University Institute of Technology (UIT)

Silver Wood Estate, H. P. University, Shimla-171005

(NAAC Accredited "A-Grade" University)

DEPARTMENT
of
INFORMATION TECHNOLOGY

Course Structure & Syllabus

for

Bachelor of Technology
in
Information Technology

Semester I-VIII
Effective for the Batch 2021-2025 and onwards

Also

Semester V-VIII
Effective for the Batch 2019-2023 and 2020-2024

Scheme of the Syllabus

Semester-I

Sr.No	Course Code	Course Title	L	T	P	Hrs/ Week	Credits	Semester End Marks	
								External Exam	Internal Assessment
1.	AS-1001	Applied Mathematics-I	3	1	0	4	**4**	100	50
2.	AS-1002	Applied Physics	3	1	0	4	**4**	100	50
3.	EC-1001	Basic Electronics	3	1	0	4	**4**	100	50
4.	IT-1001	Fundamentals of Computers	3	1	0	4	**4**	100	50
5.	AS-1003	Applied Physics Lab	0	0	2	2	**1**	50	50
6.	ME-1001	Engineering Graphics & Design Lab	0	0	4	4	**2**	50	50
7.	EC-1002	Basic Electronics Lab	0	0	2	2	**1**	50	50
TOTAL						**24**	**20**	**550**	**350**
								Total = 900	

Semester-II

Sr.No.	Course Code	Course Title	L	T	P	Hrs/ Week	Credits	Semester End Marks	
								External Exam	Internal Assessment
1.	AS-2001	Applied Mathematics-II	3	1	0	4	**4**	100	50
2.	IT-2001	Introduction to C Language	3	1	0	4	**4**	100	50
3.	HU-2001	Communication & Professional Skill in	3	0	0	3	**3**	100	50
4.	EE-2001	Basic Electrical Engineering	3	1	0	4	**4**	100	50
5.	IT-2002	C Programming Lab	0	0	2	2	**1**	50	50
6.	EE-2002	Basic Electrical Lab	0	0	2	2	**1**	50	50
7.	IT-2003	Information Technology	0	0	2	3	**2**	50	50
TOTAL						**22**	**19**	**550**	**350**
								Total Marks = 900	

Semester-III

Sr.No	Course Code	Course Title	L	T	P	Hrs/ Week	C	Semester End Marks	
								Ext. Exam	IA
1.	IT- 3001	Computer Organization	3	1	0	4	**3**	100	50
2.	IT –3002	Object Oriented Programming	3	1	0	4	**3**	100	50
3.	IT –3003	Data Structures & Algorithms	3	1	0	4	**3**	100	50
4.	IT –3004	Database Management System	3	1	0	4	**3**	100	50
5.	EC-3002	Digital Electronics	3	1	0	4	**3**	100	50
6.	HSMC -3001	Principles of Engineering Economics and Management	2	1	0		**2**	100	50
(Practical's / Drawing / Design)									
7.	EC -3052	Digital Electronics Lab.	0	0	2		**1**	50	50
8.	IT –3051	Data Structure Lab.	0	0	2		**1**	50	50
9.	IT –3052	Object Oriented Programming Lab	0	0	2		**1**	50	50
10.	IT -3053	DBMS Lab.	0	0	2		**1**	50	50
TOTAL						**24**	**21**	**800**	**500**
								Total = 900	

Semester-IV

Sr.No	Course Code	Course Title	L	T	P	Hrs/ Week	C	Semester End Marks	
								Ext.	IA
1.	IT –4001	Operating System	3	1	0	4	**3**	100	50
2.	IT –4002	Computer Networks	3	1	0	4	**3**	100	50
3.	IT-4003	Software Engineering	3	1	0	4	**3**	100	50
4.	IT- 4004	Python Programming	3	1	0	4	**3**	100	50
5.	EC -4010	Digital and Data Communication	3	1	0	2	**3**	100	50
6.	HSMC -4001	Organizational Behavior	2	1	0	4	**2**	100	50
(Practical's / Drawing / Design)									
7.	IT –4051	Operating System Lab	0	0	2		**1**	50	50
8.	IT –4052	Computer Networks Lab	0	0	2		**1**	50	50
9.	IT –4053	Python Programming Lab	0	0	2	2	**1**	50	50
10.	EC –4011	Digital and Data Communication Lab	0	0	2		**1**	50	50
TOTAL						**24**	**21**	**800**	**500**
								Total = 900	

Semester-V

Sr.No	Course Code	Course Title	L	T	P	Hrs/ Week	C	Semester End Marks	
								Ext.	IA
1.	IT – 5001	Ethical Hacking*	2	1	0	3	**3**	100	50
2.	IT – 5002	Computer Graphics	3	1	0	4	**3**	100	50
3.	IT – 5003	Dot NET Technology	2	1	0	3	**3**	100	50
4.	EC - 5001	Microprocessor and Microcontrollers	2	1	0	3	**3**	100	50
5.	IT-5004	Discrete Mathematics	3	1	0	4	**3**	100	50
(Practical's / Drawing / Design)									
6.	EC - 5051	Microprocessor Lab	0	0	2	2	**1**	50	50
7.	IT – 5006	Dot NET Technology	0	0	2	2	**1**	50	50
8.	IT – 5007	Computer Graphics Lab	0	0	2	2	**1**	50	50
9.	IT – 5008	Vocational Training **	0	0	2	2	**1**	50	50
TOTAL						**25**	**19**	**800**	**500**
								Total = 900	

***Note: -**

1. 6 Weeks Vocational Training
2. For subjects that are marked with Asterik Sign(*) the candidates are required to self-study.

Final Exams will be held by the department as usual for these subjects.

Semester-VI

Sr.No	Course Code	Course Title	L	T	P	Hrs/ Week	C	Semester End Marks	
								Ext. Exam	IA
1.	IT –6001	Object Oriented Software Engineering	2	1	0	3	**3**	100	50
2.	IT – 6002	Web Scripting Technology*	2	1	0	3	**3**	100	50
3.	IT – 6003	Artificial Intelligence	3	1	0	4	**3**	100	50
4.	IT – 6004	Parallel Computing	2	1	0	3	**3**	100	50
5.	IT – 6005	Core Java	3	1	0	4	**3**	100	50
(Practical's / Drawing / Design)									
6.	IT -6006	Artificial Intelligence Laboratory	0	0	2	2	**1**	50	50
7.	IT - 6007	Web Technology Laboratory	0	0	2	2	**1**	50	50
8.	IT-6008	Parallel Computing Laboratory	0	0	2	2	**1**	50	50
9.	IT -6009	Core Java Lab	0	0	2	2	**1**	50	50
TOTAL						**25**	**19**	**800**	**500**
								Total = 900	

***Note: -**

- For subjects that are marked with Asterisk Sign (*) the candidates are required to self-study.
  Final Exams will be held by the department as usual for these subjects.

Semester-VII

Sr.No	Course Code	Course Title	L	T	P	Hrs/ Week	C	Semester End Marks	
								Ext.	IA
1.	IT -7001	Android Application* Development	3	1	0	4	**3**	100	50
2.	IT -7002	E-commerce & ERP	2	1	0	3	**3**	100	50
3.	IT -7003	Advance Java	3	1	0	4	**3**	100	50
4.	EC -7041	Wireless communication	2	1	0	3	**3**	100	50
5.	XX -XXXX	Professional Elective-I	2	1	0	3	**3**	100	50
(Practical's / Drawing / Design)									
6.	IT -7004	Advance Java Lab	0	0	2	2	**1**	50	50
7.	IT – 7005	E-Commerce Laboratory	0	0	2	2	**1**	50	50
8.	IT -7006	Project – I	0	0	3	3	**4**	50	50
9.	IT -7016	Vocational Training *	0	0	1	1	**2**	50	50
TOTAL						**25**	**23**	**800**	**500**
								Total = 900	

***Note: -**

1. 6 Weeks Vocational Training
2. For subjects that are marked with Asterik Sign(*) the candidates are required to self-study.
   Final Exams will be held by the department as usual for these subjects.

Semester-VIII

Sr.No	Course Code	Course Title	L	T	P	Hrs/ Week	C	Semester End Marks	
								Ext.	IA
1.	IT -8002	Data Warehouse and Data Mining*	3	1	0	4	**3**	100	50
2.	XX -XXXX	Open Elective	3	1	0	4	**3**	100	50
3.	XX -XXXX	Professional Elective-II	3	1	0	4	**3**	100	50
(Practical's / Drawing / Design)									
6.	IT -8004	Project-II	0	0	10	10	**8**	50	50
7.	IT -8016	General Proficiency	0	0	1	1	**1**	50	50
TOTAL						**23**	**18**	**800**	**500**
								Total = 900	

Note:

- For subjects that are marked with AsterikSign (*) The candidates are required to self-study.

Final Exams will be held by the department as usual for these subjects.

Legend:

L - Number of lecture hours per week
T - Number of tutorial hours per week
P - Number of practical hours per week

ELECTIVES (Information Technology)

Professional Elective - I			Open Elective		
1.	Software Maintenance	**IT-7010**	**1.**	Communication System	**EC-8020**
2.	Corba / XML	**IT-7011**			
3.	Design of Embedded Systems	**IT-7013**	**2.**	Non-Conventional Electrical Power Generation	**EE-8008**
4.	GIS/Remote Sensing	**IT-7015**	**3.**	Energy Assessment and Auditing	**EE-8009**
Professional Elective - II			**4.**	Computer software Testing	**CS-8020**
			5.	Computer Network and security	**CS-8021**
			6.	Entrepreneurship Development & New Enterprise Managements	**HU-8020**
1	GPS and Application	**IT-8006**	**7.**	Accounts & Financial Management	**HU-8021**
2	Mobile Computing	**IT-8007**	**8.**	Total Quality Management	**HU-8022**
3	Neural Networks	**ES-8001**	**9.**	Advanced Operations Research	**ME-8019**
4	Multilingual Applications	**IT-8008**	**10.**	Industrial Management	**ME-8020**
5	Speech Image & Coding	**IT-8009**	**11.**	Optimization methods for Engineering System	**ME-8021**
7	Digital Image Processing	**IT-8011**	**12.**	Disaster Management	**CS-8022**
8	Bio-Informatics	**IT-8015**	**13.**	Environmental Pollution & Management	**CE-8023**
			14.	Remote Sensing & GIS	**CE-8024**

Note:

1. For subjects that are marked with Asterik Sign(*) the candidates are required to self-study. Final Exams will be held by the department as usual for these subjects.

For 7th & 8th semesters any of the core courses offered in B. Tech. (CSE/)(ECE)/(EE)/(CE) which are not being taught in B. Tech. (IT) can also be offered as elective course.

Detailed Syllabus

Semester-I

Name of the Course	**Applied Mathematics- I**		
Course Code	**AS-1001**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five Sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. A non- programmable calculator is allowed to use in examinations.

Course Objectives:

- To learn operations of matrices, echelon form of matrices and system of equations
- To introduce the concept of limits, continuity and maximum and minimum behaviour of functions.
- To compute curl, divergence of vector fields and definite integrals

Section	Course Content
Section-A	Review of Matrices, Eigen values, Eigen vectors, Properties of Eigen values, Eigen values of Hermitian, skew-Hermitian and unitary matrices, Cayley Hamilton Theorem, Rank of matrix, Normal and Echelon form of matrix, Solutions of Homogeneous and Non-Homogeneous system of equations.
Section-B	Limit and Continuity of functions of two variables, Partial Differentiation and its geometrical interpretation, Homogeneous functions, Euler's theorem, Jacobian, Taylor's and Maclaurin's infinite series, Maxima and minima of functions of two variables
Section-C	Double Integrals and Triple integrals (Cartesian and Polar Forms), Change of Order of Integration, Change of Variables, Applications of Double and Triple Integrals to find area and volume, Beta and Gamma functions
Section-D	Brief review of complex numbers, complex variable, concept of limit, continuity and derivatives of analytical function, Cauchy-Riemann equations, harmonic function, complex series, some elementary functions, logarithm.

Course Outcomes:

CO1: Perform matrix operations of addition, multiplication and solve system of linear equations.
CO2: Learn about the basic principle of calculus.
CO3: Calculate directional derivatives, gradient of vectors and understand their

geometrical significance.

Text Books:

1. Higher Engineering Mathematics: B.S. Grewal: KhannaPublishers.
2. Engineering Mathematics (2ndedition): Vol-I and Vol-II, S. S. Shastri, Prentice Hall ofIndia.

Reference Books:

1. Advanced Engineering Mathematics: E. Kreyszig, John Wiley & Sons.
2. Differential and Integral Calculus: N. Piskunov, CBSPublishers.
3. Advanced Engineering Mathematics: R. K. Jain & S. R. K. Iyengar, Narosa PublicationHouse.
4. Advanced Engineering Mathematics: Michael D. Greenberg: PearsonEducation.

Name of the Course	**Applied Physics**		
Course Code	**AS – 1002**	Credits-4	L-3, T-1, P-0
Total Lectures	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:

The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for thecourse.

For Candidates:

Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. A non- programmable calculator isallowed.

Course Objectives:

- To develop understanding of Quantum Mechanics and itsapplications.
- To understand various free electron gasmodels.
- To know the fundamental concept of theory ofrelativity and Electromagnetic waves.
- To understand principle and design of various Laser systems, optical fiber and their applications in upcoming technologies likephotonics.

Section	Course Content
Section-A	**Optics:** Methods of interference-division of wave front, division of amplitude, interference through thin films (qualitative only), Newton rings. Diffraction of light, diffraction through single slit, double slit and diffraction grating. **Theory of Relativity:** Galilean transformations. Postulates of Einstein's special theory of relativity, Lorentz transformations. Length contraction, time dilation, Variation of mass with velocity, mass-energyequivalence. **Electromagnetic Wave Theory:** Maxwell's equations and their significance, Electromagnetic waves, Poynting vector, Electromagnetic wave equation.
Section-B	**Quantum Mechanics:** Introduction to quantum mechanics, concept of de Broglie Waves, Davisson-Germer experiment, wave packet, Phase and Group Velocities (qualitative only), wave function and its properties, operators in quantum mechanics, expectation values, eigen values and eigen functions. Postulates of quantum mechanics, time dependent and timeindependentSchrodingerwaveequation,Application:Particleinabox,Tunnel Effect.

Section-C	**Band Theory of Solids**: Free electron theory: Quantum theory of free electrons, Fermi Dirac distribution function and its variation with temperature. Periodic potential and Bloch theorem, Kronig Penney Model (qualitative), E-K diagrams, Brillouin Zones. **Superconductivity:**Superconductivity,effectofmagneticfield,Meissnereffect,types of superconductors, BCS theory (qualitative only), Josephson effect, applicationsof superconductivity.
Section-D	**LASER**: Spontaneous and stimulated emission, LASER action schemes, characteristics of LASER beam, ruby LASER, He-Ne LASER, semiconductor LASER (simple Ideas), applications of LASERs. **Fibre Optics**: Principle, structure, acceptance angle and acceptance cone, numerical aperture, single mode and multi-mode fibres, step index and graded index fibres, optical fibre communications, losses in optical fibres.

Course Outcomes:

After successful completion of this course, students will be able to:

- CO1: understand new methods of interference anddiffraction.
- CO2: understand the fundamentals of relativistic mechanics, Maxwell's equations and their relevance in the modern technology and the concept of electromagnetic waves.
- CO3: explain fundamentals of quantum mechanics and its applications in microscopic systems.
- CO4: understand the various models of free electron theories and basics of superconductivity.
- CO5: understand various laser systems and theory of fiber optics.

Text Books:

1. Modern Engineering Physics: A. S. Vasudeva: S. Chand Publications.
2. A text book of Engineering Physics: M. B. Avadhanulu, P. G. Kshirsagar: S. Chand Publications.

Reference Books:

1.	Solid state Physics	: Gupta & Saxena	: Pragati Publications
2.	Concepts of Modern Physics	: Arthur Beiser	: Tata McGraw Hill
3.	Modern Engineering Physics	: Bhattacharya Tando	: Oxford
4.	Modern Engineering Physics	: Sharma & Sharma	: Pearson

Name of the Course	**Basic Electronics**		
Course Code	**EC– 1001**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L = 39, T = 13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:

The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for thecourse.

For Candidates:

Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non- programmable calculators isallowed.

Course Objectives:

- To understand operation of semiconductor devices.
- To understand DC analysis and AC models of semiconductor devices.
- To apply concepts for the design of Regulators and Amplifiers
- To verify the theoretical concepts through laboratory and simulation experiments.
- To implement mini projects based on concept of electronics circuit concepts.

