Thinning, Pruning, Detection of discontinuities, Edge detection operators, Region based segmentation, Signatures, Boundary segments, Skeleton of a region. **(06 hours)**

BOOKS RECOMMENDED:

1. Digital Image Processing — Rafael C. Gonzalez And Richard E. Wood
2. Digital Image Processing — Pratt N.K.
3. Digital Picture Processing — Rosenfeld And Kak

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

CLASS: B.E. 7th SEMESTER

CREDITS: 3

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO: CSE -701 (B) (ELECTIVE-I)

COURSE TITLE: NETWORK SECURITY

DURATION OF EXAM: 3 HOURS

Hours/ Week			Marks Distribution	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Explain the OSI security architecture	2
CO2	Discuss the algorithms of the classical encryption techniques	2
CO3	Explain symmetric and asymmetric key cryptographic algorithms	2
CO4	Discuss techniques to achieve principle of authentication on the network	2
CO5	Discuss IP Security Protocols	2
CO6	Analyze system security methods and security threats	4
CO7	Discuss Information Security & Cyber Laws	2

SECTION- A

Introduction: Introduction to N/w Security, Security Approaches, Security Policies, Principle of Security, Introduction to common attacks, IP-Spoofing, Model for N/w Security, Encryption & Decryption. **(06 hours)**

Cryptography: Concepts & Techniques: Introduction to Cryptography, Private/Public Key Cryptography, PlainText, Cipher Text, Substitution and Transposition techniques, Steganography. **(06 hours)**

Symmetric & Asymmetric Key Cryptography: Overview, Algorithm types & modes, DES scheme, RC5, Blowfish, AES scheme, Differential and Linear Crypto analysis, Key distribution and management. Overview, Key management basics, RSA Algorithm, Digital signatures, Message digest, Hash function (SHA), Message Authentication Code (MAC), Authentication protocols**.** **(08 hours)**

SECTION- B

IP Security: Architecture, Authentication header, Encapsulating, Security payload, Security associations, Keymanagement, E-mail security, Web security, Viruses & related threats. **(04 hours)**

Firewalls & Intrusions: Design principles, Characteristics, Types of firewalls, Intruders, Audit Records, Intrusion Detection Systems. **(08 hours)**

Information Security & Cyber Laws: Information security & laws, IPR, Patent law, Copyright law, Overview of cyber crimes, Security metrics – Classification, Benefits, Security tools–Attack & Penetration Tools, Defensive tool. **(08 hours)**

BOOKS RECOMMENDED:

1. Cryptography & Network Security — AtulKahate
2. Cryptography & Network Security — William Stallings
3. Computer Networks (Latest Edition) — Andrew S. Tanenbaum

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

CLASS: B.E. 7th SEMESTER **CREDITS: 0**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE TITLE: ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE	**Hours/ Week**			**Marks Distribution**	
	L	**T**	**P**	**Theory**	**Sessional**
COURSE NO.: NCC-703	**2**	**0**	**0**	**Satisfactory/Unsatisfactory**	

DURATION OF EXAMINATION: 3 HOURS

Course Outcome	**At the end of the course, the student will be able to:**	**BT Level**
CO1	Know about the Vedic philosophy in detail and its relevance in present scenario.	2
CO2	Strengthen their mind and body through the knowledge of yoga.	2

SECTION-A

VedicPhilosophy: Concept of Vedas, Ethics & Values, Educational system, Knowledge of science, trade/commerce & medicines as per Vedas, Environmental ethics: Preservation & Purification, Harnessing of natural resources in alienation with nature as per Vedas.

SECTION-B

Yoga Philosophy: Parts of Yoga, Importance of Yam and Niyam, Stress management through yoga, Purification of mind and body through yoga.

Note for Teacher: The course should aim at enlightening students with the importance of ancient traditional knowledge.

Evaluation of the course: There will be internal evaluation based on two internal sessional and viva -voce.

CLASS: B.E. 7th SEMESTER **CREDIT: 1**

BRANCH: COMPUTER SCIENCE ENGINEERING

	Hours/ Week			Marks Distribution
COURSE NO.: PCS -713	**L**	**T**	**P**	**Practical**
COURSE TITLE: MACHINE LEARNING LAB	**0**	**0**	**2**	**50**

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Install Python	1
CO2	Understand various Loops and Conditions	2
CO3	Understand the supervised and unsupervised approaches	2
CO4	Implement various classification and regression techniques	3
CO5	Understand various performance parameters for evaluating the machine learning models	2

Lab Experiments:

Exp. No.	Experiment Detail
1.	Implement loops and conditional statements
2.	Mathematical computing with Python packages like: numpy, Matplot, Lib, pandas Tensor Flow, Keras
3.	Linear regression and Logistic regression
4.	K nearest neighbour, K means clustering
5.	Support Vector Machine
6.	Naïve Bayes
7.	Decision Tree

NOTE: Additional Lab experiments/practical will be performed based on the course contents requirements.

CLASS: B.E. 7th SEMESTER **CREDIT: 1**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO.: CSE -711 (A) (ELECTIVE-I)

COURSE TITLE: DIGITAL IMAGE PROCESSING LAB

Hours/ Week			Marks Distribution
L	T	P	Practical
0	0	2	50

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Implementation of MATLAB and its working environment.	1
CO2	Understand load and save operations on an image.	2
CO3	Implement conversion of RGB to CMY and RGB TO HIS.	3
CO4	Create Histogram, negative, contrast enhancement and binary image from an image file.	3
CO5	Implement various Filters on image.	3

Lab Experiments:

Exp. No.	Experiment Detail
1.	To study the Image processing concept
2.	To obtain histogram equalization image.
3.	To Implement smoothing or averaging filter in spatial domain.
4.	Program for opening and closing of the image
5.	To fill the region of interest for the image.
6.	Program for edge detection algorithm.
7.	Program to sharpen image using gradient mask
8.	Program for morphological operations: erosion and dilation

NOTE: Additional Lab experiments/practical will be performed based on the course contents requirements.

CLASS: B.E. 7th SEMESTER **CREDIT: 1**

BRANCH: COMPUTER SCIENCE ENGINEERING

	Hours/ Week			Marks Distribution
COURSE NO.: CSE -711 (B) (ELECTIVE-I)				
	L	**T**	**P**	**Practical**
COURSE TITLE: NETWORK SECURITY LAB	**0**	**0**	**2**	**50**

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Implement encryption /decryption cryptographic algorithms using C/C++.	3
CO2	Write a C++ program to implement a symmetric cryptographic algorithms.	3
CO3	Write a C++ program to implement asymmetric cryptographic algorithms.	3
CO4	Analyze the working of Firewalls.	4
CO5	Discuss Information Security Tool.	2

Lab Experiments:

Exp. No.	Experiment Detail
1.	To implement the simple substitution technique named Caesar cipher using C language.
2.	To write a C program to implement the Play fair Substitution technique.
3.	To write a C program to implement the Hill Cipher substitution technique.
4.	To write a C program to implement the Rail Fence Transposition technique.
5.	To write a C program to implement the Data Encryption Standard (DES).
6.	To write a C program to implement the RSA Encryption algorithm.
7.	To implement the Diffie-Hellman Key Exchange algorithm using C language.
8.	To write a C program to implement the MD5 hashing technique.

NOTE: Additional Lab experiments/practical will be performed based on the course contents requirements.

CLASS: B.E. 7th SEMESTER **CREDIT:1**

BRANCH: COMPUTER SCIENCE ENGINEERING

	Hours/ Week			Marks Distribution
COURSE NO.: SII-703				
	L	**T**	**P**	**Practical**
COURSE TITLE: INDUSTRIAL TRAINING	**-**	**-**	**-**	**50**

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Interact and study with a range of students and to practice multiple management skills, including communication, independent action and teamwork.	3
CO2	Understand the engineering code of ethics and apply them as necessary.	2
CO3	Demonstrate knowledge of practical application of training.	3
CO4	Submit a training report along with the certificate issued by the concerned department.	4

Students are required to undertake 4 to 6 weeks of Practical Training during the summer vacations in the field of Computer Engineering and applications in Govt./Semi-Govt./Private sector. Thereafter, each student shall be required to submit a report on the practical training to the concern HOD for the evaluation.

Guidelines for evaluation of Practical Training: The evaluation shall be done by the departmental committee by the end of 7th semester. The committee shall have a convener and at least two members.

Distribution of Marks as per the University statues:

Total Marks for Evaluation		50 marks	
i)	Report	20	40%
ii)	Viva-Voce	15	30%
iii)	Miscellaneous Marks	15	30%

Due weightage will be given to those who have opted for Industrial Training outside the State as well as keeping in view the profile of that Industry.

Award of the Marks:

Marks under (i), (ii) & (iii) will be awarded by the departmental committee constituted for the purpose.

CLASS: B.E. 7th SEMESTER **CREDIT: 1**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO.: SEM-703

COURSE TITLE: SEMINAR

Hours/ Week			Marks Distribution
L	T	P	Practical
0	0	4	50

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Select a topic relevant to the field of Computer engineering.	1
CO2	Undertake a review of the literature on the chosen topic.	2
CO3	Prepare and present a technical report.	3

This will involve a detailed study of a topic of interest reproduced in the candidate's own style. For this, a student has to prepare a seminar by doing proper survey of literature, compilation of information so gathered and then presentation of the same followed by question-answer session. The report of which has to be submitted by the student well before the conduct of seminar. The handout submitted by the student will be in accordance with the standards of technical papers.

Guidelines and evaluation of Seminar in 7th semester:

The topic of the Seminar is to be finalized and approved by the departmental committee by the end of 6th Semester.

The committee shall have a convener and at least two members.

Distribution of Marks:

Total Marks for Seminar Evaluation = 50 marks

1.	Project Report	15 marks
2.	Presentation	25 marks
3.	Attendance	10 marks.

Award of Marks:

Marks Under (1) will be awarded by the Seminar In charge.

Marks Under (2) and (3) will be awarded by the Departmental committee constituted for the purpose.

CLASS: B.E. 7th SEMESTER **CREDIT: 1**

BRANCH: E&C ENGINEERING

COURSE NO.: ECO-711

COURSE TITLE: MATLAB PROGRAMMING

Hours/ Week			Marks Distribution
L	T	P	Practical
0	0	2	50

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Perform various arithmetic calculations.	3
CO2	Find importance of this software for generating equations of vectors and other mathematical expressions.	2
CO3	Articulate importance of software's in creating and printing simple, 2D &3D plots and execution functions.	2
CO4	Do various library blocks and their interconnections	2

Lab Experiments:

Exp. No.	Experiment Detail
1.	Study of arithmetic, exponential, Logarithmic, Trigonometric, complex number calculation.
2.	To generate equation of straight line, Geometric series, points on circle, multiply, divide and exponential vectors.
3.	To create and print simple plots and execution of functions.
4.	To generate matrices and vectors, array operations, inline functions anonymous functions etc.
5.	To generate functions like execution a function, global variable, structures.
6.	To generate 2D, 3D plots.
7.	Study of various library blocks and their interconnections.

NOTE: Each student has to perform all the aforementioned Practical / Experiments. Additional Practical / Experiments will be performed based on the course content requirements.

CLASS: B.E. 7th SEMESTER **CREDIT: 1**

BRANCH: E&C ENGINEERING

COURSE NO.: EEO-712

COURSE TITLE: NON-CONVENTIONAL ENERGY RESOURCES AND INSTRUMENTATION LAB

Hours/ Week			Marks Distribution
L	T	P	Practical
0	0	2	50

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Measure phase and frequency using CRO and Multimeter	2
CO2	Students will be able to understand Solar Radiation, distillation	2
CO3	To study Solar Energy solar cooker, street light and its applications	2
CO4	To study Fuel Cells	2

Lab Experiments:

Exp. No.	Experiment Detail
1.	To study the extension of Ammeter and voltmeter ranges.
2.	To Study Block Wise Construction of Multi meters & Frequency Counter
3.	To Study Block Wise Construction of Analog Oscilloscope & Function Generator.
4.	To study the connection of solar panels.
5.	To study overall efficiency of solar PV and battery integrated system
6.	To Study of Solar Radiation by using Pyranometer.
7.	To Study of Solar Distillation or Solar Still.
8.	To study the constructional details of a box type solar cooker.
9.	To Study of Solar Street Lighting and Lanterns.
10.	To Study of Fuel cells.