Section	Course Content
Section-A	Brief review of Band Theory, transport phenomenon in semiconductors, Electrons and holes in Intrinsic semiconductor, Donor and acceptor Impurities, charge densities in semiconductor. PN Junction, Reverse and Forward bias conditions, Diode Characteristic and parameter, Ideal vs. Practical diode. Equivalent circuits and frequency response. Rectification: half and full wave, Zener and Avalanche diode, its role as regulator, photodiode.
Section-B	Bipolar junction transistor (BJT) and their characteristics as circuit and gain elements. Two port network analysis, h-parameters and trans-conductance. Equivalent circuits for JFET and MOSFET, enhancement mode and depletion mode MOSFETS. Uni-junction transistor (UJT), UJT characteristics, parameters and circuit operation.
Section-C	Bias for transistor amplifier: fixed bias, emitter feedback bias. Feedback principles. Types of feedback, Stabilization of gain, reduction of non-linear distortion, change of inputs and output resistance by negative feedback in amplifier. Amplifiers coupling, types of coupling, Amplifier pass band, Eq circuits for BJT at high frequency response of CE, RC-Coupled amplifiers at mid, low and high frequencies.

Section-D	Semiconductor processing, active and passive elements, Integrated circuits, bias for integrated circuits. Basic operational amplifier, applications of operational amplifier – adder, subtractor, Integrator, differentiator and comparator, Photo transistor: its characteristics and applications.

Course Outcomes:

CO1: Understand the current voltage characteristics of semiconductor devices.
CO2: Analyse dc circuits and relate ac models of semiconductor devices with their physical Operation.
CO3: Design and analyse of electronic circuits.
CO4: Evaluate frequency response to understand behaviour of Electronics circuits.

Reference Books: -

1 Electronic Principles : A. P. Malvino : TMH
2 Electronic Fundamentals and Applications: J. D. Ryder : PHI
3 Electronic Circuits & Devices : J. Millman and C. C. Halkias : TMH
4 Integrated Circuits & Devices: J. Millman & C. C. Halkias : TMH
5 Basic Electronic & Linear Circuits: N. N. Bhargava & Kulshrestha : TMH

Name of the Course	**Fundamentals of Computers**		
Course Code	**IT–1001**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L = 39, T = 13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:

The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:

Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non- programmable calculators isallowed.

Course Objectives:

- To understand Computer System and its applications in daily life.
- To study the hardware and software of computer.
- To understand how computers are integrated into large system through network.

Section	Course Content
Section A	Computer Appreciation:Definition of an Electronic Digital Computer, history, Generations, Characteristics and applications of Computers, classification of Computers. Information and Data Hardware:CPU, Primary and Secondary storage, I/O devices, Bus structure, Computer Peripherals - VDU, Keyboard, Mouse, Printer. Software:System software, Application software, open source software. Concept of Programming Languages:Machine Language, Assembly Language, High Level Language, Object Oriented Language, Introduction to 4GLS, linker , loader, assembler.
Section B	Number systems and Codes:Number representation: Weighted codes, Non-weighted codes, Positional, Binary, Octal, Hexadecimal, Binary Coded Decimal (BCD), Conversion of bases. Complement notations, Binary Codes: Gray, Alphanumeric, ASCII, EBCDIC Basic Computer Organization:IAS Computer, Von Neumann Computer, System Bus. Instruction Cycle, Data Representation (bit, byte, word), CPU Organization, Arithmetic and Logic Unit, Control Unit, CPU Registers, Instruction Registers, Program Counter, Stack Pointer.
Section C	Storage:memory hierarchy, caparison of memories on the basis of speed, capacity and cost. Operating system:evaluation of Operating system, definition and function: batch processing OS, multi programming and multi-tasking OS, time sharing OS, Real time OS, Spooling

	Data communication and network :Data transmission modes : Simplex, half-duplex, full-duplex, Data transmission speed: narrowband, voiceband, broadband. Transmission media: Guided and unguided media, twisted wires, coaxial cable, optical fiber, microwave. Switching techniques:Circuit switching, message switching, Packet switching.
Section D	Introduction to Networking:Basic Features, LAN, MAN and WAN; Mode of operation and characteristics. LAN Topologies, OSI model of networking, client – Server Architecture's. Intranet and Internet:Servers and Clients; Ports; Domain Name Server (DNS); WWW, Browsers, Dial up, ISDN, ADSN; Cable, Modem; E-mail, Voice and Video Conferencing.

Course Outcomes:

CO1: To exacerbate knowledge by studying Evolution of computer, Basic components of a Digital Computer, Computer Classification.

CO2: To expedite knowledge by studying about Information Representation, Integer Representation, and Binary Arithmetic.

CO3: To gain the knowledge about Memory, Storage Fundamentals, and Various Storage Devices.

CO4: To gain knowledge about operation system, data communication and computer networks.

Text Books:

1. Computer Fundamentals, P.K. Sinha, BPB Publications
2. Fundamentals of Computers, V. Rajaraman, PHI

Reference Book:

1. Computer Organization, Morris Mano, Pearson Publications
2. Introduction to Information Technology, V. Rajaraman, PHI

Name of the Course	**Applied Physics Lab**		
Course Code	**AS-1003**	Credits-1	L-0, T-0, P-2
Total Practical Sessions	15 (2 Hr Each)		
Semester End Examination	Max Marks: 50	Min. Pass Marks: 20	Max. Time: 3 Hrs.
Internal Assessment: (based on Continuous Lab Work Assessment: 20%, Experiment Performance: 30%, Attendance 10%, Viva: 40%)			Max Marks: 50 Min. Pass Marks: 25

List of Experiments

Sr. No.	**Name of the Experiment**
1	To find the wavelength of sodium light by Newton's rings experiment.
2	To find the wavelength of sodium light by Fresnel's bi-prism experiment
3	To find the wavelength of various colours of white light using plane transmission diffraction rating.
4	To find the wavelength of sodium light by Michelson interferometer
5	To find the refractive index and Cauchy's constant of a prism by using spectrometer
6	To find the resolving power of a telescope
7	To study the beam parameters of a helium-neon laser
8	To find flashing & quenching potentials of argon & hence to find the capacitance of unknown capacitor.
9	To find the value of high resistance by Substitution method
10	To convert a galvanometer into an ammeter of a given range
11	To study the variation of magnetic field with distance for Stewart and Gee's apparatus
12	To find the reduction factor of two turn coil tangent galvanometer using copper voltammeter
13	To find the value of e/m for electrons by Helical method.
14	To determine the charge of an electron by Millikan's oil drop method
15	To find the value of Planck's constant by using a photoelectric cell
16	To calculate the hysteresis loss by tracing a B-H curve for a given sample
17	To determine the band gap of an intrinsic semiconductor by four probe method
18	To determine the resistivity of a semi-conductor by four probe method at different temperatures
19	To determine the Hall co-efficient
20	To study the photovoltaic cell & hence to verify the inverse square law

Course Outcomes:

CO1: After performing the experiments related to optics, students shall be able to visualise fringe patterns and use them in determination of wavelength of light used.

CO2: Students shall be able to perform experiments based on electricity and magnetism.

CO3: Students shall be able to determine various properties of semiconducting materials.

CO4: Students shall be able to perform experiments based on bridges to determine the characteristic values of various circuit components.

Text Books:

1. Practical Physics: S. L. Gupta & V. Kumar: PRAGATI Publications.
2. Practical Physics for B.Sc. I, II and III: S. L. Arora: S. Chand Publications.

Name of the Course	**Engineering Graphics and Design Lab**		
Course Code	**ME-1001**	Credits-2	L-0, T-0, P-2
Total Practical Sessions	15 (2 Hr Each)		
Semester End Examination	Max Marks: 50	Min. Pass Marks: 20	Max. Time: 3 Hrs.
Internal Assessment: (based on Continuous Lab Work Assessment: 20%, Experiment Performance: 30%, Attendance 10%, Viva: 40%)			Max Marks: 50 Min. Pass Marks: 25

List of Experiments

Sr. No.	**Name of the Experiment**
1	Drawing Techniques: Various type of lines, principal of dimensioning, size & location as per IS code of practice (SP-46) for general engineering drawing. Practice of drawing, various types of lines & dimensioning exercises. Drawing exercises pertaining to symbols. Conventions & Exercise of lettering techniques. Free hand printing of letters & numerals in 3, 5, 8 & 12-mm sizes, vertical & inclined at 75^{o}. Instrumental lettering in single stroke. Linear Scale, Diagonal scale & vernier scale. Projection of Points, Lines and Planes: Concept of horizontal and vertical planes. First and third angle projections: projections of point & lines, true length of lines and their horizontal & vertical traces, projection of planes & their traces.
2	Projections of Solids: Right regular solids of revolution & polyhedrons etc. and their auxiliary views. Sectioning of Solids: Principal of sanctioning, types of sanctioning & their practice on projection of solids.
3	Practice In: Orthographic projections of individual blocks/ parts. Isometric Projection: Concept of isometric views: isometric scale and exercise on isometric views.
4	Development of Surfaces: Development of surfaces of cylinders, cones, pyramid, prism etc. exercises involving development of unique surfaces like Y-piece, hopper, tray, truncated pieces etc. Intersection of Surfaces: Intersection of cylinders, cones & prisms with their axes being vertical, horizontal or inclines. Exercise on intersection of solids-cylinder & cylinder, cylinder & cone, prism & prism.

Course Outcomes:

CO1: Student's ability to hand letter will improve.
CO2: Student's ability to perform basic sketching techniques will improve
CO3: Students will be able to draw orthographic projections and sections
CO4: Student's ability to use architectural and engineering scales will increase

Text Books:

1. Elementary Engineering Drawing: N. D. Bhatt: Charotar Pub. House.
2. Engineering Drawing & Engg. Graphics. P. S. Gill: S. K. Kataria & sons
3. Engineering Graphics: L.V. Lakshminarayan & R. S. Vaish
4. Engineering Drawing Plane and Solid Geometry: N. D. Bhatt V. M. Panchal: Charotar Pub. House, 2002.

Reference Books

1. Engineering Graphics with AutoCAD 2002: James D. Bethune: Pearson Education
2. Engineering Graphics and Drawing: P. S. Gill: S. K. Kataria.
3. Engineering Graphics using AUTOCAD 2000: T. Jeyapoovan:Vikas Publishing House.

4. Engineering Drawing and Graphics + AutoCAD 4th Edition: K. Venugopal: NewAge International
5. Engg. Drawing: Harwinder Singh: Dhanpat Rai Publications.
6. Engg. Drawing: R. K. Dhawan : S. Chand Publications.

Name of the Course	**Basic Electronics Lab**		
Course Code	**EC-1002**	Credits-1	L-0, T-0, P-2
Total Practical Sessions	15 (2 Hr Each)		
Semester End Examination	Max Marks: 50	Min. Pass Marks: 20	Max. Time: 3 Hrs.
Internal Assessment: (based on Continuous Lab Work Assessment: 20%, Experiment Performance: 30%, Attendance 10%, Viva: 40%)			Max Marks: 50 Min. Pass Marks: 25

List of Experiments

Sr. No.	Name of the Experiment
1	To study the use and scope of using an oscilloscope as a measuring device in an electronic laboratory
2	To study the use and scope of using a millimetre (digital and analog) as a measuring device in an electronics laboratory
3	To study the use and scope of function generator as a signal source in an electronics laboratory.
4	Draw forward bias and reverse bias characteristics of a p-n junction diode and use it as a half wave and full wave rectifier
5	Draw the characteristics of a zener diode and use it as a voltage regulator
6	Draw characteristics of common base configuration of p-n-p transistor
7	Draw characteristics of common emitter configuration of an npn transistor
8	Draw characteristics of common drain configuration of a MOSFET
9	Find the voltage and current gain of single stage common emitter amplifier.
10	Draw the characteristics curve of UJT.
11	Find the voltage gain of single stage voltage series feedback amplifier
12	Use operational amplifier as: a) Inverting amplifier , b) Non-inverting amplifier, c) Comparator, d) Integrator e) Differentiator, f) Adder, g) Precision amplifier

Course Outcomes:

CO1: To study basics of semiconductor & devices and their applications in different areas
CO2: To study different biasing techniques to operate transistor, FET, MOSFET and operational amplifier in different modes.
CO3: Analyse output in different operating modes of different semiconductor devices

Text Books:

1. Basic Electronic & Linear Circuits: N. N. Bhargava & Kulshrestha: TMH
2. Electronic Devices & Circuit Theory: Robert L. Boylestad, Louis Nashelsky: Pearson Edu.

Semester-II

Name of the Course	**Applied Mathematics – II**		
Course Code	**AS – 2001**	**Credits-4**	**L-3, T-1, P-0**
Total Lectures	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max Marks: 100**	**Min. Pass Marks: 40**	**Max. Time: 3 Hrs.**
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			**Max Marks: 50**

Instructions

For Paper Setters:

The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for thecourse.

For Candidates:

Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non- programmable calculators isallowed.

Course Objectives:

- To explain the basics of linear algebra including matrix theory, system of linear equations, eigenvalues and eigenvectors.
- To elaborate the basic concepts of complex algebra and analysis for applications in engineering subjects.
- To demonstrate the basics of numerical methods for different kind of interpolations; finding roots of algebraic and transcendental equations etc.
- To demonstrate the basics of numerical differentiation and integrations and their applications.
- To display the theories of Laplace, Fourier transformations and their applications in differential equations.
- To impart competence to the students for solving problems of the standards pertaining to standards of the various national level competitive examinations like GATE, UPSC, PSUs etc.

Section	**Course Content**
Section-A	**Vector Calculus**: Tangent, curvature and torsion, Directional derivative, Gradient of a scalar field, divergence and curl of a vector field. Line, surface and volume integrals, theorem of gauss and Stoke's (proofs not needed).
Section-B	**Integral Transforms**: Fourier series, Euler's formula, even and odd functions, half range expansions. Fourier and Laplace transform, Inverse transform of derivatives and integrals, shifting theorem, application to periodic functions, unit step function.
Section-C	**Second order Differential Equations**: Solution by: Power series method and its basis, Solution of Bessel and Legendre differential equations, properties of Bessel and Legendre functions.

Section-D	**Partial Differential Equations (PDE)**: Formulation and classification. Solution of wave equation heat equation in one dimension and Laplace equation in two dimensions by the method of separation of variables.

Course Outcomes:

CO1: Gain the knowledge to develop the concepts of surface Z= f (x, y) its partial derivatives, Euler Theorem & modified Euler Theorem for homogenous function & deduction develops ability to solve problems related to partial derivatives.

CO2: Learn to expand any functions of two variables in the ascending power of variables and also develops error and approximation, extremum value of a given function related to engineering application.

CO3: Develops the ability to solve higher order & first degree linear non homogenous differential equation arising in various branch of engineering and related mathematical model develops arising to form mathematical modelling of Real-World Problem with its physical interpretation.

CO4: Solve some differential equation which is not solvable in ordinary case but its series solution gives an idea of developing special function which has important role in some physical phenomena arising in engineering problems.

Text Books:

1. Higher Engineering Mathematics: B. S. Grewal: Khanna Publishers.
2. Advanced Engineering, Mathematics: R. K. Jain and. S. R. K Iyengar: Narosa Publishing House.

Reference Books:

1. Advanced Engineering Mathematics: E. Kreyszig: John Wiley & Sons (Asia) Pvt. Ltd.
2. Engineering Mathematics (2nd edition):S. S. Shastri: Prentice Hall of India Pvt. Ltd. Vol-I and Vol-II.
3. Differential and Integral Calculus: N. Piskunov: CBS Publishers and Distributors.
4. Advanced Engineering Mathematics: Michael D Greenberg: Pearson Education Asia.

Name of the Course	**Introduction to C Language**		
Course Code	**IT-2001**	**Credits-4**	**L-3, T-1, P-0**
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five Sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. A non- programmable calculator is allowed to use in examinations.

Course Objectives:

- To introduce the concept of computer fundamentals and computer programming
- To enable the student to design algorithms
- To enable the students to understand "C" language and its application in problem solving.

Section	**Course Content**
Section-A	Problem solving with Computers: Algorithms, pseudo codes and Flowcharts. Overview of C Programming: Structure of C program, character set, keywords & identifiers, Data types, Constants, variables, expressions (arithmetic and logical), typedef, enum Operators: Arithmetic, relational, logical, bitwise, conditional and modulus operator, operator's precedence & associativity, preprocessors statements, data inputs and output functions, assignments statements.
Section-B	Conditional statements: If-else, nested if-else, switch case statement Control statements: for loop, while loop, do-while, nested loops, jump control statements: break, continue, goto, exit, return. Functions: Declaration of functions, definition of functions, calling of functions, call by value and call by reference
Section-C	Arrays: One dimensional arrays,–Declaration of 1D arrays –Initialization of 1D arrays –Accessing element of 1D arrays –Reading and displaying elements – Two dimensional arrays –Declaration of 2D arrays –Initialization of 2D arrays –Accessing element of 2D arrays –Reading and displaying elements. Storage classes, recursion. Strings versus character arrays:–Initializing strings, Reading strings, displaying string, String-handling functions.