CLASS: B.E. 7th SEMESTER
BRANCH: IT ENGINEERING

COURSE NO.: ITO-714
COURSE TITLE: LINUX SHELL PROGRAMMING

CREDIT: 1

Hours/ Week			Marks Distribution
L	**T**	**P**	**Practical**
0	**0**	**2**	**50**

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Understand Linux commands to manage files and file systems	2
CO2	Write a shell programs to solve a given problem.	3
CO3	Write Regular expressions for pattern matching and apply them to various filters for a specific task	3
CO4	Analyze a given problem and apply requisite facets of SHELL programming in order to devise a SHELL script to solve the problem	4

Lab Experiments:

Exp. No.	Experiment Detail
1.	Implement the Linux Shell Commands: ls, mkdir, rmdir, cd, cat, banner, touch, file, wc, sort, cut, grep, dd, dfspace, du, ulimit , Commands related to inode, I/O redirection, piping, process control commands, mails,manage the password,Vieditors,wild card characters used in Linux.
2.	Write a shell programs to perform operations using case statement such as Addition 2) Subtraction 3) Multiplication 4)Division
3.	Write a shell scripts to see current date, time username and directory
4.	Write a shell programs to find maximum of three numbers
5.	Write a script to check whether the given no. is even/odd
6.	Write a script to calculate the average of n numbers
7.	Write a script to check whether the given number is prime or not
8.	Write a script to calculate the factorial of a given number
9.	Write a script to calculate the sum of digits of the given number
10.	Write a shell script to print file names in directory showing date of creation & serial no. of file

CLASS: B.E. 7th SEMESTER **CREDITS: 1**

BRANCH: MECHANICAL ENGINEERING

COURSE TITLE: THEORY OF MACHINE LAB

COURSE NO.: MEO-715

DURATION OF EXAMINATION: 3 HOURS.

L	T	P	Marks Practical
0	0	2	50

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Understand the kinematics of Quick Return Motion	2
CO2	Know about gyroscopic effect.	2
CO3	Familiar with various cases of vibrating motion.	2
CO4	Describe the mechanics behind the Governors	2

Lab Experiments:

Exp. No.	Experiment Detail
1.	Find displacement, velocity and acceleration of slider of the Quick-return motion mechanism.
2.	To analyze the motorized gyroscope.
3.	To analyze static and dynamic balancing apparatus.
4.	To analyze the torsional vibration (undamped) of single rotor shaft system.
5.	To analyze various types of cams and followers.
6.	To analyze various types of gear trains.
7.	To analyze various types of Governors with the help of stroboscope and to determine sleeve displacement, speed of Governor and corresponding radius of Governor in case of: i) Watt Governor ii) Porter Governor iii) Proell Governor
8.	To analyze Gearbox.
9.	To analyze various types of brake systems.
10.	To study the phenomenon of whirling of shafts.
11.	To study the Coriolis components of acceleration.

NOTE:

1. At least seven practicals should be performed.
2. Additional labs/ experiment will be performed based on course content requirements.
3. Simulation/ virtual labs are used to enhance the practical ability of students.

CLASS: B.E. 7th SEMESTER **CREDITS: 1**

BRANCH: CIVIL ENGINEERING

COURSE TITLE: BASIC CIVIL TESTING LAB

COURSE NO.: CEO-716

L	T	P	Marks Practical
0	0	2	50

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Perform tests on bricks and aggregates	
CO2	Determine the physical properties of cement.	
CO3	Determine the Workability and Compressive strength of concrete.	
CO4	Determine the Specific gravity, Atterberg limits, Compaction characteristics of Soil	

Lab Experiments:

Exp. No.	Experiment Detail
1.	To determine water absorption and compressive strength of bricks
2.	To determine the consistency and initial and final setting time of a given sample of cement using Vicat's apparatus.
3.	To determine the Soundness and Compressive strength of cement.
4.	To determine the fineness modulus and bulk density of fine and coarse aggregates.
5.	To determine flakiness index and Impact value of coarse aggregates.
6.	To determine Workability and Compressive strength of concrete
7.	To determine the tensile strength of the steel.
8.	To determine the Specific gravity and Atterberg limits of Soil.
9.	To determine the compaction characteristics of soil by proctor's test.
10.	To determine C_d for Venturi meter
11.	To determine C_d for Orifice meter
12.	To determine C_d for a Notch.

CLASS: B.E. 7th SEMESTER

CREDIT: 1

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO.: CSO-713

COURSE TITLE: PROGRAMMING LAB

Hours/ Week			Marks Distribution
L	T	P	Practical
0	0	2	50

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Remember the role of languages like C++/ Java/Python/HTML & DHTML/Android	1
CO2	Understand the syntax and develop the programs on specific language.	2
CO3	Implement various programs using C++/Java/Python/HTML.	3

Lab Experiments:

Exp. No.	Experiment Detail
1.	WAP To use different arithmetic operation in java/C++/Python or use different tags in HTML.
2.	WAP to perform manipulation on strings in java / C++ / Python.
3.	WAP to demonstrate Exception handling in java / C++.
4.	Program to create frame and table using HTML
5.	Design a website on your own using HTML and CSS
6.	Develop an application representing a simple calculator
7.	Develop an application for working with notification
8.	Develop an application for connecting to internet and sending e-mail.
9.	Develop an application for working with device camera

NOTE: Additional Lab experiments/practical will be performed based on the course requirements.

DEPARTMENT OF
COMPUTER SCIENCE & ENGINEERING

B.E. Computer Science &Engineering 8th Semester-Scheme 1

Contact Hrs: 26

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	CREDITS
			L	T	P	Internal	External		
CSE-801	Professional Elective Course		2	1	-	50	100	150	3
ECO-801	Open Elective Course	Embedded Systems	2	1	-	50	100	150	3
EEO-802		Conventional Energy Sources &Instrumentation							
ITO-804		Python Programming							
MEO-805		Advanced Manufacturing Processes							
CEO-806		Essentials of Civil Engineering							
HOE-806		InternationalEconomics							
NCC-806	Non- Credit Course	DISASTER MANAGEMENT & MITIGATIONS	2	0	0	Satisfactory/ Unsatisfactory			Non-Credit
MOC-803	Massive Open Online Course	SYAWAM / NPTEL / Any other MOOC Platform	2	0	-	50	-	50	2
PRJ-803	Project	Project	0	0	16	200	100	300	8
TOTAL			**8**	**2**	**16**	**350**	**300**	**650**	**16**

Elective-I	
CSE-801 (A)	Soft Computing
CSE-801(B)	Data Science

CLASS: B.E. 8th SEMESTER **CREDITS: 3**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO: CSE -801(A)

COURSE TITLE: SOFT COMPUTING

DURATION OF EXAM: 3 HOURS

Hours/ Week			Marks Distribution	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Acquire knowledge about Artificial Neural Networks and learning mechanisms.	2
CO2	Master basic neural network models and their training using BPN.	2
CO3	Implement Fuzzy reasoning in developing Fuzzy Associative Memory (FAM).	3
CO4	Understand the concept of Neuro-Fuzzy modelling by its implementation in classification and regression trees.	2
CO5	Acquire the knowledge of evolutionary computation and genetic algorithm to tackle real world Problem.	2

SECTION- A

Artificial Neural Networks: - Basic concepts: Single Layer Perception, Multilayer Perception, Supervised and unsupervised learning, Back propagation, Networks-Kohen's self-organizing networks, Hopfield network, Feed forward network, Hopfield network. **(06 hours)**

Neural Network Models: Neural network models, layers in neural network and their connections. Instar, Outstar, Weights on connections, Threshold function, Application: Adaline and Madaline. **(04 hours)**

Back Propagation: - Feed forward back propagation network- Mapping, Layout, Training, BPN applications. **(04 hours)**

Learning and Training: Objectives of learning, Hebb's rule, Delta rule, Learning vector quantizer, Associative memory models, One-shot learning, Resonance, Stability, Training and convergence. **(06 hours)**

SECTION- B

Fuzzy Systems: Fuzzy sets and Fuzzy Reasoning, Fuzzy matrices, Fuzzy functions, Decomposition, Fuzzy automata and languages, Fuzzy control methods, Fuzzy decision making. **(06 hours)**

BAM- Bidirectional associative memory, inputs and outputs, weights and training. FAM-fuzzy associative memory, Association. **(04 hours)**

Neuro - Fuzzy Modelling: Adaptive networks based Fuzzy interface systems, Classification and Regression Trees, Data clustering algorithms, Rule based structure identification, Neuro-Fuzzy controls, Simulated annealing, Evolutionary computation. **(06 hours)**

Genetic Algorithms: Survival of the Fittest, Fitness Computations, Cross over, Mutation, Reproduction, Rank method, Rank space method. **(04 hours)**

BOOKS RECOMMENDED:		
1.	Neuro-Fuzzy and Soft computing	Jang J.S.R., Sun C.T. and Mizutani E
2.	Fundamentals of Neural Networks	LaureneFausett.
3.	Artificial Intelligence - A New Synthesis	N. J. Nelsson

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

CLASS: B.E. 8th SEMESTER **CREDITS: 3**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO: CSE-801(B) (ELECTIVE 1)

COURSE TITLE: DATA SCIENCE

DURATION OF EXAM: 3 HOURS

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	100	50

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	To understand the need and significance of data science	2
CO2	To understand statistics and machine learning concepts that are vital for data science	2
CO3	Predict outcomes with supervised machine learning techniques.	2

SECTION- A

Introduction to Data Science: What is data science, relation to data mining, machine learning, big data& statistics, ExamplesComputing simple statistics- Means, variances, standard deviations, weighted averaging, modesSimple visualizations-Histograms, Boxplots, Scatterplots, Time series, Spatial data.

Overview of Tasks & Techniques: Prediction Models-The prediction task-Definition, Examples, Format of input / output data, training-test data, cross validationPrediction algorithms- Decision trees, Rule learners, Linear/logistic regression, Nearest neighbour learning.Support vector machines, Properties of prediction algorithms and practical exercises **(12 Hours)**

SECTION - B

Measuring performance of a model: Accuracy, ROC curves, precision-recall curves, Loss functions for regression, Interpretation of results- Confidence interval for accuracy, Hypothesis tests for comparing models, algorithm.

Probabilistic Models: Introduction- Probabilities, Rule of Bayes and Conditional Independence, Naïve Bayes, Bayesian Networks. **(5 Hours)**

Exploratory Data Mining: Introduction to Exploratory Data Mining,Association discovery- Definition, challenges, Apriori algorithm, Clustering- Definition challenges, Apriori algorithm, Clustering- Definition, Challenges **(9 Hours)**

BOOKS RECOMMENDED:

1. Data Science from Scratch: First principles with Python — Joel Grus
2. An Introduction to Statistical Learning — Gareth James, Daniela Witten, Trevor Trevor Hastie, Robert Tibshirani
3. Data Mining: Practical Machine Learning Tools and Techniques — I. Witten, E. Frank, M. Hall

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

CLASS: B.E. 8thSEMESTER **CREDITS: 3**

	Hours/ Week			Marks Distribution	
BRANCH: E&C ENGINEERING					
COURSE NO: ECO-801	**L**	**T**	**P**	**Theory**	**Sessional**
COURSE TITLE: EMBEDDED SYSTEM	**2**	**1**	**0**	**100**	**50**

DURATION OF EXAM: 3 HOURS

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Understand the concept of Microcontroller 8051, learn to write simple programs.	2
CO2	Understand the concept and applications of DC motor and indicators and use in project work.	2
CO3	Understand the concept of hardware details of ARM7.	2
CO4	Write the algorithm and design a system based on 8051.	3

SECTION–A

Definition of Embedded system, macro and micro embedded systems: Architecture of 8031/8051/8751. Comparison of Microprocessors and Microcontroller Data types and Directives. Pin description 0f 8051, I/O port functions, Time Delay Generation and calculation. Addressing modes, Logic instructions and programs, single bit instructions and programs, Programming using 8051 timers, counter programming, simplex, half duplex, full duplex transmission, synchronous and asynchronous communication. **(16 hrs)**

SECTION–B

Architecture: Block Diagram and Pin Diagram of ARM7, Instruction Set, Addressing Modes ARM Processor. System Design based on 8051/ARM Processor. Peripheral Interfaces: LCD, Seven Segment Display, Sensor: IR, temperature. Relays, analog to digital converter, digital to analog converter interfaces with 8051 and ARM7. **(14 hrs)**

BOOKS RECOMMENDED:

1. The 8051 Microcontroller (Architecture, Programming and Applications) — Kenneth J. Ayala -----Penram International
2. The 8051 Microcontroller and Embedded Systems — Muhammed Ali Mazidi& Janice GillispieMazdi
3. ARM system development guide — Andrew-n-sloss& Dominic Symes Publisher –Morgan Aausamann.