Section-D	Pointer Concepts: Need of Pointers, Integer & Character pointers, array and functions, Array & pointers, function & pointers, Parameter passing by reference. Structure & Union: Definition of Structure & union, Structure & Pointers, Nesting of Structures, Structure and arrays, Arrays of pointer to structures Files Concepts in C: Using files in C, Buffer and streams, working with text files and Binary Files, file operations using standard library and system calls, File management I/O functions, Random Access Files Reading, Writing text and binary files.

Course Outcomes:

CO1: Know the basic components of the computer and working of each device.
CO2: Design algorithms and flowcharts.
CO3: Understand the fundamentals of C programming.
CO4: Use suitable data structure for problem solving.

Text Books:

1. Kanetkar, "Let us C", BPB Publications
2. E. Balaguruswamy, "Programming in C", Tata McGraw Hill

Reference Books:

1. V Rajaraman "Fundamentals of Computers"
2. D.Dromey, "How to Solve it by Computers" (Prentice Hall)
3. Richie and Kerningham, "C Programming"

Name of the Course	**Communication & Professional Skills in English**		
Course Code	**HU-2001**	Credits-3	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:

The question paper will consist of five Sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:

Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. A non- programmable calculator is allowed to use in examinations.

Course Objectives:

- To develop independent perspective through critical thinking.
- To communicate their perspective in clear and correctly articulated language through LSRW skills.
- To instil a lifelong habit of language learning.

Section	**Course Content**
Section-A	**Reading Skills:** The skill of effective reading – eye movements, fixations, regression and visual wandering, the right approach to reading; Factors affecting the style of reading – reader, related material related and environmental; Memory, retention, association of reading material. **Kinds of Reading:** Introduction to phonetics – familiarization with speech soundsandtheir symbols– articulation of speech sounds – stress andintonation. **Grammar:** Word building use of punctuation marks, articles, tenses, abbreviations, prepositions, idioms & phrases, transformation of sentences, incorrect to correct English, single word for a group of words.

Section-B	**Writing Skills:** Business letters: principles, structure and style of writing business i.e., sales letters, claim and adjustment letters, inviting quotations/tenders, writing a memo, job application letters, preparing a personal resume; Effective Meetings: Qualities i.e. planning, processing the discussion, conducting a meeting, use of differenttypeofquestions,summaries,handlingproblemsituationsandproblempeople,writingnotices,agenda andminutesofmeetings;Reportwriting:Characteristics,typesofreports,structureoftechnical/researchreports, preparatorystepstoreportwriting;Elementsofstyle:Definitionofstyle,characteristicsofagoodtechnicalstyle – practical hints to improve the style of writing; précis writing; Comprehension of passages.
Section-C	**Listening Skills:** Barriers to listening, effective listening and feedback skills, Telephone techniques. Considerations of listening and voice, developing telephone skills – preparing for the call, controlling the call, follow up action. Handling difficult calls and difficult callers.
Section-D	**Speaking And Discussion Skills:** Effective speaking: Preparation i.e., deciding the objective, preparing the environments, organizing the material selection of words, voice modulation, speed, expression, body language, dealing with questions, dealing with nervousness, presentation of audio-visual aids; Group Discussions: The art ofparticipatingingroupdiscussioni.e.,initiative,cooperationwithgroupmembers,analysisoftheissue,putting one's views effectively, establishingleadership. Assignments / Seminars / discussions may be given for following skill development. a) Word processing a (b) Report writing c) Preparing agenda for (d) Preparing minutes of the e) Press Releases (f) Preparing a Brochure g) Advertisements (h) Preparing a power point slide show

Course Outcomes:

CO1. Identify the importance of Communication Skills.
CO2: Apply Critical Thinking to what they read, listen to and observe.
CO3: Apply principles of effective LSRW skills in professional & Social Communication.
CO4: Assess the verbal and non-verbal messages effectively.

Text Books:

1	An Approach to Communication Skills	: I. Bhatacharya	:Dhanpat Rai & Co.
2	Business Correspondence and Report writing	: R.C.Sharma & Krishna Mohan	:Tata McGraw Hill
3	Business Communication	: K.K.Sinha	: Galgotia Publishing

Name of the Course	**Basic Electrical Engineering**		
Course Code	**EE-2001**	Credits-3	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time:3Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:

The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For candidates:

Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non- programmable calculators is allowed.

Course Objectives:

- To impart knowledge about the electrical quantities and to understand the impact of electricity in a global and societal context.
- To introduce the fundamental concepts relevant to DC and AC circuits and network theorems.
- Highlight the importance of electromagnetism and transformers in transmission and distribution of electric power.
- To explain the working principle, construction, applications of DC machines, AC machines & measuring instruments.

Section	Course Content
Section-A	**D.C. circuits**: V- I characteristics of ideal voltage and ideal current sources, various types of controlled sources, passive circuit components, V-I characteristics and ratings of different types of R, L, C elements. Ohm's law, Kirchoff's Laws, delta-star transformation, Nodal and Mesh analysis, Thevenin's, Norton's, superposition theorem, Maximum power transfer theorem, Reciprocity, Compensation, Millman and Tellegan's Theorem.
Section-B	**A. C. Circuits:**Sinusoidal signal, instantaneous and peak values, RMS and average values, phase angle, polar and rectangular, exponential and trigonometric representations RL and C components, Concept of complex power, power factor. Series and Parallel A.C. circuit, Series and Parallel resonance. Q factor, cut off frequency and bandwidth. **Three Phase Circuits**: Phase and line voltages and currents, balanced star and delta circuits, power equation, measurement of power by 2-wattmeter method.

Section-C	**Magnetic Circuits:** Amperes circuital law, B-H curve, concept of reluctance, flux and mmf, analogies between electrical and magnetic quantities, solution of magnetic circuits, hysteresis and eddy current losses, mutual inductance and dot convention.
Section-D	**Electromagnetic Theory of Electric Machines: Electrical Machines:** Basic concepts includingprinciple, construction and working of transformers and D.C. Machines.

Course Outcomes:

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

CO1: Identify and predict the behaviour of any electrical and magnetic circuit.

CO2: Formulate and solve complex AC and DC circuits.

CO3: Realize the requirement of transformers in transmission and distribution of electric power and other applications.

CO4: Identify the type of electrical machines used for that particular application.

Books and References

1. Fundamental of Electric Circuits by Charles K Alexander and Matthew N. O. Sadiku, MH Publication.
2. Electrical Engineering Fundamentals by Vincent Del Toro, PHI Publication.
3. Basic Electrical Engineering by V N Mittal & Arvind Mittal, TMH Publication.
4. Basic Electrical Technology by A.E. Fitzgerald, McGraw Hill Publication.
5. Electrical Estimating and Costing by N Alagappan and B Ekambaram, TMH Publication

Name of the Course	**C Programming Lab.**		
Course Code	**IT -2002**	Credits-1	L-0, T-0, P-2
Total Practical Sessions	15 (2 Hr Each)		
Semester End Examination	Max Marks: 50	Min. Pass Marks: 20	Max. Time: 3 Hrs.
Internal Assessment: (based on Continuous Lab Work Assessment: 20%, Experiment Performance: 30%, Attendance 10%, Viva: 40%)			Max Marks: 50 Min. Pass Marks: 25

List of Experiments

Sr. No.	Name of the Experiment
1	Write a program to find the largest of three numbers (if-then-else).
2	Write a program to find the largest number out of ten numbers (for statement).
3	Write a program to find the average male height & average female heights in the class (input is in form of sex code, height).
4	Write a program to find roots of quadratic equation using functions and switch statement.
5	Write a program using arrays to find the largest and second largest no.
6	Write a program to multiply two matrices.
7	Write a program to read a string and write it in reverse order
8	Write a program to concatenate two strings.
9	Write a program to sort numbers using the Quick sort Algorithm. Represent a deck of playing cards using arrays.
10	Write a program to compute the Fibonacci series.
11	Write a program to find weather the number is palindrome or not.

Course Outcomes:

CO1: Identify and abstract the programming task involved for a given problem.
CO2: Design and develop modular programming skills.
CO3: Trace and debug a program.

Text Books:

1. Let us C: Yashwant Kanetkar: BPB Publication
2. Programming in C: E. Balaguruswamy: Tata McGraw Hill

Name of the Course	**Basic Electrical Engineering Lab**		
Course Code	**EE – 2002**	Credits-1	L-0, T-0, P-2
Total Practical Sessions	15 (2 Hr Each)		
Semester End Examination	Max Marks: 50	Min. Pass Marks: 20	Max. Time: 3 Hrs.
Internal Assessment: (based on Continuous Lab Work Assessment: 20%, Experiment Performance: 30%, Attendance 10%, Viva: 40%)			Max Marks: 50 Min. Pass Marks: 25

List of Experiments

Sr. No.	**Name of the Experiment**
1	To verify KCL and KVL.
2	To study frequency response of series RLC circuit and determine resonance frequency and power factor for various values of R,L,C.
3	To study frequency response of parallel RLC circuit and determine resonance frequency and Q factor for various values of R,L,C
4	To perform direct load test of transformer and plot efficiency v/s load characteristics.
5	To perform direct load test of the DC shunt generator and plot load v/s current curve
6	To study and verify Thevenins, Norton's, superposition, Milliman's, maximum power, reciprocity theorems.
7	To perform O.C and S.C test of transformer.
8	To study various types of meters.
9	Measurement of power by 3 voltmeter/ 3 ammeter method.
10	Measurement of power in 3-phase system by 2-wattmeter method.

Course Outcomes:

CO1: Verify fundamental laws like Ohm's Law, KCL, KVL, etc.

CO2: Use different meters and instruments for the measurement of common electrical quantities

CO3: Understand the importance of various theorems and transformer tests

Text Books:

1. Experiment in Basic Electrical Engineering: S. K. Bhattachrya & K. M. Rastogi: New Age International Pub.
2. Experiment and Viva – Voce on Electrical Machines: V. N. Mittal & A. Mittal: Standard Publishers.

NameoftheCourse	**InformationTechnologyTrainerWorkshop**		
CourseCode	IT-2003	Credits-2	L-0,T-0,P-3
LecturestobeDelivered	39Hrs.(LabSession=13(3hrs.each))		
SemesterEndExamination	MaxMarks:50	MinPassMarks:20	Max.Time:3hrs
Internal Assessment	Labwork30% LabRecord25% Viva/Handson25% Attendance20%	MaxMarks:50	MinPassMarks:25

Instructionsforpapersetter/candidates:

Laboratoryexaminationwillconsistoftwoparts:

(i) Performingapracticalexercisesassignedbytheexaminer(25marks).
(ii) Viva-voceexamination(25marks)

Viva-voceexaminationwillberelatedtothepracticalperformed/projectexecutedbythecandidaterelatedtothepaperduringthecourseofthesemester.

Theworkshopwillprovidetrainingofhardwareandsoftwaretheoryofacomputerbasedon Pentium-IVCPUwithwindows98asanoperatingsystemwithDMP/DeskJetPrinter/LaserPrinter.

(i) StudyofComputerMotherBoard:-
a) CPU,DMA,Waitstate,RAM/ROM,NMI,LogicAddress,reset,I/OPorts,DeviceDrivers,PowerManagement,BlockDiagram.

(ii) Studyofbus,SlotsandPorts:-
a) ISA,EISA,VESA,PCI,MCA,AGP,USB,AMR
b) Parallel,Serial – RS232C,USB

(iii) StudyofMemoriesonaPC:-
a) Memory – Types,Selection,Installation
b) ROMBIAS – Types,Setup,Installation
c) FloppyDrive – Types,R/Whead,ControlCard,SpindleMotor,StepperMotor,TerminationResistor,BlockDiagram, Writeprotect,Testing.
d) HardDisk – JumperSetting,Configuration,HDC,InstallationSoftware,Testing,BlockDiagram.

(iv) StudyofInput/OutputDevice:-

a) Monitor – Types,Workingprinciple,Configuration,modes,scanning,BlockdiagramAdapter
b) Card – Types,Dotpitch,Resolution.
c) Keyboard – Types,Construction,WorkingPrinciple.
d) Mouse – Types,Construction,WorkingPrinciple.

(v) StudyofHardware,Accessories(Mechanical/Electrical):-

a) Cabinet – Types,Selections
b) SMPS – Rating,GreenPC,EPACompliance
c) Cables – HDCable,FDDCable,PrinterCable.
d) Connectors – 9pinM/F,25PinM/F

(vi) StudyofPrinters:-

a) Printers – Types,construction,workingPrinciple,Fonts,DeskJet,DotMatrix,LaserJet,LinePrinter,Plotters,BlockDiagram

(vii) StudyofMultimediaHardwareModules

a) CDROMdrive – Jumpersetting,Installation,Cables,BlockDiagram,Configuration.
b) DVDdrive – Types,WorkingPrinciple,Installation,Configuration
c) Speakers/Mike – DifferentTypes
d) TunerCards – DifferentTypes
e) DigitalCameras – DifferentTypes
f) VideoConferencingKit.

(viii) StudyofCleanPowerSupplyEquipment:-

a) CVT's
b) UPS

Note:-

Industrialvisitscanbeundertakentovariousindustriesavailableinthevicinityoftheconcerned EngineeringCollege.Oneprojectattheendofsemesterhastobesubmittedbyagroupofsixstudents.

SEMESTER - III

Name of the Course	**Computer Organization**		
Course Code	**IT – 3001**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five Sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. A non- programmable calculator is allowed to use in examinations.

Section	**Course Content**
Section-A	**BASICS:** An introduction to computers with block diagram, Computers generation, Impact of technology. Flynn's Classification of computers (SIMD, MISD, MIMD). **LOGIC DESIGN TECHNIQUES**: Designing combinations logic using Karnaugh-Maps with building blocks of basic gates , Multiplexers, de-multiplexer, decoders and encoders, arithmetic, logics units .Instruction codes Computers registers and instructions, timing and control, instruction cycle memory reference instruction, I–O interruption. Basic sequential logic blocks flip-flops, registers, shift registers and counters,
Section-B	**COMPUTER ARITHMETIC**: Adder and Subtraction circuits, Booth Multiplication algorithm Performance bench marks, Division Algorithm, Floating Point Arithmetic operations. **CONTROL PATH DESIGN:** Sequence counter method, Micro programmed controllers address sequencing Control Option.
Section-C	**CENTRAL PROCESSING UNIT:** Registers general register origination, stack origination, Instruction formats, address instructions, addressing modes, data transfer and manipulations, CISC, programmed control RISC instruction set Design applications of CISC &RISC three address instructions and arithmetic pipelines with example of floating point adder, instruction pipe lines, advanced pipe lining using instruction level parallelism,
Section-D	**MEMORY ORGANISATION**: Memory device characteristics, random access memory, serial access memory virtual memory associative memory cache memory, memory management hardware. I/O ORGANISATION: I/O interface asynchronous data transfer DMA interrupt, I/O processor.

Course Outcomes:

CO1:	Appreciate macro organization of any computing system.
CO2:	Design instruction set architectures and develop their micro architectures.
CO3:	Understand various digital arithmetic algorithms.
CO4:	Analyze various caching and architecture memory system architectures.
CO5:	Understand instruction level parallelism.

Text and Reference Books

1. M. Moris Mano , Computer System &Architecture PHI
2. Hayes J. P Computer Architecture &Organization.
3. M. Morris & Charles R. Kire , Logic and Computer Design Fundamental–PHI 1995

Name of the Course	**Object Oriented Programming**		
Course Code	**IT – 3002**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five Sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. A non- programmable calculator is allowed to use in examinations.

Section	**Course Content**
Section-A	**Introduction to object oriented concepts**: Overview, Abstract data type: Object, Modularization, classes, creating and destroying objects, garbage collection strategies, overloading, dynamic binding, polymorphism, constants. Inheritance: class inheritance, inheriting instance variable inheriting methods, meta classes, object inheritance, multiple and multilevel inheritance
Section-B	**C++ programming language**: overview: programming paradigm support for data abstraction and object oriented programming, declaration and constant, expression and statements, functions and files. **Classes and objects**: Definitions of class declaration, data numbers class function definition, member function definition scope resolution operator, private and public member function, nesting of member function, creating objects, accessing class data member functions, array of objects, objects as function arguments. **Operator overloading**: Operator function, user defined typed conversion large objects, assignment and initialization and subscripting and functions call, referencing, increment and decrement, a string class, friends and members.
Section-C	**Inheritance thorough extending classes**: Base and drive classes, visibility modes, single inheritance, protect member and inheritance, multilevel inheritance, nesting of classes. Streams templates and design of libraries .output, input, formatting files and streams, C-I/O, Design of libraries.
Section-D	**Objected oriented analysis and design**: Object oriented analysis and system design, objected design, semantic and entity relationship modeling, contrasting design for data bases and OOA, OOD.