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

CLASS: B.E. 8TH SEMESTER **CREDITS:3**

BRANCH: ELECTRICAL ENGINEERING **MARKS**

COURSE CODE: EEO-802

	L	T	P	THEORY	SESSIONAL
TITLE: NON-CONVENTIONAL ENERGY SOURCES AND INSTRUMENTATION	**3**	**0**	**0**	**100**	**50**

DURATION OF EXAM: 3 HOURS

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Understand the need of energy, Various types of energy and scenario	2
CO2	Identify non-conventional energy as alternate form of energy and to know how it can be tapped.	2
CO3	Understanding various methods of measurement and instrumentation	2
CO4	Understanding about illumination and other lighting schemes.	2

SECTION-A

Module 1: Introduction: Limitations of conventional energy sources need & growth of alternate energy sources, basic schemes and applications of direct energy conversion. Photovoltaic effect, characteristics of photovoltaic cells, conversion efficiency, solar batteries and applications. Solar energy in India, solar collectors, solar furnaces & applications. Geothermal system, Characteristics of geothermal resources, choice of generators, electric equipment and precautions. Low head hydro plants, definition of low head hydro power, choice of site and turbines. Tidal energy, idea of tidal energy, Tidal electric generator, limitations. **(8 hrs)**

Module 2: Wind Energy & MHD Generators: History of wind power, wind generators, theory of wind power, characteristics of suitable wind power sites, scope in India. Basic Principles and Half effect, generator and motor effect, different types of MHD generators, conversion effectiveness. Practical MHD generators, applications and economic aspects. **(5hrs)**

Module 3: Fuel Cells & Thermo-electric, Generators: Principle of action, Gibbs free energy, general description of fuel cells, types, Construction, operational characteristics and applications. Seeback effect, peltier effect, Thomson effect, thermoelectric convertors, brief description of the construction of thermoelectric generators, applications & economic aspects. **(5 hrs)**

SECTION-B

Module4: MEASURING INSTRUMENTS: Classification, effects utilized in measuring instruments. Indicating instruments: Deflection, controlling and damping forces, various dampings. Measurement of low resistance: - Potentiometer method, Kelvin double bridge. Ammeters and Voltmeters: Moving coil, moving iron ammeter and voltmeters, Errors in Ammeters and Voltmeters. **(7 hrs)**

Module 5: MEASUREMENT OF POWER: Wattmeter measurement in single phase A.C. circuits, Wattmeter errors. Measurement of three phase power by two wattmeter methods. Energy meters for A.C. circuits, Theory of Induction type meters. **(5 hrs)**

Module 6: Illumination: Nature and production of light. Photometric definitions. Incandescent lamps, arc and discharge lamps. Design of illumination schemes for indoor and outdoor uses. Flood lighting. **(4 hrs)**

RECOMMENDED BOOKS:

1. Non-conventional Energy Resources — D.S. Chauhan
2. Conventional energy sources — G.D. Rai
3. Non-Conventional energy sources — B.H. Khan
4. Solar Energy Fundamentals and Applications — H.P. Garg and Jai Prakash
5. A course in Electrical and Electronics Measurement & instrumentation — A.K. Sawhney

NOTE: There shall be total eight questions, four from each section. Five questions have to be attempted selecting at least two questions from each section. Use of calculator is allowed.

CLASS: B.E. 8TH SEMESTER **CREDITS:3**

BRANCH: IT ENGINEERING **MARKS**

COURSE CODE: ITO-804

	L	T	P	THEORY	SESSIONAL
COURSE TITLE: PYTHON PROGRAMMING	**2**	**1**	**0**	**100**	**50**

DURATION OF EXAM: 3 HOURS

Course Outcome	At the end of the course the student will be able to	BT Level
CO1	Understand and describe the data types, operators, strings operations, List, Tuples, sets and Dictionaries in Python.	2
CO2	Determine the techniques to create and manipulate Python programs by using the data structure like lists, tuples, sets and dictionaries.	2
CO3	Apply Object Oriented Programming in Python with concepts of inheritance and polymorphism	3
CO4	Perform different File handling operations and IO Exceptions handling mechanism.	3
CO5	Evaluate and Analyze different database operations.	2

SECTION–A

Introduction to Python Programming Language: -Introduction to Python Language, Strengths and Weaknesses, IDLE, Dynamic Types, Naming Conventions, String Values, string Operations, String Slices, String Operators, Numeric Data Types, Built in Functions. **(10 hours)**

Data Collections and Language Component: -Introduction, Control Flow and Syntax, Indenting, The if Statement, Relational Operators, Logical, Operators, True or False, Bit Wise Operators, The while Loop, break and continue, The for Loop, Lists, Tuples, Sets, Dictionaries, Sorting Dictionaries, Copying Collections. **(5 hours)**

Functions and Modules: - Introduction Defining Your Own Functions Parameters Function Documentation Keyword and Optional Parameters Passing Collections to a Function Variable Number of Arguments Scope Functions - "First Class Citizens" Passing Functions to a Function Mapping Functions in a Dictionary Lambda Modules Standard Modules – sys Standard Modules – math Standard Modules – time Thedir Function **(6 hours)**

SECTION- B

Object and Classes: -Classes in Python, Principles of Object Orientation, Creating Classes, Instance Methods Special Methods Class Variables, Inheritance, Polymorphism. **(6 hours)**

I/O and Error Handling in Python: Introduction, Data Streams, Creating Your Own Data Streams, Access Modes, Writing Data to a File, Reading Data from a File, Additional File Methods, Handling IO Exceptions, Working with Directories, Errors, Run Time Errors, The Exception Model, Exception Hierarchy, Handling Multiple Exceptions. **(10 hours)**

BOOKS RECOMMENDED:

1. Think Python - Allen B. Downey ,second edition ,O'Reilly
2. Online Version - www.greenteapress.com/thinkpython2.pdf.
3. How to think like a computer Scientist- Brad Miller and David Ranum.
4. Python Programming: An Introduction to Computer Science. - John Zelle.

Online Version:www.interactivepython.org/runstone/static/thinkscpy/index.html.

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

CLASS: B.E. 8th SEMESTER **CREDITS: 3**

BRANCH: MECHANICAL ENGINEERING

COURSE TITLE: ADVANCED MANUFACTURING PROCESSES

COURSE NO.: MEO-805	**L**	**T**	**P**	**Marks: Theory**	**Marks: Sessional**
DURATION OF EXAMINATION: 3 HOURS	**3**	**0**	**0**	**100**	**50**

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Understand the fundamentals of non - conventional machining processes.	2
CO2	Understand the working and uses of various mechanical machining processes such as AJM, USM etc	2
CO3	Understand the purpose of chemical and electrochemical machining.	2
CO4	Understand the purpose of electric discharge machining.	2
CO5	Understand the fundamentals of electron beam and laser beam machining.	2

SECTION – A

Introduction to Advanced Manufacturing Processes, Mechanical Processes, Abrasive Jet Technology, Ultrasonic Machining, Water Jet Machining. Fundamental principles, processes parameters, characteristics, Tool design, Metal removal rate-analysis, Part design, Analysis of the processes. Chemical and Electro-chemical machining:-Introduction, Principles & Scheme, Process parameters, Material removal rate, dynamic and hydro-dynamic & hydro-optimization, electrolytes. **(17 Hrs)**

SECTION - B

EDM:-Introduction, basic principles & scheme, circuitry controls, material removal rate, machining accuracy, optimization, selection of tool material and tool design, Di-electric, analysis. Laser Beam Machining & Electron beam machining background, production of laser, machining by Laser and other applications, Electron beam action, Dimensionless analysis to establish correlation behavior EBM parameters.

High Velocity forming of metals, explosive forming principles and applications, Electro-hydraulic and other applications, Analysis of the process. **(19 Hrs)**

RECOMMENDED BOOKS:

1. Non-traditional machining methods: ASME.
2. New Technology by Bhattayacharya; I.E. (India)
3. Ultrasonic cutting by Rozenberg; Consultants Bureau; N.Y.

NOTE:

1. Question paper will be of 3 Hours' duration
2. There will be 8 questions in all, four from **Section- A** (each of 20 marks) and four from **Section – B** (each of 20 marks)**.**
3. Students are required to attempt five questions in all, at least two question from each section
4. Use of scientific calculator will be allowed in the examination hall.

CLASS: B.E. 8th SEMESTER
BRANCH: CIVIL ENGINEERING **CREDITS: 3**
COURSE TITLE: ESSENTIALS OF CIVIL ENGINEERING
COURSE NO.: CEO-806
DURATION OF EXAMINATION: 3 HOURS.

L	T	P	Marks Theory	Marks Sessional
3	0	0	100	50

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Able to identify the properties of building materials	
CO2	Acquaint with the masonry construction and finishes	
CO3	Carry out surveying in the field for engineering projects.	
CO4	Plan and schedule the Project by various network techniques of construction planning	

Module –I **(9Hours)**

Brick: Classification of bricks, constituents of good brick earth, harmful ingredients, manufacturing of bricks, testing of bricks.

Timber: Classification of timber, structure of timber, seasoning of timber, defects in timber and prevention of timber.

Aggregates: Classification of aggregates and various tests conducted on aggregates

Module -II **(9 Hours)**

Masonry Construction Introduction: various terms used, stone masonry-Dressing of stones, Classifications of stone masonry, safe permissible loads, Brick masonry-bonds in brick work, laying brick work, Defects in brick masonry, composite stone and brick masonry.

Foundations: Purpose, site exploration, Methods of Testing Bearing Capacity of Soils, Types of Foundations, Combined Footing and Raft Foundation. Pile Foundation and its types, Pile Driving, Cofferdams.

Module -III **(9 Hours)**

Introduction to surveying, Principles of surveying, Measurement of distance. Chain Surveying, Field Equipment, Methods of Chain Surveying, Plotting from the Field Books and Degree of Accuracy, Tape corrections. **Levelling**: Instruments used and field book recording, Methods of Levelling, height of Instrument method and Riseand Fall method, Temporary and permanent adjustments in levels.

Module -IV **(9 Hours)**

Network techniques in construction management

Bar Charts and Mile stone charts, Elements of network, Development of network, Network rules, Network techniques CPM and PERT, Network analysis, Time estimates, Time computations, classification of activities, Determination of Slack and float, Critical Path.

BOOKS RECOMMENDED:

1. BUILDING MATERIAL & CONSTRUCTION - SUSHIL KUMAR
2. BUILDING MATERIAL - PRABIN SINGH
3. SURVEYING VOL.- I - B.C PUNMIA
4. PERT & CPM - Principles & Applications - L SRINA

NOTE:There shall be total eight questions of 20 marks each, two from each module. Five questions have to be attempted selecting at least one from each module. Use of Calculator is allowed.

CLASS: B.E. 8TH SEMESTER **CREDITS: 3**

BRANCH: CSE/ECE/EE/CIVIL/MECH. ENGINEERING

	Hours/ Week			Marks	
COURSE NO.: HOE-806	**L**	**T**	**P**	**Theory**	**Sessional**
COURSE TITLE: INTERNATIONAL ECONOMICS	**2**	**2**	**0**	**100**	**50**

DURATION: 3 HOURS

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Understand the concept of international trade in general as well as with the classic and modern theories.	2
CO2	Analyze the concept of foreign exchange and foreign trade multiplier in detail and hence shall be able to understand the international market conditions.	3
CO3	Compete in international corporate world by understanding the various concepts of terms of trade like tariffs, quotas, balance of payment and international organizations etc.	2

SECTION-A

UNIT - I: Concept of International Trade

Meaning, Significance and scope of International Economics, concepts of internal, interregional and international trade and their comparison, Theories of international trade: Absolute Cost Advantage, Comparative Cost Advantage, Opportunity cost theory (features, assumptions and limitations)

UNIT - II: Theories of International Trade

Modern Theories of International Trade: General equilibrium theory, Heckscher- Ohilin Theory, Rybznski Theorem, The Stopler – Samuelson Theorem, Factor Price-Equalization Theorem.