Course Outcomes:

CO1: Understand the concept of object oriented paradigm and programming.
CO2: Apply the concept of polymorphism and inheritance.
CO3: Implement exception handling and templates.
CO4: Handling of files and streams during programming.

Text and Reference Books"

1. The C++ programming language, Bjarne Stroustrup, Addison Wesley , 2000.
2. Obejcting Moudling and design, James, Rumbaugh, Michel Blha, William Premerlani, Fredetrick Eddy and William Lorence ,PHI-1998
3. Object oriented programming in turbo C++, RobbetLofre, Galgotia Publication Pvt Ltd.1994.
4. Object oriented Programming with C++, Balaguruswamy, Tata McGraw Hill Publication Co. Ltd2000.
5. Programming with C++, D. Ravichandern, Tata McGraw Hill1996.

Name of the Course	**Data Structures & Algorithms**		
Course Code	**IT – 3003**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five Sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. A non- programmable calculator is allowed to use in examinations.

Section	**Course Content**
Section-A	**INTRODUCTION:** Basic concepts and notions, data structures and data structure operation, mathematical notation and functions algorithm complexity, running time of program. **Development of Algorithms**: Storage Structure of Array, Stack and Queues. **Linked List**: Singly Linked List, Linked Stacks and Queues, doubly linked list, circularly Linked list**.**
Section-B	**TREES**: Definitions and basic concept, linked tree representation, representations in contiguous storage, binary trees, binary tree traversal, searching insertion and deletion in binary trees, heap trees, heap sort algorithm, height balanced trees and AVL trees.
Section-C	**GRAPHS:** Graphs and application, sequential and linked representation of graph, adjacency matrix, operation on graph, traversing a graph, Dijkstra's algorithm for shortest distance. Tables, searching sequential tables Hash tables and symbol tables.
Section-D	Searching and sorting: Use of various data structure for searching and sorting, linear and binary search, insertion sort, selection sort, Merge sort, Radix sort and Bubble sort, Heap Sort, Comparing the Complexities of Different searching and sorting Algorithm.

Course Outcomes:

CO1:	Design and Analyze of Algorithms
CO2:	capable of understanding the data structures, their advantages and drawbacks, how to implement them in C, how their drawbacks can be overcome
CO3:	learn about the data structures/ methods/algorithms mentioned in the course with a comparative perspective so as to make use of the most appropriate data structure/ method/algorithm in a program
CO4:	enhance the efficiency (i.e. reduce the run-time) or for better memory utilization, based

	on the priority of the implementation
CO5:	Demonstrate detailed time analysis of the graph algorithms and sorting methods and understand at least the efficiency aspects of the graph and sorting algorithms covered in this course

Text and Reference Books

1. Tenebaum, A. Lanhgsam Y and Augensatein, A. J: Data structures using C, Prentice Hall ofIndia.
2. Seymour Lipschutg : Theory an practice of Data structure , McGraw Hill1998.
3. Horowitz E and Sahni S: Data structure with Pascal 3rd edition , Galgotia1991.

Name of the Course	**DATABASE MANAGEMENT SYSTEM**		
Course Code	**IT– 3004**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five Sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. A non- programmable calculator is allowed to use in examinations.

Section	**Course Content**
Section-A	Overview of DBMS, Components of DBMS: (users, language, structure, data-dictionary, data manager, DBA, etc.). File Oriented approach versus Database Oriented approach, SPARC 3-level architecture. A brief overview of data models (hierarchical mode, network model, relational model, E-R model, Object Oriented Model), Overview of types of databases (Centralized, Parallel, Client-Server, Distributed).
Section-B	Entity-Relationalship model as a tool for conceptual design, Converting ER-Model into relational schema. Properties of relational model {Codd's 12 rules (integrity rules (concept of keys))}Relational algebra (select, project, cross product, joins (theta-join, equi-join, natural-join, outer join)),
Section-C	Functional Dependencies, Multi-valued Dependencies, Normalization (up to 5^{th} level), Structured Query language (DDL, DML), INSERT, DELETE, UPDATE, VIEW definitions, Select Statement, integrity constraints: (not null, unique check, primary key, foreign key references), file organization: (Sequential file, index sequential files, Direct files, Hashing, B- trees, index files).
Section-D	Transaction Processing & Concurrency Control: Transaction Concepts, Recovery in centralized DBMS, Serializability, Locking schemes (two phase locking, tree-locking protocol), granularity of locking. Query processing (Introduction, steps in Query processing, General Processing Strategies, Query Optimisation) and security.

Course Outcomes:

CO1: Understand basic concepts and appreciate the applications of database systems.
CO2: Explain relational data model, entity-relationship model, relational database design, relational algebra and SQL.
CO3: Understand basic database storage structures and access techniques
CO4: Improve the database design by normalization.
CO5: Understand concurrency and recovery strategies for DBMS.

Text and Reference Books

1. C.J. Date, "An introduction to data base System", 7th ed. Addison Wesly, 2000.
2. Abraham Silberschataz, Henry F. Korth S.Sudershan, The McGraw Hill Companies, Inc.,1997.
3. Naveen prakash ,"Introduction to Database managementsystems",Tata McGraw hill .
4. Bipin C Desai,An introduction to database management system.
5. Database Systems Concept, design and applications, S.K Singh, Pearson education

Name of the Course	**Digital Electronics**		
Course Code	**EC – 3002**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks:40	Max. Time:3Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five Sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. A non- programmable calculator is allowed to use in examinations.

Section	**Course Content**
Section-A	**Number Systems And Boolean Algebra:** Number systems, Addition, Subtraction using 1's & 2's complements and using 9's&10's complements, Binary codes, Error detecting and Correcting codes, Theorems of Boolean algebra, Canonical forms, Logic gates.
Section-B	**Combinational Circuits:** Representation of logic functions, Simplification using Karnaugh map, Tabulation method, Implementation of combinational logic using standard logic gates, Multiplexers and Demultiplexers, Encoders and Decoders, Code Converters, Adders, Subtractors, Parity Checker and Magnitude Comparator.
Section-C	**Sequential Circuits:** Flip flops - SR, JK, D and T flip flops - Level triggering and edge triggering, Excitation tables - Counters - Asynchronous and synchronous type Modulo counters, Shift registers, type of registers. **Digital Logic Families:** Introduction to bipolar Logic families: RTL, DCTL, DTL, TTL, ECL and MOS Logic families: NMOS, PMOS, CMOS, Details of TTL logic family-Totem pole, open collector outputs, TTL subfamilies, Comparison of different logic families.
Section-D	**D/A And A/D Converters:** Weighted resistor type D/A Converter, Binary ladder D/A converter, Steady state accuracy test, D/A accuracy and resolution, Parallel A/D Converter, counter type A/D converter, Successive approximation A/D converter, Single and Dual slope A/D converter, A/D accuracy and resolution. **Semiconductor Memories:** Memory organization, Classification, and characteristics of memories, Sequential memories, ROMs, R/W memories, Content Addressable memories, Charged-Coupled Device memory, PLA, PAL,PROM and Gate Array.

Course Outcomes:

CO1: Solve different binary codes.
CO2: Employ the minimization technique.
CO3: Prepare various combinational and sequential circuits.
CO4: Prepare various combinational and sequential circuits Develop i.e. modulo counters.
CO5: Integrate basic computer system.

Text Books

1. Digital Principles& Applications Malvino and Leach : TMH
2. Digital Integrated Electronics Taub and Schilling : TMH
3. Digital Circuits and Logic Design Samuel C Lee : PHI
4. Pulse, Digital and Switching Waveforms Millman and Taub.:TMH
5. Modern Digital Electronics R.P.Jain :TMH
6. Digital Fundamentals Floydd :Pearson Edu.

Reference Books

1. Mano M. Morris, "Digital Design", 3rd edition, Pearson Education 2006.
2. Jain R. P. "Modern Digital Electronics", 3rd edition, Tata McGraw-Hill 2003.
3. Malvino and Leach "Digital principles and Applications", 5th edition, Tata McGraw Hill, 2003.
4. James W. Bignell and Robert Donovan, "Digital Electronics", 5th edition, Delmar Publishers, 2007.
5. Flecther "An Engineering Approach to Digital Design", 1st edition, PHI, 2009.

Name of the Course	**Principles of Engineering Economics and Management**		
Course Code	**HSMC – 3001**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50
Instructions			
For Paper Setters: The question paper will consist of five Sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.			
For Candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. A non- programmable calculator is allowed to use in examinations.			

Section	**Course Content**
Section-A	**Economics:** Definitions; Nature & scope of Economics; Economics Systems-meaning of Capitalism; Socialism & mixed economy. **Demand and supply analysis:** Law of demand and supply, exception to the law of demand; Elasticity of demand and supply and their types; Methods of measuring elasticity of demand and supply.
Section-B	**Theory of production:** Scales of production, Law of returns; Break even analysis. **Monetary and Fiscal policy**: Meaning & objectives of fiscal policy in a developing country like India; Functions of Reserve Bank of India and commercial banks. **Economics & business environment:** Privatization; Growth of private capitalism in India; Business/Trade Cycles – Meaning; Characteristics & classification; foreign capital & economic development.
Section-C	**Management principles:** Meaning & types of Management; Concept of Scientific Management; Management by Objectives; System Approach to Management. **Financial management:** Meaning; Functional areas of financial management; Sources of Finance; Meaning of financial accounting; accounting principles-concepts & conventions; Importance of final accounts – profit & loss a/c and balance sheet; Need and importance of capital budgeting. **Marketing management:** Introduction to marketing management; Market segmentation; Developing & managing advertising programs; Deciding on media & measuring effectiveness.
Section-D	**Production Management:** Procedure for production planning & Control; Plant Location & Lay-out; Routing; Scheduling; CPM & PERT **Quality Management:**Quality Management System, Quality Management

	Principles, ISO 9001 Structure, Quality Audits, ISO Registration, Requirements, Benefits of ISO registration.

Course Outcomes:

CO1: Describe and determine the effect of financial analysis and its impact on budgeting of projects and their outcomes.

CO2: Identify the characteristics of various methods used for the generation of financial management decisions.

CO3: Develop and analyze information on investment planning and cost controls, and conduct cost/benefit analysis.

CO4: Quantify and include elements of uncertainty and risk into an economic analysis.

CO5: Use modern

Text and Reference Books

1. 1.Business Organisation & Management by B.P.Singh, T.N.Chabra, Dhanpat Rai & Sons 2.Modern Economic Theory by K .K. Dewett, S.Chand & Co
2. 3. Marketing Management by Philip Kotler, Prentice Hall of India 4.Financial Management by
3. I.M. Pandey, Vikas Publishin g House
4. Indian Economic by Ruddar Dutt, K. P. M. Sundaram, S.Chand & Co
5. Advanced Economic Theory by H.L.Ahuja, S.Chand & Co
6. Production Operation Management by Dr. B.S. Goel, Pragati Prakash an
7. Statistical Quality Control by Grant, Leaven worth, Tata Mc. Graw Hill
   Personnel Management by, Edwin B.Flippo, Tata Mc. Graw Hll .

Name of the Course	**Digital Electronics Lab**		
Course Code	**EC-3052**	Credits-1	L-0, T-0, P-2
Total Practical Sessions	26 hours of Lab. work (2 hrs. per week)		
Semester End Examination	Max Marks: 50	Min. Pass Marks: 20	Max. Time: 3 Hrs.
Internal Assessment: (based on Continuous Lab Work Assessment:20%, Experiment Performance: 30%, Attendance 10%, Viva: 40%)			Max Marks: 50 Min. Pass Marks: 25

List of Experiments

Sr. No.	Name of the Experiment
1	Verify the truth tables of all logic gates on trainer kit using TTL ICs.
2	Design and implement half and full adder using basic/universal gates.
3	Design and implement half and full subtractor using basic/universal gates.
4	To design and verify the operation of magnitude comparator.
5	Implementation of 4x1 multiplexer using logic gates.
6	Implementation of 1x4 de-multiplexer using logic gates.
7	Design and implement a code converter that converts gray code to binary code and vice-versa.
8	To verify the truth tables of S-R; J-K; T and D type flip flops.
9	To verify the operation of SISO, SIPO, PISO and PIPO shift register.
10	Design, and verify the 4- bit synchronous counter.
11	Design, and Verify the 4-Bit asynchronous counter.
12	Implement and verify the operation of BCD to 7 segment display.

Course Outcomes: After the completion of the course, students will be able to:

CO1: understand the digital logic and create various systems by using these logics.
CO2: develop an understanding of design and simulation of digital logic circuits.
CO3: get a basic understanding of layout of electronic circuits.
CO4: use the Multisim tool for design and simulation.

Text Books:

1. A. Anand Kumar, Fundamentals of digital circuits, 3rd Edition, PHI.
2. M. Morris Mano, Digital Design, 4.ed., Prentice Hall of India Pvt. Ltd., New Delhi, Sixth impression /Pearson Education (Singapore) Pvt. Ltd., New Delhi.
3. Jain R. P. "Modern Digital Electronics", 3rd edition, Tata McGraw-Hill 2003.
4. Malvino and Leach "Digital principles and Applications", 5th edition, Tata McGraw Hill, 2003.

Reference Books:

1. Thomas L. Floyd, 10th Edition, Digital Fundamentals, Pearson Publications.
2. James W. Bignell and Robert Donovan, "Digital Electronics", 5th edition, Delmar Publishers, 2007.
3. Flecther "An Engineering Approach to Digital Design", 1st edition, PHI, 2009.

Name of the Course	**Data Structures Laboratory**		
Course Code	**IT – 3051**	Credits-1	L-0, T-0, P-2
Total Practical Sessions	15 (2 Hr Each)		
Semester End Examination	Max Marks: 50	Min. Pass Marks: 20	Max. Time: 3 Hrs.
Internal Assessment: (based on Continuous Lab Work Assessment: 20%, Experiment Performance: 30%, Attendance 10%, Viva: 40%)			Max Marks: 50 Min. Pass Marks: 25

List of Experiments

Sr.No.	**Name of the Experiment**
1.	Write a program to search an element in a two-dimensional array using linear search.
2.	Using iteration & recursion concept write programs for finding the element in the array using Binary Search Method.
3.	Write a program to perform following operations on tables using functions only a) Addition b) Subtraction c) Multiplication d) Transpose
4.	Using iteration & recursion concept write the program for Quick Sort Technique.
5.	Write a program to implement the various operations on string such as length of string, string concatenation, reverse of a string & copy of a string to another.
6.	Write a program for swapping of two numbers using 'call by value' and 'call by reference 'strategies.
7.	Write a program to implement Binary search tree. (Insertion & deletion in binary search tree)
8.	Write a program for implementation of a file and performing operations such as insert, delete and update a record in a file.
9.	Write a program to create a linked list & perform operations such as insert, delete, update, reverse in the link list.
10.	Create a linked list and perform the following operation onit a) Add a node b) Delete a node c) Count no. of nodes d) Sum of nodes
11.	Write a program to simulate the various searching & sorting algorithms and compare their timings for a list of 1000elements.
12.	Write a program to simulate the various graph traversing algorithms.
13.	Write a program, which simulates the various tree traversal algorithms. ❖ Circular double linked list Sorting a) Bubble sort b) Merge sort

	a) Insertion sort b) Selection sort
14.	Write down a program to implement polynomial equation addition in single linked list.
15.	Stack implementation using a) Array b) Linked list
16.	Queue implementation using c) Array d) Linked list
Note: At least 5 to 10 more exercises to be given by the teacher concerned.	

Name of the Course	**Object Oriented Programming Lab**		
Course Code	**IT-3052**	Credits-1	L-0, T-0, P-2
Total Practical Sessions	15 (2 Hr Each)		
Semester End Examination	Max Marks: 50	Min. Pass Marks: 20	Max. Time: 3 Hrs.
Internal Assessment: (based on Continuous Lab Work Assessment: 20%, Experiment Performance: 30%, Attendance 10%, Viva: 40%)			Max Marks: 50 Min. Pass Marks: 25

List of Experiments

Sr.No.	**Name of the Experiment**
1.	Raising a number n to a power of p is the same as multiplying n by itself p times. Write a function called power( ) that takes a double value for an int value for p and returns the result as double value . Use a default argument of 2 of p, so that if this argument is omitted, the number will be squared. Write a main( ) function that gets values from the user to test this function.
2.	A point on the two dimensional plane can be represented by two numbers: an X coordinate and a Y coordinate. For example (4,5) represents point 4 unit to the right of origin along the X axis and 5 units up the y-axis . The sum of the two points can be defined as new point whose X and Y Coordinates. Write a program that uses a structure called point to model a point. Define three points and have the user input values to two of them. Then set the third point equal to the sum of the other two. And display the value of new points. Interaction with the program might look like this. Enter CoordinateofP1:34 Enter CoordinateofP2:57 Coordinates of P1+P2are:811
3.	Create the equivalent of four function calculator. The program should request the to user to enter a number, an operator and another number. It should carry out the specified arithmetical operation: adding, subtracting, multiplying, or dividing the two numbers. (it should use a switch statement to select the operation) finally it should be display the result. When it finishes the calculation, the program should ask if the user want to do another calculation. The response can be 'Y' or 'N'. Some sample interaction with the program might look like this. Enter first number ,operators and second number 12+100 Answer =112 Do another (Y/N)?N
4.	A phone no. such as (212)767-8900, can be thought of as having three parts area code (212), the exchange (767) and the number (8900). Write a program that uses a structure to store these three parts of phone both no. separately. Call the structure phone. create two structure Enter your area code Exchange and number : 415

	5551212 My number is (415)555-1212
5.	Create two classes DM and DB which stores the value of distances DM stores distance in meters and centimeters and DB in feet and inches. Write a program that can read value for the classes objects and add one object of DM with another object DB. Use a friend function to carry out the addition operation .The object that stores the result may be a Dm object or DB object depending on the units in which result are required. The display should be in the format of feet and inches or meters and centimeters depending on the object on display.
6.	Create a class rational which represents numerical value by two double value NUMERATOR &DENOMENATOR. Include the following public member functions: ❖ Constructor with no arguments.(defaults) ❖ Constructor with two arguments. ❖ Void reduce( ) that reduce the rational number by eliminating the highest common factor between the numerator and denominator. ❖ Overload +operator to add two rational number ❖ Overload operator >> operator to be enabled input thoroughpin ❖ Overload <<operator to be enabled input through count. Write a main ( ) to test all the functions in the class.

7.	Consider the following class definition class father{ Protected : intage;
	Public:
	Father (int x){age = x;} Virtual void iam ()
	{
	{cout<<"I AM THE FATHER , my age is ",<<age<<endl;}
	};
	
	Derive the two classes son and daughter from the above classes and for each define I am() to write our similar but appropriate message .You should also define suitable constructors for these classes
	Now write a main ( ) that creates objects of three classes and then call I am( ) them .Declare pointer to father , successively assign addresses of object of the two derived classes to this pointer and in each case , call I am( ) through the pointer to demonstrate polymorphism in action.

8.	Write a program that creates binary files by reading the data from the students from the terminal. The data of each student consist of roll no, name (a string of 30 or lesser no. of character) and marks.

9.	A hospital wants to create a database regarding its indoor patients. The information to store includes. a) Name of the patient b) Date of admission c) Disease d) Date of discharge Create a structure to store the data (year, month, date as its members). Create a base class to store the above information. The member function should include function to enter information and display a list of all the patients in database Create a drive class to store the age of patients. List the information about all to store the age of the patients. List the information about all the pediatric (less then twelve years image)
10.	Makes a class Employee with the name and salary. Makes a class manager in her it from the Employee Add an instance variable named: Department, type: string. Supply a method to String that print the manager's name, department and salary. Make a class Executive inherits from information store in the manager super class object. Supply a test program that test these classes and methods.
11.	Imagine a tollbooth with a class called Toll booth. The two data item are a type unsigned into to hold the total number of cars and type double to hold the total amount of money collected. Acorn structure initializes both the seta 0. A member function called no pay car ( ). Increments the car total and adds 0.50 to the cash total. Another function, called no pay car ( ), increment the car total but adds nothing to the cash total. Finally, a member function called display the two totals. Include a program to test this class. This program should allow the user to push one key to count paying a car, and another to count a non paying car . Pushing the ESC key should cause the program to print out the total cars and total cash and then exit
12.	Write a function called reverse it ( ) that reverses a string(an array of char) use a for loop that swap the first and last characters, then the second and next to last character and so on. the string should be passed to reverses it ( ), and print out the result. Use an input method that allows embedded blanks. Test the program with Napoleon's famous phrase, "Able was ere I saw Elba".
13.	Create some objects of the string class, and put them in a Deque – some at the head of the Deque and some at the tail. Display the contents of the Deque using the forEach ( ) function and a user written display function. Then search the Deque for a particular strings, using the first That ( ) Function and display any string that match, finally remove all the item from the date using the get left ( ) Function and display each item. Notice is the order in which the item are displayed: Using Get Left ( ), Those inserted on the left (head),of the Deque are removed in "last and first out" order while those put on the right side are removed in "first in first out" order. The opposite would be true if Get right ( ) were used.
14.	Assume that a blank maintain two kinds of accounts for customer. One called as

<table>
<tr><td></td><td>saving accounts and another is current account. The saving account provides compound interest and withdrawal facility but no cheque book facility, The current account provides cheque book facility but no interest Current account holders should also maintain a minimum balance and if the balance false below this level, a service charge is imposed.</td></tr>
<tr><td>15.</td><td>Create a class account that store customer name, account number and type of account. From this drive the class's current, account and saving, account to make them more specific to their requirement. Include necessary member function in order to achieve the following task
a) Accept deposit from a customer and update the balance
b) Display the balance
c) Compute and deposit interest
d) Permit withdrawal and update the balance
e) Check for the minimum balance, impose penalty, necessary and update the balance.
f) Do not use any constructor , use member function to initialize the class members</td></tr>
<tr><td>16.</td><td>Create a base class called shape .Use this class to store two double type values that could be used to compute the area of figure, Derive to specific classes called triangle and rectangle from the base shape. Add to the base class, a member function get data ( ) to initialize base class data member and another member function display area ( ), To compute and display the area of figures make display area ( ) as virtual function and redefine this function in the derived classes to suit their requirements.
Using this three classes design a program that will accept dimension of triangle or rectangle interactively and display the area
Remember the two value given as input will be treated as length of two sides in the case of rectangle and as base and height in the case of triangle and used as follows
<table>
<tr><td>Area of rectangle</td><td>= x</td><td>*y</td><td></td></tr>
<tr><td>Area of triangle</td><td>=1/2</td><td>*x</td><td>*y</td></tr>
</table>
Programming of exercise in C++ in the form of project (based on "object oriented programming in TURBO C++") , Robert lafore, Galgotia Publication Pvt. Ltd.1994 to be done in consultation with the faculty in charge for the course</td></tr>
<tr><td colspan="2">Note: Record to be maintained both electronically and hard copy of evaluation.</td></tr>
<tr><td colspan="2"></td></tr>
</table>

Name of the Course	**DBMS Lab**		
Course Code	**IT-3053**	Credits-1	L-0, T-0, P-2
Total Practical Sessions	15 (2 Hr Each)		
Semester End Examination	Max Marks: 50	Min. Pass Marks: 20	Max. Time: 3 Hrs.
Internal Assessment: (based on Continuous Lab Work Assessment:20%, Experiment Performance: 30%, Attendance 10%, Viva: 40%)			Max Marks: 50 Min. Pass Marks: 25

List of Experiments

Sr. No.	Name of the Experiment
1	Familiarization with the contemporary RDBMS (MySQL,ORACLE etc.) to design small databases
2	Create a database and write the programs to carry out the followingoperations: i)Add a record in thedatabase.(ii)Delete a record in the database. (iii) Modify the record in the database. (iv) Generate queries.(v) Generate the report. (vi) List alltherecords of database in ascending order.
3	Creation, altering and dropping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECTcommand. Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints. Example:- Select the roll number and name of the student who secured fourth rank in the class.
4	Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.
5	Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char,to_date).
6	Creation of simple PL/SQL program (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records werefound) Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQLblock.
7	Develop a program that includes the features NESTED IF, CASE and CASE expression. The program can be extended using the NULLIF and COALESCEfunctions.
8	Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT IN Exceptions, USE defined Exceptions, RAISE-APPLICATION ERROR.

9	Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.
10	Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.
11	Program development using creation of package specification, package bodies, private objects, package variables and cursors and calling storedpackages.
12	Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.
13	Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers andINSTEAD OF Triggers
14	Develop a menu driven project management of database system: a) Library information system for Engineering and MCA department. b) Inventory controlsystem for Computer Lab and CollegeStore. c) Student InformationSystem for Academic and Finance. d) Time Table developmentsystem CSE, IT & MCADepartments.Electrical, ECE & Civil Departments.
15	**Usage of S/W:** 1. VB, ORACLE and/orDB2 2. VB, MSACCESS, MySQL 3. VB, MS SQL SERVER2002 **Note:** At least 5 or 10 more exercises to be given by the teacher concerned.

Course Outcomes:

CO1: Understand the basic of Database software.
CO2: Understand basic concepts and develop application using DBMS tools and techniques.
CO3: Use relational data model, entity-relationship model, relational database design, relational algebra and SQL Improve the database design by normalization.
CO4: Understand the concepts of normalization.

Text Books:

1. Ivan Bayross, SQL, PL/SQL: The Programming Language of ORACLE. BPB Publications.
2. Database Management System: A practical approach by Rajiv Chopra, S.Chand Publications

Semester-IV

Name of the Course	**OPERATING SYSTEM**		
Course Code	**IT-4001**	Credits-3	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five Sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. A non- programmable calculator is allowed to use in examinations.

Section	Course Content
Section-A	**What is an Operation System?** Simple Batch Systems; Multi programmed Batched Systems; Time-Sharing System; Personal-Computer systems; Parallel System; Distributed System; Real-Time Operating Systems. System Components System Calls, System Programs; System Structure; Virtual Machines. **Process concept:** Process Scheduling; Operation on processes, Inter process Communication CPU Scheduling fundamental concepts, Scheduling criteria; Scheduling Algorithms; Multi-processor Scheduling; Real Time Scheduling. Threads: Overview; Multithreading Process Synchronization, Critical section problem, synchronization hardware, Critical reasons, Automatic Transactions.
Section-B	**Deadlock:** System Model; Deadlock Characterization, Methods of Handling Deadlock, deadlock Prevention; Deadlock Avoidance; Deadlock Detection, Recovery from deadlock; Combined approach to deadlock handling **Protection:** Goals of protection; Domain of protection; Access matrix and its implementation; Revocation of Access Right; Capability- Based Systems; Language Based Protection. **Security:** The Security Problem; Authentication; One Time passwords program Threats, System Threats; Threat Monitoring; Encryption and decryption; Computer-Security Classification; An example Security Model: windows NT.
Section-C	**Memory Management:** Logical Versus Physical Address Space, Swapping, Contiguous Allocation; Paging; Segmentation; Segmentation with paging. **Virtual Memory:** Demand Paging Performance of Demand Paging page Replacement Page Replacement Algorithms; Allocation of Frames Thrashing; Demand Segmentation;

	Cache memory and implementation. **Secondary Storage Structure:** Disk Structure; Disk Scheduling; Disk Management; Swap-space management; Disk Reliability; Stable-Storage Implementation.
Section-D	**File System Interface:** File Concept; Access Methods; Directory Structure; Protection; Consistency Semantics; **File System Implementation:** File System Structure; Allocation Methods, Free Space Management Directory Implementation; Efficiency and Performance; Recovery.

Course Outcomes:

CO1: Understand and analyze the concepts of operating system and its management.
CO2: Illustrate the scheduling of processes for a given problem instance.
CO3: Identify the dead lock situation and provide appropriate solution.
CO4: Analyze memory management techniques and implement replacement algorithms.
CO5: Understand and implement file systems.

Text Books:

1. Abrahanm Silbers chatz, Peter Baer Galvin, " Operating System Concepts " John Wiley & Sons, Inc., Vth Eduction,2000. Detail
2. H. M. "An Introduction to Operating System" Addison Wesley Publishing Co.1984.

Name of the Course	**Computer Networks**		
Course Code	**IT-4002**	Credits-3	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five Sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. A non- programmable calculator is allowed to use in examinations.

Section	Course Content
Section-A	**Introduction:** Layered Network Architecture; ISO-OSI Model; Data Communication Techniques: Pulse Code Modulation (PCM); Differential Pulse Code Modulation (DPCM), Delta Modulation (DM), Data Modems, Multiplexing Techniques – Frequency – Division, Statistical time – Division Multiplexing, Multiplexing Hierarchies, Transmission Media – Wires, Cables, Radio Links, Satellite Links, Fiber-optic Links, Error Detection: Parity Check Codes, Cyclic Redundancy Codes.
Section-B	**Data Link Protocols:** Stop and Wait protocols: Noise free and Noisy Channels, Performance and Efficiency; Sliding Window protocols: Go Back and Selective Repeat ARQs, performance and Efficiency; Verification of Protocols using Finite State Machine; HDLC Data Link Protocol; Integrated Services Digital network; Interfaces, Devices; Channel Structure; Asynchronous Transfer Mode (ATM); ATM Cells, Header and Cell Formats, Layers in ATM, Class 1,2,3,4 Traffic. Local Area Networks (LANs): IEEE 802.3, 802.4 and 802.5 Protocols; performance of Ethernet and Token ring Protocols; FDDI protocol; Distributed Queue Dual Bus (DQDB) protocol.
Section-C	**Network Layer Protocols:** Design Issues: Virtual Circuits and Data grams; Routing Algorithms; Optimality principle, Shortest path routing – Dijkstra, Bellman-Ford and Floyd-War shall Algorithms, Flooding and Broadcasting, Distance Vector Routing, Link Stat Routing, Flow Based Routing, Multicasting Routing; Flow and Congestion Control; General Principles, Window Flow Control, Packet Discarding, Isarithmic Control, Traffic Shaping, Choke packets, RSVP; Dead Locks and their Avoidance; Network Layer in ATM; Interworking: Bridges, Routers and Gateways; Internet Architecture and

	Addressing. **Transport Layer Protocols:** Design Issues: Quality of Services, Primitives; Connection Management: Addressing, Connection Establishment and Releases, Use of Timers, Flow Control and Bufferings, Multiplexing, Crash Recovery; Elements of TCP/IP Protocol: User Datagram protocol (UDP/TCP Layering, Segment Format, Checks Sum, Timeout, Connection Management, Finite State Machine.
Section-D	**Session Layer protocol:** Dialog Management; Synchronization; OSI Session primitives; Connection Establishment. **Presentation and Application Layer protocols:** Presentation Concepts; SNMP-abstract Syntax notation.1 (ASN. 1), Structure of Management, Management Information Base; Cryptography: substitution and Transposition Ciphers; Data Encryption Standards (DES), DES Chaining, Breaking DAS, Public Key Cryptography, Authentication Protocols; Electronic Mail; World Wide Web.

Course Outcomes:

CO1: Understand network models and architectures.
CO2: Identify the pros and cons of choosing a suitable MAC layer protocol.
CO3: Analyze the performance of various routing protocols and design of new routing protocol.
CO4: Solve basic network design problems using knowledge of common local and wide area network architectures.

Text Books:

1. A. S. Tanenbaum, " Computer Networks", Second Ed., Prentice Hall, India.
2. J. F. Hayes, "Modelling and analysis of Computer Communication Networks", Plenum Press (Reprinted in India by Khana Publishers).
3. D. Bertsekas and R. Gallager, " Data Networks", Second Ed., Prentice Hall, India.
4. D.E.Comer, " Internetworking with TCP/Ip", Vol. 1, Prentice Hall, India.
5. G. E. Keiser, " Local Area Networks", McGraw Hill, International Edition.
6. W. Stalling, "Data & Computer Communication", Max well Macmillan International Edition.

Name of the Course	**SOFTWARE ENGINEERING**		
Course Code	**IT-4003**	Credits-3	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five Sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Non- programmable calculators allowed to use in examinations.

Section	Course Content
Section-A	**Introduction:** Need for software engineering, issue in the design of large software, software life cycle models, overview of software development process.
Section-B	**Software Requirement Analysis and Specification-** Requirements Engineering, Crucial process step, State of the practice, problem analysis, Data dictionaries, Entity relationship diagram, code object diagram, approaches to problem analysis, Structured requirements definition, structured analysis & design techniques, Software prototyping, Software requirements specification, Nature of SRS, characteristics of good SRS. Organization of the SRS, Specifying behavioural requirements, finite state machines, decision tables & tree, PDL.
Section-C	**Software Matrices:** What and why: Definition, areas of applications, problems during implementation, size matrices, The basic information Flow Model, the more sophisticated information Flow Model, Metrics analysis using statistics for Assessment, problems with metric data, The common of pool of data. A pattern for successful applications.
Section-D	**Software Project Planning:** Cost estimation: Models , Static ,single variable model, Static multivariable model, The constructive cost model: Basic model, International model, Detailed COCOMO Model, The Putnam resource allocation model: The trade off- -of-time versus cost, development sub cycle, **Software Risk Management**: what is Risk, typical software risks, Risk management Activities, Risk identification, Risk projection, Risk management activity?