UNIT- III: Foreign Exchange and Foreign Trade Multiplier

Foreign Exchange: Meaning and problems of foreign exchange, Methods of foreign payment, Demand and Supply of foreign currency, Foreign Trade-Multiplier, Exchange control (concept, features, objectives, and methods).

SECTION - B

Unit- IV: Terms of trade

Meaning, Different Terms of Trade Indexes (Net Barter, Gross Barter, Income, Single and Double Factoral), Factors influencing Terms of Trade; Prebisch-Singer Thesis; Doctrine of reciprocal demand- importance and limitations.

Unit- V: Trade barriers

Tariffs and Quotas (Meaning, classifications and their impact), theory of optimum tariff, devaluation (concept, merits, demerit and limitations)

Unit VII: Balance of payment and International organisations

Concept and components of balance of trade and balance of payment, equilibrium and disequilibrium in BOP, consequences of disequilibrium in BOP, Various measures to correct deficit in BOP.

International organisations: IMF, World bank, World Trade organisations- objectives, functions.

Reference Books

1. International Economics -H.G Mannur
2. International Economics -Paul R. Krugman and Maurice Obstfeld
3. International Economics - Dominick Salvatore
4. International Economics - Sodersten Bo
5. International Economics - OSShrivastva
6. International Economics - M.L. Jhingan

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of calculator is allowed.

CLASS: B.E. 8th SEMESTER **CREDITS: 3**
BRANCH: COMPUTER SCIENCE ENGINEERING

	Hours/ Week			Marks	
COURSE NO: CSO-803					
	L	**T**	**P**	**Theory**	**Sessional**
COURSE TITLE: WEB TECHNOLOGY	**2**	**1**	**0**	**100**	**50**

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Explain the working of Internet and its related concepts like IP, IP address, ISPs, etc.	2
CO2	Design a static webpage using HTML and CSS for a given application scenario.	3
CO3	Design a dynamic web page using DHTML and JavaScript for a given application scenario.	3
CO4	Write a well-formatted XML document for a given application	3
CO5	Explain life cycle of a Java Servlet and its use.	3
CO6	Explain methods to handle HTTP request and response for accessing the webpage	3
CO7	Develop a Server-side application using Java Server Pages (JSP) for a given scenario.	3
CO8	Discuss the basic usages of EJB and ASP in Web development applications.	2

SECTION- A

Introduction to WWW: - Protocols and programs, Secure connections, Application and development tools, The web browser, What is server, Choices, Dynamic IP.

Introduction to HTML: - The development process, HTML tags and simple HTML forms, Web site structure. Introduction to XHTML: XML, Move to XHTML, Meta tags, Character entities, Frames and frame sets, Inside browser. **(7 Hours)**

Style Sheets: - Need for CSS, Introduction to CSS, Basic syntax and structure, Using CSS, Background images, Colors and properties, manipulating texts, using fonts, Borders and boxes, Margins, padding lists, Positioning using CSS, CSS2. **(7 Hours)**

JavaScript: - Client side scripting, What is JavaScript, How to develop JavaScript, Simple JavaScript, variables, Functions, Conditions, Loops and repetition. (**3Hours)**

SECTION- B

Advance script: JavaScript and objects, JavaScript own objects, The DOM and web browser environments, forms and validations.

DHTML: Combining HTML, CSS and JavaScript, events and buttons, controlling your browser, Ajax: Introduction, advantages & disadvantages, Purpose of it, ajax based web application, alternatives of ajax.

XML: Introduction to XML, uses of XML, simple XML, XML key components, DTD and schemas, Well formed, using XML with application XML, XSL and XSLT, Introduction to XSL, XML transformed simple example, XSL elements, Transforming with XSLT. **(7 Hours)**

PHP: - Starting to script on server side, Arrays, Function and forms, Advance PHP.

Databases: - Basic command with PHP examples, Connection to server, creating database, selecting a database, listing database, listing table names, creating a table, inserting data, altering tables, Queries, deleting database, Deleting data and tables, PHP myadmin and database bugs. **(10 Hours)**

BOOKS RECOMMENDED:

1. HTML Black Book — Steven Holzner, Dremtech press.
2. Web Technologies, Black Book. — Dreamtech Press
3. Web Applications: Concepts and Real-World Design — Knuckles, Wiley-India
4. Internet and World Wide Web How to program — P.J. Deitel& H.M.

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

CLASS: B.E. 8th SEMESTER **CREDITS: 3**
BRANCH: COMPUTER SCIENCE ENGINEERING

	Hours/ Week			Marks
COURSE NO: NCC-806				
COURSE TITLE: DISASTER MANAGEMENT &MITIGATION	**L**	**T**	**P**	**Satisfactory /Unsatisfactory**
	2	**0**	**0**	

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Identify various types of disasters, their causes and Impacts	3
CO2	To understand the disaster management principles, objectives and approaches	2
CO3	To understand various elements of disaster management.	2
CO4	To study the modern techniques used in disaster mitigation and management.	2

Module I

Introduction to Disaster Management: Define and describe disaster, hazard, emergency, vulnerability, risk and disaster dimensions. Important phases of Disaster Management Cycle.

Disasters classification- Natural disaster (floods, draught, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.); manmade disasters (industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills, transportation accidents, terrorist strikes, etc.)

Module II

Disaster Management: principles, objectives, and approaches. Element of disaster management; role of NGOs, community – based organizations and media; central, and state.

Disaster Mitigation: Hazard assessment, Vulnerability assessment, and Risk assessment. Emergency Management

Systems (EMS): Emergency medical and essential public health services, response and recovery operations, reconstruction and rehabilitation.

BOOKS RECOMMENDED:

1. Disaster Management - Harsh K Gupta
2. Disaster Management Techniques and Guidelines - B K Singh
3. Disaster Risk Reduction in South Asia - Pradeep Sahni
4. Disaster management, A P H Publishers - Sharma. S. R

NOTE: Evaluation of the course. There will be internal evaluation based on two internal sessional tests of 30 marks each.