Course Outcomes:

CO1: Understand and analyze the concept of software development and software engineering.
CO2: Compare and comprehend different software engineering process models.
CO3: Design of software projects and do the cost estimation.
CO4: Apply different software testing techniques.

Text Books:

1. Software Engineering- A practitioner's Approach, RogerS. Pressmen
2. Software Engineering-K.K. Aggarwal &Yogesh.
3. Software Engineering- A Systematic Approach by J.S. Dilawari, Paragon Publishers New Delhi

Name of the Course	**Python Programming**		
Course Code	**IT-4004**	Credits-3	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks:100	Min. Pass Marks:40	Max. Time:3Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five Sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Non- programmable calculators allowed to use in examinations.

Section	Course Content
Section-A	Parts of Python Programming Language, Identifiers, Keywords, Statements Expressions, Variables, Operators, Precedence and Associativity, Data Types, Indentation, Comments, Reading Input, Print Output, Type Conversions, The type() Function and Is Operator, Dynamic and Strongly Typed Language, Control Flow Statements, The if Decision Control Flow Statement, The if…else Decision Control Flow Statement, The if…elif…else Decision Control Statement, Nested if Statement, The while Loop, The for Loop, The continue and break Statements, Catching Exceptions Using try and except Statement, Functions, Built-In Functions, Commonly Used Modules, Function Definition and Calling the Function, The return Statement and void Function, Scope and Lifetime of Variables, Default Parameters, Keyword Arguments, *args and **kwargs, Command Line Arguments.
Section-B	Strings, Creating and Storing Strings, Basic String Operations, Accessing Characters in String by Index Number, String Slicing and Joining, String Methods, Formatting Strings, Lists, Creating Lists, Basic List Operations, Indexing and Slicing in Lists, Built-In Functions Used on Lists, List Methods, The del Statement.
Section-C	Files, Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data, Reading and Writing Binary Files, The Pickle Module, Reading and Writing CSV Files, Python os and os path Modules, Regular Expression Operations, Using Special Characters, Regular Expression Methods, Named Groups in Python Regular Expressions, Regular Expression with glob Module.

Section-D	Object-Oriented Programming, Classes and Objects, Creating Classes in Python, Creating Objects in Python, The Constructor Method, Classes with Multiple Objects, Class Attributes versus Data Attributes, Encapsulation, Inheritance, The Polymorphism.

Course Outcomes:

CO1: To learn and understand Python programming basics and paradigm.
CO2: To learn and understand python looping, control statements and string manipulations.
CO3: Students should be made familiar with the concepts of GUI controls and designing GUI applications.
CO4: To learn and know the concepts of file handling, exception handling and database connective it

Text Books:

1. Gowri shankar S, Veena A, **"Introduction to Python Programming",** 1st Edition, CRC Press/Taylor & Francis, 2018. ISBN-13: 978-0815394372

Reference Books / Weblinks:

1. Jake Vander Plas, **"Python Data Science Handbook: Essential Tools for Working with Data",** 1st Edition, O'Reilly Media, 2016. ISBN-13: 978-1491912058
2. Aurelien Geron, **Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems",** 1st Edition, O'Reilly Media, 2017. ISBN – 13: 978-1491962299.
3. Wesley J Chun, **"Core Python Applications Programming",** 3rd Edition, Pearson Education India, 2015. ISBN-13: 978-9332555365
4. Miguel Grinberg, **"Flask Web Development: Developing Web Applications with Python",** 2nd Edition, O'Reilly Media, 2018. ISBN-13: 978-1491991732.

Name of the Course	**Digital and Data Communication**		
Course Code	**EC-4010**	Credits-3	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five Sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. A non- programmable calculator is allowed to use in examinations.

Section	**Course Content**
Section-A	**Introduction:** A communications model, data communication networking – Standards – Making organizations – Data Transmission: Concepts and terminology – Analog and Digital Transmission – Transmission impairments – Transmission media. Data Encoding: Digital data, Digital signals: Encoding schemes: NRZ-L,NRZ-I, Manchester-Diff-Manchester-Encoding,Pseudoternary-Bipolar-AMI,B8ZS- HDB3 – Evaluation factors-Digital data, analog signals: Encoding Techniques –ASK-FSK-PSK-QPSK-Performance comparision-Analog data, digital signals: Quantization- Sampling theorm-PCM-Delta modulation- Errors- comparision- Analog Data, analog signals: Need for modulation - Modulation methods – Amplitude modulation- Angle modulation
Section-B	Digital data communication techniques: Asynchronous and synchronous transmission –Error Detection techniques: Parity checks – Cycle redundancy checks-Checksum-Error Correcting codes: Forwards and backward error corrections DTE & DCE interface: Characterstics of DTE-DCE interface. Interfaces: Rs-232-C , Rs-449/422,A/423- A.
Section-C	Data link control Need for data link control – Line configurations: Topology, duplexity and line discipline – flow control: effect of propagation delay and transmission rate – sliding window protocol-Error Control; Error detection – ARQ – Bit oriented link control- Necessity – Protocols – HDLC,ADCC,LAP-B,SDLC – Character-oriented link control- Binary synchronous communications – Their categories-Limitations, serial Controller 85C30. Multiplexing Advantages – Types of Multiplexing – FDM – Synchronous TDM – Statistical TDM or Asynchronous TDM, Study of their characteristics and carrier systems.

Section-D	**Satellite Communication Systems:** Satellite parameters and configurations – Capacity allocation, Frequency Division FDMA; Time Division TDMA- Fixed assigned multiple access (FAMA), Demand assign multiple access(DAMA) – The concept of spread spectrum: FHSS, DSSS – CDMA – Transmission and reception.

Course Outcomes:

CO1: Analyze the performance of a baseband and pass band digital communication system in terms of error rate and spectral efficiency.
CO2: Perform the time and frequency domain analysis of the signals in a digital communication system.
CO3: Select the blocks in a design of digital communication system.
CO4: Analyze Performance of spread spectrum communication system

Text Books:

1. Proakin, "Digital Communications", McGraw Hill.
2. W. Stalling, "Wireless Communication And Networks" Pearson. Stallings, "Data & computer Communications", PHI.
3. Forouzen, "Data Communication & Networking", Tata Mcgraw Hill. Pratt, "Satellite Communication", John Wiley.

Name of the Course	**Organizational Behaviour**		
Course Code	**HSMC – 4001**	Credits-3	L-2, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five Sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. A non- programmable calculator is allowed to use in examinations.

Section	**Course Content**
Section-A	**OB:**Learning Objectives, Definition &Meaning, Why To Study OB, An OB Model, New Challenges For OB Manager **Learning:**Nature Of Learning, How Learning Occurs, Learning &OB
Section-B	**Personality:**Meaning & Definition, Determinants of Personality, Personality Traits, Personality & OB **Perception:**Meaning & Definition, Perceptual process, Importance of Perception in OB **Motivation:**Nature & Importance, Herzberg's Two Factor theory and Maslow's Need Hierarchy theory
Section-C	**Groups In Organisation:**Nature, Types, Why do people join groups, Group Cohesiveness & GroupDecision Making- managerial Implications, Effective Team Building **Leadership:**Leadership & management, Theories of leadership- Trait theory, Behavioural Theory, Contingency Theory, Leadership & Followership, How to be an Effective Leader C**onflict**: Nature of Conflict & Conflict Resolution
Section-D	**Organizational Culture And Climate:**Factors affecting organizational climate, Importance **Job Satisfaction**: Determinants, Measurements, Influence on behaviour, **Stress:**Work Stressors, Prevention and Management of stress, Balancing work and Life

Course Outcomes:

CO1: Identify the importance and intricacies of organizational behavior.
CO2: Describe personality, attitudes and perception to motivate employees.
CO3: Implement effective communication skills to handle group behavior.

CO4:	Resolve organizational conflicts and politics through negotiations.
CO5:	Monitor human resources through effective leadership.

TEXT BOOKS and REFERENCE BOOKS:

1. Stephen P. Robbins and Mary Coulter, 'Management', Prentice Hall of India, 8th edition.
2. Charles W L Hill, Steven L McShane, 'Principles of Management', McGraw Hill Education, Special Indian Edition, 2007.
3. Hellriegel, Slocum & Jackson, ' Management - A Competency Based Approach', Thomson South Western, 10th edition, 2007.

Name of the Course	**Operating System Lab**		
Course Code	**IT-4051**	Credits-1	L-0, T-0, P-2
Total Practical Sessions	15 (2 Hr Each)		
Semester End Examination	Max Marks: 50	Min. Pass Marks: 20	Max. Time: 3 Hrs.
Internal Assessment: (based on Continuous Lab Work Assessment: 20%, Experiment Performance: 30%, Attendance 10%, Viva: 40%)			Max Marks: 50 Min. Pass Marks: 25

List of Experiments

Sr.No.	**Name of the Experiment**
	CASE STUDIES on the following operating system to be done in consultation with the faculty in charge for the course:
1.	Signal User System: MS-DOS andWindows98.
2.	Network Operating System: Windows 2000/Windows.NET.
3.	Multiuser System: Unix/Linux.
4.	Study the Linux operating system and implement various commands and shell scripting.
5.	Implement the process synchronization using semaphores.
6.	Write the program to mount the various devices (i.e. floppy, CD-Rom etc).
7.	Write a program do the following thing… a. Find the attribute of file. b. To change the attribute of file. c. Create the directory. d. Delete the directory. e. Create the file. f. Delete the file.

Name of the Course	**Computer Networks Lab**		
Course Code	**IT-4052**	Credits-1	L-0, T-0, P-2
Total Practical Sessions	15 (2 Hr Each)		
Semester End Examination	Max Marks: 50	Min. Pass Marks: 20	Max. Time: 3 Hrs.
Internal Assessment: (based on Continuous Lab Work Assessment: 20%, Experiment Performance: 30%, Attendance 10%, Viva: 40%)			Max Marks: 50 Min. Pass Marks: 25

List of Experiments

Sr.No.	**Name of the Experiment**
1.	Implement the data link layer farming methods such as character, character stuffing and bit stuffing.
2.	Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRCCCIP.
3.	Implement Dijkstra‘s algorithm to compute the Shortest path thru a graph.
4.	Take an example subnet graph with weights indicating delay between nodes.
5.	Now obtain Routing table art each node using distance vector routing algorithm.
6.	Take an example subnet of hosts. Obtain broadcast tree for it.
7.	Take a 64 bit playing text and encrypt the same using DES algorithm.
8.	Write a program to break the above DES coding.
9.	Using RSA algorithm to Encrypt a text data and Decrypt the same.

Name of the Course	**Python Programming Lab**		
Course Code	**IT-4053**	Credits-1	L-0, T-0, P-2
Total Practical Sessions	15 (2 Hr Each)		
Semester End Examination	Max Marks: 50	Min. Pass Marks: 20	Max. Time: 3 Hrs.
Internal Assessment: (based on Continuous Lab Work Assessment: 20%, Experiment Performance: 30%, Attendance 10%, Viva: 40%)			Max Marks: 50 Min. Pass Marks: 25

List of Experiments

Sr.No.	**Name of the Experiment**
1.	Write Program to print "HELLO PYTHON".
2.	Write a Program to get input from user and print it on screen.
3.	Write a program to swap two numbers.
4.	Write a Program to perform basic calculator operations.
5.	Write a Program to check if string is palindrome or not.
6.	Write a Program to illustrate common string operations in python.
7.	Write a Program to print prime numbers.
8.	Write a Program that uses ten different inbuilt Mathematical functions.
9.	Write a Program to find factorial of given number.
10.	Write a Program to reverse the string.
11.	Write a Program to print Fibonacci series.
12.	Write a Program to explain different types of loop control statements.
13.	Write a Program to show different types of functions in Python.
14.	Write a Program showing concept of 'Scope of Variable'.
15.	Write a Program to show use of five dictionary functions.
16.	Write a Program to show types of inheritance in Python.
17.	Write a Program to explain method overloading and method overriding.
18.	Write a Program to show Exception Handling in Python.
19.	Write a program to explain User-Defined Exception.
20.	Write a Program to short the list entered by the user.
21.	Write a Program to delete and update the element in list.
22.	Write a Program the shows the use of mkdir(), chdir(), getcwd(), rmdir() function.
23.	Write a Program to write "Hello Python" in file.
24.	Write a Program to explain match and search functions. (Related to Regular Expressions)
25.	Write a Program that works as chat application between client and server.
26.	Write a Program to get following output using GUI.

Name of the Course	**Digital and Data Communication Lab**		
Course Code	**EC -4011**	Credits-1	L-0, T-0, P-2
Total Practical Sessions	15 (2 Hr Each)		
Semester End Examination	Max Marks: 50	Min. Pass Marks: 20	Max. Time: 3 Hrs.
Internal Assessment: (based on Continuous Lab Work Assessment: 20%, Experiment Performance: 30%, Attendance 10%, Viva: 40%)			Max Marks: 50 Min. Pass Marks: 25

List of Experiments

Sr.No.	**Name of the Experiment**
1.	To perform Amplitude modulation/demodulation andcalculate modulation index and percentage (%age) modulation.
2.	Perform frequency modulation for calculating frequency deviation (DF) and modulation index.
3.	Prove and perform sampling theorem for various bit rates (eg.8kbps, 16kbps, 32kbps, 64kbps).
4.	Convert analogy signal into digital using delta modulation/demodulation.
5.	Prove and perform “adaptive delta modulation/demodulation” to reduce the quantization voice.
6.	Analyze the pulse code modulation (PCM) system and performA/D conversion using PCM.
7.	Prove and perform multiplexing using time division multiplexing technique.
8.	Analyze and establish a PC TO PC Communication using RS-332 DTE- DCE interface.
9.	Establish a transmitter and receiver link using optical fiber.

Semester V

Name of the Course	**Ethical Hacking**		
Course Code	**IT – 5001**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for thecourse.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculator's isallowed.

Course Objectives:

- Introduces the ethical hacking methodologies.
- Covers applying cyber security concepts to discover and report vulnerabilities in a network.
- Explores legal and ethical issues associated with ethical hacking.

Section	**Course Content**
Section-A	Introduction: HackingImpacts, The Hacker Framework: Planning the test, Sound Operations, Reconnaissance, Enumeration, Vulnerability Analysis, Exploitation,FinalAnalysis, Deliverable,IntegrationInformation Security Models: Computer Security, Network Security, Service Security, Application Security, Security ArchitectureInformation Security Program: The Process of Information Security, Component Parts of Information Security Program, Risk Analysis and Ethical Hacking
Section-B	The Business Perspective: Business Objectives, Security Policy, Previous Test Results, Business Challenges Planning for a Controlled Attack: Inherent Limitations, Imposed Limitations, Timing is Everything, Attack Type, Source Point, Required Knowledge, Multi-Phased Attacks, Teaming and Attack Structure, Engagement Planner, The Right Security Consultant, The Tester, Logistics, Intermediates, Law Enforcement Preparing for a Hack: Technical Preparation, Managing the Engagement Reconnaissance: Social Engineering, Physical Security, Internet Reconnaissance
Section-C	Enumeration: Enumeration Techniques, Soft Objective, Looking Around or Attack, Elements of Enumeration, Preparing for the Next Phase Exploitation: Intutive Testing, Evasion, Threads and Groups, Operating Systems, Password Crackers, RootKits, applications, Wardialing, Network, Services and Areas of

	Concern
Section-D	Deliverable: The Deliverable, The Document, Overall Structure, Aligning Findings, Presentation Integration: Integrating the Results, Integration Summary, Mitigation, Defence Planning, Incident Management, Security Policy, Conclusion

Course Outcomes:

Upon completion of the course students should be able to:

- **CO1:** Plan a vulnerability assessment and penetration test for a network.
- **CO2:** Execute a penetration test using standard hacking tools in an ethical manner.
- **CO3:** Report on the strengths and vulnerabilities of the tested network.
- **CO4:** Identify legal and ethical issues related to vulnerability and penetration testing.

Textbook And Reference Books

1. James S. Tiller, "The Ethical Hack: A Framework for Business Value Penetration Testing", Auerbach Publications, CRC Press
2. EC-Council, "Ethical Hacking and Countermeasures Attack Phases", Cengage Learning
3. Michael Simpson, Kent Backman, James Corley, "Hands-On Ethical Hacking and Network Defense", Cengage Learning

Name of the Course	**Computer Graphics**		
Course Code	IT-5002	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculator's is allowed.

Course Objectives:

- To introduce the use of the components of a graphics system and become familiar with building approach of graphics system components and algorithms related with them.
- To learn the basic principles of 3- dimensional computer graphics.
- Provide an understanding of how to scan convert the basic geometrical primitives, how to transform the shapes to fit them as per the picture definition.
- Provide an understanding of mapping from a world coordinates to device coordinates, clipping, and projections.

Section	Course Content
Section-A	**Graphic Hardware:** The functional characteristics of systems are emphasized **Input Devices:** Keyboards, Touch Panel, Light Pens, Graphics Tablets, Joysticks, Trackball, Data glove, Digitizer, Image scanner, Mouse, Voice Systems. **Hard Copy Devices:** Impact and non-impact printers, such as line printer, dot matrix, laser, ink-jet, electrostatics, flatbed and drum plotters. **Video Display Devices:** Refresh cathode- ray tube, raster scan displays, random scan displays, color CRT-monitors, direct view storage tube, flat- panel display, 3D viewing devices, virtual reality, raster scan systems, random scan systems, graphics monitors and workstations.
Section-B	Scan Conversion algorithms for line, circle and ellipse, Bresenham's algorithms area filling techniques, character generation. **2-dimensional Graphics:** Cartesian and Homogeneous co-ordinate system, Geometric transformations, (Translation, Scaling, Rotation, Shearing), Composite transformation, Affine transformation, Two dimensional viewing transformation and clipping (line, polygon andtext)

Section-C	**2-dimensional graphics:** Geometric transformation (Translation, Scaling, Rotation, Reflection, Shearing), Composite transformation, Mathematics of projections (parallel and perspective) , 3-D viewing transformation and clipping. Hidden line and surface elimination algorithms, z-buffer, scan line, sub-division, and Painter's algorithm.
Section-D	**Shading:** Modeling Light intensities: Diffuse reflection, Specular reflection, refracted light, texture surface patterns, halftoning.**Surface Shading Methods:** Constant intensity method, Gauraud Shading, Phong Shading. **Animation:** Principles of animation, animation techniques- draw – erase, animation with lookup table, Storyboards for animation, key frame system, basic requirements in animation, animation softwares.

Course Outcomes:

Upon completion of the course students should be able to:

CO1: To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling,clipping.

CO2: To describe the importance of viewing and projections.

CO3: To define the fundamentals of animation, virtual reality and its related technologies

Textbook And Reference Books

1. Foley, van Dam et al: Computer Graphics: principles and Practice In C, 2nd Ed., Addison Wesley,1997.
2. Hearn and Baker: Computer Graphics, 2ndEd., Prentice Hall of India,1999.
3. Woo, Neider, Davis, and Shreiner: Open GL Programming Guide, 3rdAddison Wesley, 2000.
4. Steven Harrington: Computer Graphics: A programming approach, 2ndEd.Addison Wesley,1997.
5. A. Watt: Three-dimensional Computer Graphics, 3rdEd. Addison Wesley, 2000.
6. D.F. Rogers: Procedural Elements of Computer Graphics, 2ndEd., McGraw Hill International Editions.
7. Edward Angel: Intractive Computer Graphics; a top-down Approach with Open GL, 2nd ED., AddisonWesley
8. YeshwantKanetkar: Graphics underC.

Name of the Course	**Dot NET Technology**		
Course Code	**IT – 5003**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for thecourse.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators isallowed.

Course Objectives:
- ❖This course is designed to provide the knowledge of Dot Net Frameworks

Section	**Course Content**
Section-A	**INTRODUCTION TO .NET**: Introducing .NET: Microsoft web development, Move from workstation to distributed computing, Internet factor, importance of.net platform- OS neutral environment, device independence, wide language support, internet based component services. .NET framework: Common language runtime(CLR), code management and execution, security support, error handling and garbage collection,.net framework class libraries-System classes, data and XML classes, windows form and drawing classes, web classes. Features of .NET framework: ASP.NET web forms and web services- Web page authoring & server controls, ASP.NET infrastructure
Section-B	VB.NET : Introduction, statement, lines, comments, operators, procedures, variables- implicit, explicit, constants, parameters, arrays, branching, looping, objects, classes, inheritance, accessibility of inherited properties and methods, overriding methods. System class, working with numbers, manipulating strings, Date Time arithmetic, converting values, formatting values, managing arrays. Namespace and assemblies, Relating namespaces and DLL assemblies,creating assemblies, importing assemblies, using imported assemblies, compiling with imported namespace.
Section-C	ASP.NET Web Forms: Web forms code model, In-page vs. Code-behind format, web form object life cycle, handling client side events on the server, web form event handling, define and respond web form control events, AutoPostBack property, automatic state management with web forms. HTML sever control: definition, RunAt server attribute, HTML control class,General controls-Anchor, image, form, division, span, Table control, Input Control.

	Web server Control: Web Control class, General control- Hyperlink, link button,image, label, Panel, Form Controls, Table controls.
Section-D	Web form List Control: Simple List controls, Template List controls. Validation Controls: Definition, properties and methods of validation controls, validation controls – RequiredFieldValidator, CompareValidator, RangeValidator, RegularExpressionValidator, CustomValidator, ValidationSummary. User Controls: Definition, Markup-Only User Control, Custom properties, handling events and loading user controls dynamically.

Course Outcomes:

Upon completion of the course students should be able to:

CO1: Use the features of Dot Net Framework Using vb.net and asp.net.

Textbook And Reference Books

1. Michael Amundsen, Paul Litwin, "ASP.NET for developers", SAMS Publishing.
2. Bill Evjen, Scott Hanselman, Devin Rader, Farhan Muhammad, S. Srinivas Sivakumar, "Professional ASP.Net 2.0", Wiley India Edition.
3. Joe Duffy, "Professional .Net Framework 2.0", Wiley India Edition.

Name of the Course	**Microprocessor and Microcontrollers**		
Course Code	**EC – 5001**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for thecourse.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators isallowed.

Course Objectives:

- To introduce students with the architecture and operation of typical microprocessors and microcontrollers.
- To familiarize the students with the programming and interfacing of microprocessors and microcontrollers.
- To provide strong foundation for designing real world applications using microprocessors and microcontrollers

Section	**Course Content**
Section-A	Evolution of microprocessors,The 8085 Microprocessor:Architecture,instructionset,interrupt structure and assembly language programming.
Section-B	The 8086 Architecture: Architecture,block diagram of 8086,memory segmentation and physical address calculations,programrelocation,addressingmodes,instructionformats,pin diagrams and description of various signals.
Section-C	Instruction set of 8086: instruction execution timing,assembler instruction format,data transfer instructions,arithmeticinstructions,branchinstructions,loopinginstructions,NOP and HLT instructions,flag manipulation instruction,logical instructions, shift and rotate instructions,directives and operators,programming examples
Section-D	Interfacing devices: The 8255 A Programmable Peripheral Interface chip,DMA,8237DMA controller,8259 and programmable intervaltimer.

Course Outcomes: Upon completion of the course students should be able to:

CO1: Assess and solve basic binary math operations using the microprocessor and explain the microprocessor's and Microcontroller's internal architecture and its operation within the area of manufacturing and performance.

CO2: Apply knowledge and demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target microprocessor and microcontroller

CO3: Compare accepted standards and guidelines to select appropriate Microprocessor (8085 & 8086) and Microcontroller to meet specified performance requirements.

CO4: Analyze assembly language programs; select appropriate assemble into machine a cross assembler utility of a microprocessor and microcontroller.

CO5: Design electrical circuitry to the Microprocessor I/O ports in order to interface the processor to external devices.

CO6: Evaluate assembly language programs and download the machine code that will provide solutions real-world control problems

Textbook And Reference Books

1. Microprocessor Architecture, Programming & Applications with 8085: Ramesh S Gaonkar; Wiley EasternLtd.
2. The Intel Microprocessors 8086- Pentium processor: Brey;PHI
3. Microprocessors and interfacing : Hall; TMH
4. The 8088 & 8086 Microprocessors-Programming, interfacing, Hardware& Applications:Triebel& Singh;PHI

Name of the Course	**Discrete Mathematics**		
Course Code	**IT – 5004**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for thecourse.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators isallowed.

Course Objectives:
This course will cover major themes:

- Discrete structures: Students will learn the basic concepts of sets, permutations, relations, graphs, trees and finite state machines. Students will represent discrete objects and relationships using abstract mathematical structures.
- Algorithmic thinking: Students will verify whether an algorithm works well and perform analysis in terms of memory and time.
- Applications and modelling: Discrete mathematics has been used in numerous applications. Students will formulate and model problems with the concepts and techniques of discrete mathematics

Section	**Course Content**
Section-A	**Mathematical Logic:** Introduction; Statements and Notation; Connectives-negation, conjunction, disjunction, statement formulas and truth tables; Tautologies and contradiction; Laws of equivalence; rules of substitution and transitivity; normal forms, principal disjunctive normal forms; principal conjunctive normal forms Ordering and uniqueness of normal forms. **The Predicate Calculus:** Predicates; the statement function, variables and quantifiers; Predicate formulas; Free and bound variables; the universe of discourse.
Section-B	**Permutations, Combinations, and Discrete Probability:** Introduction, The Rules of Sum and product; permutations; Combinations; Generation of permutations and combinations, Discrete probability, Information and Mutual Information. **Set Theory:** Basic concepts, venn diagrams, set operations, Algebra of set, Duality , Finite and Infinite sets, Classes of sets, Power sets, Multisets, Cartesian Product. **Relations and Functions:** Introduction, properties of Binary Relations;

	Equivalence Relations and partitions; Partial Ordering Relations and Lattices; Chains and Ant chains; Functions- definitions and notation, one to one, onto, one to one and onto, composition, related results and the Pigeonhole principle.
Section-C	**Graphs and Planner Graphs:** Introduction, Basic Terminology, Multigraphs and Weighted Graphs, Paths and Circuits; Warshall' algorithm, Dijkstra's Shortest path algorithm in Weighted Graphs, Eulerian paths and circuits; Hamiltonian paths and circuits, The Travelling Salesperson problem; Factors of Graph; planar Graph. **Trees and cut**-sets: Trees, Rooted Trees, path, Lengths in Rooted trees; prefix codes; Binary search trees; Spanning Trees and cut-sets; Minimum Spanning Trees.
Section-D	**Groups and Rings:** Introduction, Algebraic structures, semi-group, Group and Subgroup- examples and standard results; Generators and evaluation of Powers; Cosets and Lagrange's Theorem; permutation groups; Codes and Group codes; Isomorphisms and Automorphisms; Homomorphisms; Rings, Integral Domains, and Fields. **Recurrence Relations:** Introduction, recurrence relations, linear recurrence relations with constant coefficients- homogeneous solutions, particular solutions and solution by the method of generatingfunctions.

Course Outcomes:

Upon completion of the course students should be able to:

CO1: An ability to apply knowledge of computing and mathematics appropriate to the discipline.

CO2: An ability to apply mathematical foundations, algorithmic principles, and computer science theory to the modeling and design of computer based systems in a way that demonstrates comprehension of the trade-offs involved in design choices.

Textbook And Reference Books

1. J.P. Trembley and R. Manohar, "Discrete mathematics Structures with Applications to Computer Science", (TaTa McGraw-Hill, 1997)
2. C.L.Liu, " Elements of Discrete Mathematics", 2nd Edition (TaTa McGraw- Hill, 1985)

Name of the Course	**Microprocessor Lab**		
Course Code	**EC-5051**	Credits-4	L-0, T-0, P-2
Total Lectures	15 (2 Hr Each)		
Semester End Examination	Max Marks: 50	Min. Pass Marks: 20	Max. Time: 3 Hrs.
Internal Assessment: (based on Continuous Lab Work Assessment: 20%, Experiment Performance: 30%, Attendance 10%, Viva: 40%)			Max Marks: 50 Min. Pass Marks: 25

Instructions

For Paper Setters/ For Candidates:

Laboratory examination will consist of two parts:

Performing a practical examination assigned by the examiner. (25 marks)

Viva-voce examination. (25 marks)

Viva-voce examination will be related to the practical performed/projects executed by the candidate related to the paper during the course of the semester.

Sr.No	**Exercises on computer**
I.	Study of 8085 Microprocessor kit.
II.	Write a program using 8085 and verify for : ❖ Addition of two 8-bit numbers. ❖ Addition of two 8-bit numbers (with carry).
III.	Write a program using 8085 and verify for :subtraction of two 8-bit numbers.
IV.	Study of 8085 Microprocessor kit.
V.	Write a program using 8085 and verify for : ❖ Addition of two 8-bit numbers. ❖ Addition of two 8-bit numbers (with carry).
VI.	Write a program using 8085 and verify for: subtraction of two 8-bit numbers.
VII.	Write a program using 8085 for multiplication of two 8- bit numbers by repeated addition method. Check for minimum number of additions and test for typical data
VIII.	Write a program using 8085 for dividing two 8- bit numbers by bit rotation method and test for typical data.
IX.	Study of 8086 microprocessor kit
X.	Write a program using 8086 for division of a defined double word (stored in a data segment) by another double word division and verify.
XI.	Write a program using 8086 for finding the square root of a given number and verify.
XII.	Write a program using 8086 for copying 12 bytes of data from source to destination and verify.
XIII.	Write a program using 8086 and verify for: ❖ Finding the largest number from an array. ❖ Finding the smallest number from an array.
XIV.	Write a program using 8086 for arranging an array of numbers in descending order

Name of the Course	**Dot NET Technology Lab**		
Course Code	**IT-5006**	Credits-4	L-0, T-0, P-2
Total Lectures	15 (2 Hr Each)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on Continuous Lab Work Assessment: 20%, Experiment Performance: 30%, Attendance 10%, Viva: 40%)			Max Marks: 50 Min. Pass Marks: 25

Instructions

For Paper Setters/ For Candidates:
Laboratory examination will consist of two parts:
Performing a practical examination assigned by the examiner. (25 marks)
Viva-voce examination. (25 marks)
Viva-voce examination will be related to the practical performed/projects executed by the candidate related to the paper during the course of the semester.

Sr.No	**Exercises on computer**
I.	To print the factorial of a number entered by the user in the Textbox at the button's click.
II.	To create a user account by getting input for his Name , Father's name, Mother's name, email-ID, city, phone number, password, confirm password, validating it such that user is directed to the page which reads "Thank you for sharing your details. You are registered."
III.	To use link button to redirect to the page corresponding to the link.
IV.	To use image control to display the image file using browse template.
V.	To display the usage of Select-Case statement.
VI.	To demonstrate the working of loops For-Next, For-Each-Next, Do-Until .
VII.	To add/edit/delete master details in form using SQL server.
VIII.	To demonstrate the name and roll no. of those students from the table who obtained above 75% marks using Data Connection, Data Repeater.
IX.	To generate a master page which spans over 3 other pages- College website having other links having same menu bar.
X.	To create the stored procedure to calculate total amount payable by the customer after deducting the discount on the various commodities

Name of the Course	**Computer Graphics Lab**		
Course Code	**IT-5007**	Credits-4	L-0, T-0, P-2
Total Lectures	15 (2 Hr Each)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on Continuous Lab Work Assessment:20%, Experiment Performance: 30%, Attendance 10%, Viva: 40%)			Max Marks: 50 Min. Pass Marks:25

Instructions

For Paper Setters/ For Candidates:
Laboratory examination will consist of two parts:
Performing a practical examination assigned by the examiner. (25 marks)
Viva-voce examination. (25 marks)
Viva-voce examination will be related to the practical performed/projects executed by the candidate related to the paper during the course of the semester.

Sr.No	**Exercises on computer**
I.	Familiarize yourself with creating and storing digital images using scanner and digital camera (compute the size of image when stored in different formats) and convert the stored images from one format to another (BMP, GIF, JPEG, TIFF, PNG, etc.) and analyze them.
II.	Implement bresenham's line algorithm. Also provide Provision to change attributes of graph primitives such as stippling (Dotted and Dashed pattern), colours and Butt & round Caps.
III.	Implement bresenham's circle algorithm. Also provide to change attributes of graph primitives such as stippling (Dotted and Dashed pattern) and colors.
IV.	Implement 2-D transformation with translation, scaling, rotation, reflection, Shearing and scalingConstruct Bezier curves and Spline curves with 6 or more control points entered through mouse.
V.	Construct fractal geometric shapes using linear or non-linear procedures.
VI.	Consider a scene with two or more three dimensional polygonal object. Generate Different perspective views of scene by changing various 3D viewing parameters interactively.
VII.	Implement tweening procedure for animation with key frames having equal or different no. of edges.
VIII.	Write a program for 2D line drawing as Raster Graphics Display.
IX.	Write a program for 2D circle drawing as Raster Graphics Display.
X.	Write a program for 2D polygon filling as Raster Graphics Display.
XI.	Write a program for line clipping.
XII.	Write a program for polygon clipping.
XIII.	Write a program for displaying 3D objects as 2D display using perspectives transformation.
XIV.	Write a program for rotation of a 3D object about arbitrary axis.
XV.	Write a program for hidden surface removal from a 3D object.
XVI.	Note: At least 5 to 10 more exercises to be given by the teacher concerned.