CLASS: B.E. 8th SEMESTER			**CREDITS: 2**	
BRANCH: COMPUTER SCIENCE ENGINEERING	**Hours/ Week**			**Marks**
COURSE NO: MOC-803	**L**	**T**	**P**	**Sessional**
COURSE TITLE: MOOC	**2**	**0**	**0**	50

The students shall select a MOOC of duration 4 to 6 weeks available at the time on any reputed platform and shall pursue the same after due approval of the same from the departmental Committee. However, the selected MOOC course should not be similar to the regular courses offered as a part of the department curriculum.

The overall monitoring of the MOOC course will be under the supervision of the teacher In charge of the department. The Departmental Academic Committee shall assess the student work based on a presentation of the course undertaken/ project completed along with a relevant course completion certificate.

CLASS: B.E. 8th SEMESTER **CREDITS: 8**

BRANCH: COMPUTER SCIENCE ENGINEERING
COURSE NO.: PRJ-803

COURSE TITLE: PROJECT

Hours/ Week			Marks Distribution		
L	T	P	Internal	External	Total
0	0	16	200	100	300

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Complete their assigned project work initiated in minor project.	
CO2	Demonstrate the project work followed by question-answer session	
CO3	Present and submit the detailed project report.	

The project will be assigned to the students towards the end of 7th semester and they will start working on those projects at the commencement of their 8th semester.

The students will submit the synopsis of their project work in the 7th semester. The Departmental Academic Committee will finalize and approve the projects. However, a departmental guide will be allotted to each project who shall periodically evaluate the student's performance during the project.

The topic of the project will be decided as per the developments taking place in the field of Computer Engineering. This may require complete literature survey, design, fabrication, simulation of some models and/or some preliminary laboratory experiments etc.

The students will have to submit a detailed project report individually to the internal guide and a copy of the certificate should also be appended to the report.

Guidelines for evaluation of Project work in 8th semester:

There shall be a mid-semester evaluation, followed by an End Semester (Final)

Evaluation **Sub-distribution of marks:**

- For External Examiner : 100
- For Internal Examiner : 200

Sub-distribution of internal marks:

- Out of the total 250 marks for internal evaluation, 100 marks are for mid-sem evaluation and 150 marks are for final internal evaluation
- Mark distribution of internal Project work as per the University statues shall be based on:

	Distribution	Mid-Sem		Internal Final	
1.	Viva-Voce	15	30%	45	30%
2.	Presentation	15	30%	45	30%
3.	Report	20	40%	60	40%
		50		**150**	
	Total Internal	**200**			

NOTE: The students will submit a detailed project report individually to the Head of the department and a copy of the certificate if awarded should also be appended to the report.

B.E. Computer Science & Engineering
8th Semester Scheme 2

Contact Hrs: 30

COURSE CODE	COURSE TYPE	CPURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	CREDITS
			L	T	P	Internal	External		
PII-803	Professional Industry Internship	Industry Internship	-	-	28	350	250	600	14
MOC-803	Massive Open Online Course	SYAWAM / NPTEL / Any other MOOC Platform	2	0	-	50	-	50	2
TOTAL			**2**	**0**	**28**	**400**	**250**	**650**	**16**

CLASS: B.E. 8th SEMESTER **CREDIT: 14**

BRANCH: COMPUTER SCIENCE ENGINEERING

	Hours/ Week			Marks Distribution		Total
COURSE NO.: PII-803	**L**	**T**	**P**	**Internal**	**External**	
COURSE TITLE: Industry Internship	**-**	**-**	**28**	**350**	**250**	**600**

Course Outcome	At the end of the course, the student will be able to:	BT Level
CO1	Complete their assigned project work initiated in minor project.	
CO2	Demonstrate the project work followed by question-answer session	
CO3	Present and submit the detailed project report.	

The project will be assigned to the students towards the end of 7th semester and they will start working on those projects at the commencement of their 8th semester.

The students will submit the details of the company / industry where they intend to do their project work alongwith company's consent letter in the 7th semester. The Departmental Academic Committee will finalize and approve the projects. However, an internal guide will be allotted to each project who shall periodically evaluate the student's performance during the project.

The topic of the project will be decided as per the developments taking place in the field of Computer Engineering. This may require complete literature survey, design, fabrication, simulation of some models and/or some preliminary laboratory experiments etc.

The students will have to submit a detailed project report individually to their internal guide and a copy of the certificate if awarded should also be appended to the report. They should also submit a monthly progress of their project duly signed by the concerned authority via mail to their respective guide.

NOTE: Students are also allowed to start their start up, provided they submit a DPR with a detailed proposal of their start up that would define their action plan and idea to the start-up cell. Only after the submitted proposal has been approved by the start-up cell will the students be allowed to work on their project.

Guidelines for evaluation of Project work in 8th semester:

There shall be a mid-semester online evaluation, followed by an End Semester (Final)

Evaluation **Sub-distribution of marks:**

- For External Examiner : 250
- For Internal Examiner : 350

Sub-distribution of internal marks:

- Out of the total 350 marks for internal evaluation, 100 marks are for mid-sem evaluation and 250 marks are for final internal evaluation

- Mark distribution of internal Project work as per the University statues shall be based on:

	Distribution	Mid-Sem		Internal Final	
1.	Viva-Voce	30	30%	75	30%
2.	Presentation	30	30%	75	30%
3.	Report	40	40%	100	40%
		100		**250**	
	Total Internal	**350**			

CLASS: B.E. 8th SEMESTER **CREDITS: 2**

BRANCH: COMPUTER SCIENCE ENGINEERING

COURSE NO: MOC-803

COURSE TITLE: MOOC

Hours/ Week			Marks
L	T	P	Sessional
2	0	0	50

The students shall select a MOOC of duration 4 to 6 weeks, available at the time on any reputed platform and shall pursue the same after due approval of the same from the departmental Committee. However, the selected MOOC course should not be similar to the regular courses offered as a part of the department curriculum.

The overall monitoring of the MOOC course will be under the supervision of the teacher In charge of the department. The Departmental Academic Committee shall assess the student work based on a presentation of the course undertaken/ project completed along with a relevant course completion certificate.