Name of the Course	**Vocational Training**		
Course Code	**IT-5008**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50
Instructions			
For Paper Setters/ For Candidates: This six weeks training will be related to Industrial Projects to be undertaken under the guidance of Faculty preferably at Industry / Software Park / Incubation Centre or related areas. This may also be undertaken with in the Institute. This training will be undertaken during vacation. Student is supposed to submit the project report at the end of the training. Evaluation will be based on Project Report, presentation and comprehensive Viva-voce examination related to the project. Project should be made only on any technology (Training to be done only in CSE and IT Company)			

Semester-VI

Name of the Course	**Object Oriented Software Engineering**		
Course Code	**IT – 6001**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Course Objectives:

- To learn object-oriented (OO) analysis and design using UML and other techniques.

Section	**Course Content**
Section-A	Review of object oriented systems: Design object, class hierarchy, inheritance, polymorphism, object relationships and associations, aggregations and object containment, object persistence, meta class, object oriented systems development life cycle, software development process object oriented systems development : a use case driven approach
Section-B	Methodology for object oriented design: Object modelling techniques as software engineering methodology, Rumbaugh methodology, Jacobson methodology, Booch Methodology, Patterns, Frameworks, the unified approach, unified modelling language(UML).
Section-C	Object Oriented Analysis : analysis process, use case driven object oriented analysis, use-case model, object classification, theory, different approaches for identifying classes, classes, responsibilities and collaborators, identifying object relationship, attributes and methods, super sub class relationships, A – part of relationships aggregation class responsibilities, object responsibilities.
Section-D	Object oriented design process, corollaries, design axioms, design patterns, object oriented design philosophy, UML object constraint language, designing classes: The process, class visibility, refining attributes, designing methods ad protocols, packages and managing classes, designing interface objects, view layer interface design, Macro and Micro level Interface design, Macro and Micro level interface design process.

Course Outcomes:
Upon completion of the course students should be able to:

CO1: To learn how to OO languages support abstraction and polymorphism.

CO2: To improve communications skills in the context of software development.
Textbook and Reference Books: 1. Object Oriented systems development, Ali Baharmi, 1999, MGH. 2. Object Oriented Modeling and Design, Rumbaugh et.al. 1997, PHI. 3. Object Oriented analysis and design, Grady Booch, 1995,Addison Wesley. 4. Object Oriented software Engineering by Subhash Mehta, Suresh K. Basandra, Galgotia Publication

Name of the Course	**Web Scripting Technology**		
Course Code	**IT – 6002**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Course Objectives:

- To learn web scripting technology such as ruby tcl and perl.

Section	**Course Content**
Section-A	Introduction: Ruby, Rails, the structure and Execution of Ruby Programs, Package Management with RUBYGEMS, Ruby and web: Writing CGI scripts, cookies, Choice ofWeb servers, SOAP and web services. RubyTk – Simple Tk Application, widgets, Binding events, Canvas, scrolling. Extending Ruby: Ruby Objects in C, the Jukebox extension, Memory allocation, Ruby TypeSystem, Embedding Ruby to Other Languages, Embedding a Ruby Interpreter
Section-B	Introduction to PERL and Scripting: Scripts and Programs, Origin of Scripting, Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL-Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.
Section-C	Advanced Perl Finer points of looping, pack and unpack, filesystem, eval, data structures, packages, modules, objects, interfacing to the operating system Creating Internet ware applications, Dirty Hands Internet Programming,security Issues.
Section-D	TCL: TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures, strings, patterns, files, Advance TCL- eval, source, exec and up level commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface. TK: TK-Visual Tool Kits, Fundamental Concepts of TK, TK by example, Events and Binding, Perl-TK.

Course Outcomes:

Upon completion of the course students should be able to:

CO1: To be able to learn ruby.
CO2: To be able to learn perl and advanced perl
CO3: To learn TCL.

Textbook And Reference Books:

1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Ruby Programming language by David Flanagan and Yukihiro Matsumoto O'Reilly
3. "Programming Ruby" The PramaticProgammers guide by Dabve Thomas Second edition
4. Open Source Web Development with LAMP using Linux Apache, MySQL, Perl and PHP, J.Lee and B. Ware (Addison Wesley) Pearson Education.
5. Perl by Example, E. Quigley, Pearson Education.
6. Programming Perl, Larry Wall, T. Christiansen and J. Orwant, O'Reilly, SPD.
7. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.
8. Perl Power, J.P. Flynt, Cengage Learning.

Name of the Course	**Artificial Intelligence**		
Course Code	**IT – 6003**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:

The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:

Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Course Objectives:

- ❖ The primary objective of this course is to introduce the basic principles, techniques, and applications of Artificial Intelligence.
- ❖ Emphasis will be placed on the teaching of these fundamentals, not on providing a mastery of specific software tools or programming environments

Section	**Course Content**
Section-A	Scope of AI: Games, theorem Proving, Natural Language Processing, Vision and speech processing, Robotics, Expert system AI techniques search knowledge, abstraction, problem solving, State space search, Control strategies, depth first search, breadth first search, production system, problem characteristics, Decomposable, ignorable, recoverable, predictable. Use of Heuristics: Hill climbing, Best first search, A * algorithm: Admissibility, AND/OR graph 0 AO *, constraint, satisfaction, crypto arithmetic, Waltz line labelling. Game playing, Minimax search, Alpha-Beta pruning. Knowledge Representation: Predicate logic, well-formed formulas, quantifiers, prenex normal form skolemization, unification, modus pones, resolution refutation various strategiesRule based system, Forward reasoning: Conflict resolution Backward reasoning: Use for no back track.Structured knowledge representation. Semantic net: Slots inheritance, frames – exceptions and default attached predicates; conceptual dependency form formalism, object oriented representation
Section-B	Programming language: PROLOG: Syntax, procedural and declarative meaning, Prolog unification mechanism, Anonymous variable, Lists, Use of fail, CUT, not.LISP: Basic concepts, Eval function, Function and variable, scooping of LISP variable, iteration and recursion.

Section-C	Headlong uncertainty: Probabilistic reasoning, Byes net, Dumpster Shafer theory: use of certainty factors Fuzzy logic, no monotonic reasoning, Dependence directedbacktracking, Truth maintenance systems. Learning: Concept of learning, learning automation, the genetic algorithm, learning by induction, Neural Networks: Hop field Networks, perceptions learning algorithm, back propagation network, Boltzman Machine.
Section-D	Planning: Components of planning system, Plan generation algorithm: Forward state propagation, backward state propagation, non-linear planning using constraint posting. Expert System: Need & justification for expert system – Cognitive problems, Expert system architecture: Rule based system, Non-production system, knowledge acquisition, case studies: MYCIN, RI. Natural language processing: syntactic analysis, top down and bottom up parsing, Augmented transition networks Semantic analysis case grammars.

Course Outcomes:

Upon completion of the course students should be able to:

CO1: Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.

CO2: Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.

CO3: Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.

Textbook And Reference Books:

1. AI – E. Rich & K Knight Tata McGraw Hill (2nd edition)
2. Introduction to Expert system – D.W. Paterson, Prentice Hall of India (1992)
3. Introduction to expert system –Peter Jackson, Addison Wesley publishing company.
4. AI an engineering Approan –R.JSchalkoff, McGraw Hill international Edition
5. Principles of AI Nilsson Narosa publishing Narosa publishing house.
6. Programming in PROLOG – Clocksm 7 Mellish, Narosa Publishing House
7. Rule Based Expert System- M. Sasikumar, S, Ramani
8. Artificial Intelligence – P.H. Wisnston, 2nd edition, Addison Wesley 1884.

Name of the Course	**Parallel Computing**		
Course Code	**IT – 6004**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Course Objectives:

- The course gives an overview of the architectures and communication networks employed in parallel computers.
- The course covers the foundations for development of efficient parallel algorithms, including examples from relatively simple numerical problems, sorting, and graph problems

Section	**Course Content**
Section-A	Review of Computer Architecture: Taxonomy of MIMD Computers, Multi-vector and SIMD, Computers, Vector Supercomputers SIMD Supercomputers. PRAM and VLSI Models: Parallel Random-Access Machines, VLSI Complexity Model. Architectural Development Tracks: Multiple-Processor Tracks, Multi- vector and SIMD Tracks, Multithreaded and Dataflow Tracks. Conditions and Parallelism: Data and Resource Dependences, Hardware and Software Parallelism, The role of compilers. Program partitioning and scheduling: grain Sizes and Latency, Grain Packing and scheduling, static Multiprocessor Scheduling. Program Flow Mechanisms: control flow Mechanism, Demand-Driven Mechanism, Comparison of Flow Mechanisms, System Interconnect Architectures: Network properties and Routing, Static Connection networks, Dynamic Connection Networks.
Section-B	Performance Metrics and Measures: Parallelism Profile in Programs, Harmonic mean Performance, Efficiency, Utilization and Quality. Speedup performance Law: Amdahl's law for a fixed workload, Gustafron's Law for sealed problems. Scalability Analysis and Approaches: Scalability metrics. Advance Processor

	Technology: Instruction set architecture, CISC and RISC Scalar processors. Superscalar and Vector Processors: Superscalar Processors, The VLIW Architecture, Vector and Symbolic Processors. Memory Hierarchy Technology: Hierarchical Memory Technology Inclusion, Coherence and Locality, Memory Capacity Planning.
Section-C	Multiprocessor System Interconnects: Hierarchical Bus system, Crossbar Switch and Multiport Memory, Multistage and Combining networks. Cache Coherence and Synchronization Mechanism: The Cache coherence problem, Snoopy bus protocol, Hardware Synchronization Mechanisms. Vector Processing principles: Vector Instruction Types, Vector Access Memory Schemes. Multivector Multiprocessors: Performance Directed Design rules, Cray Y– MP SIMD Computer Organization: The CM-2 Architecture.
Section-D	Software for parallel Programming: Shared variable Model, Message Passing Model, Data parallel Model, Function and Logic Models. Parallel Language and Compilers: Language feature for parallelism, Parallel language Constructs, Optimizing Compiler for parallelism. Parallel Programming Environment: Software tools and environment, Y- MP, Pargon and CM-5 Environment. Mapping Programs on to Multicomputers: Domain Decomposition Techniques, Control Decomposition techniques, Heterogeneous Processing.

Course Outcomes:

Upon completion of the course students should be able to:

- **CO1:** the basic construction and use of parallel computers,
- **CO2:** the content and use of the terminology for how one measures the performance of parallel algorithms and parallel computers,
- **CO3:** How to develop computer programs for different types of parallel computers.

Textbook And Reference Books:

1. Kai Hawang: Advance Computer Architecture – Parallelism, Scalability and Programmability, McGraw Hill International Edition, Computer Series 1993.
2. Michael J. Quinn: Parallel Computing – Theory and Practice, McGraw Hill International Edition, Computer Science Series, 2nd Edition, 1994.
3. S. G. Akl: Design and Analysis of parallel algorithms, Prentice Hall, Englewood Cliff NJ.
4. S. Lakshmivarahan and S. K. Dhail: Analysis and Design of Parallel Algorithms-arithmetic and Matrix Problems, McGraw Hill International Edition, Computer Science Series.1990.
5. A practical approach to parallel Computing by S.K. Ghosal, University press (India) Ltd.

Name of the Course	**Core Java**		
Course Code	**IT – 6005**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Course Objectives:

- Covers software design, implementation, and testing using Java. Introduces object-oriented design techniques and problem solving.
- Emphasizes development of secure, well-designed software projects that solve practical real-world problems

Section	Course Content
Section-A	Introduction to Java, Difference between C/C++ and Java, Applets and Applications, Java Development Kit, Advantages of Java, (Data types, modifiers, expressions, operators in Java), Control Statements in Java, Classes statements in Java
Section-B	Classes, Inheritance (single, multilevel, hierarchical), Multiple Inheritance using Interfaces, Arrays, Strings and Vectors, Java packages.Event Handling: Event Handling Models, Event classes, Event Listener Interfaces, Adapter Classes.
Section-C	Multithreading: Java Thread Model, Thread Priorities, Creating Multiple Threads, Synchronization, Inter thread communication, Exception handling.
Section-D	Applets: Applet Basic, Applet Architecture, Display Methods, HTML APPLET tag.AWT Classes: Window fundamentals, working with frames windows, Panels, working with colour, fonts, AWT Controls, layout Manager & Menus. Applets, Graphics and AWT

Course Outcomes:
Upon completion of the course students should be able to:

CO1: Use an integrated development environment to write, compile, run, and test simple object-oriented Java programs.

CO2: Read and make elementary modifications to Java programs that solve real-world problems.

CO3: Validate input in a Java program. **CO4:** Identify and fix defects and common security issues in code.
Textbook And Reference Books: 1. Programming with JAVA, John R . H ubbard, Schaum ’s Outline Series,McG raw H ill 2. Java Script, Don G osselin, Thomson L earning, Cam bridge, 3. P rogram m ing w ith Java, E B alagurusam y, T ata M cG raw H ill, New Delhi, 2002

Name of the Course	**Artificial Intelligence Lab**		
Course Code	**IT-6006**	Credits-1	L-0, T-0, P-2
Total Lectures	15 (2 Hr Each)		
Semester End Examination	Max Marks: 50	Min. Pass Marks: 20	Max. Time: 3 Hrs.
Internal Assessment: (based on Continuous Lab Work Assessment:20%, Experiment Performance: 30%, Attendance 10%, Viva: 40%)			Max Marks: 50 Min. Pass Marks: 25

Instructions

For Paper Setters/ For Candidates:

Laboratory examination will consist of two parts:
Performing a practical examination assigned by the examiner. (25 marks)
Viva-voce examination. (25 marks)
Viva-voce examination will be related to the practical performed/projects executed by the candidate related to the paper during the course of the semester.

Course Outcome:

Upon completion of the course students should be able to:
Implement these practical in LISP or Prolog in which you feel comfortable.
Depth –bounded depth first search.
Iterative Deepening Search.
Best first search.
A * Search.
AO* Search.
Minmax Search.
Alpha Beta Pruning.
Solve the water jug problem using AI technique.
Solve the Missionaries problem using AI technique.
Design the following expert system using LISP or Prolog in which you feel comfortable.
Weather Forecasting System.
Legal Expert System.
Design parser for NLP using Lex and Yacc utilities

Name of the Course	**Web Technology Lab**		
Course Code	**IT-6007**	Credits-1	L-0, T-0, P-2
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 50	Min. Pass Marks: 20	Max. Time: 3 Hrs.
Internal Assessment: (based on Continuous Lab Work Assessment:20%, Experiment Performance: 30%, Attendance 10%, Viva: 40%)			Max Marks: 50 Min. Pass Marks: 25

Instructions

For Paper Setters/ For Candidates:

Laboratory examination will consist of two parts:
Performing a practical examination assigned by the examiner. (25 marks)
Viva-voce examination. (25 marks)
Viva-voce examination will be related to the practical performed/projects executed by the candidate related to the paper during the course of the semester.

Course Outcome:

Upon completion of the course students should be able to:
To create dynamic animation, simulations and interactive web pages using HTML, Java Script.
Create databases using: -
HTML / Java Script / DHTML.
WEB Technology
Setting up intranet.
Learning of tools – DHTML, flash, director
Design of web pages/sites.
Development of web pages/site.
Evaluation of web site.
Registering of website.

Name of the Course	**Parallel Computing Lab**		
Course Code	**IT-6008**	Credits-1	L-0, T-0, P-2
Total Lectures	15 (2 Hr Each)		
Semester End Examination	Max Marks: 50	Min. Pass Marks: 20	Max. Time: 3 Hrs.
Internal Assessment: (based on Continuous Lab Work Assessment: 20%, Experiment Performance: 30%, Attendance 10%, Viva: 40%)			Max Marks: 50 Min. Pass Marks: 25

Instructions

For Paper Setters/ For Candidates:

Laboratory examination will consist of two parts:
Performing a practical examination assigned by the examiner. (25 marks)
Viva-voce examination. (25 marks)
Viva-voce examination will be related to the practical performed/projects executed by the candidate related to the paper during the course of the semester.

Course Outcome:

Upon completion of the course students should be able to:
Usage of FORTRAN 77/90 for implementation of following programs.
Finding the root of a non linear equation by (a) Bisection Method
(b) Newton Raphson method.
Two point and three point numerical differentiation with error estimates.
Integration by Simpson rule with error estimate.
Integration by Gaussian Quadra rule with error estimate.
Solving an ordinary differential equation using four point Runge Kutta Method with error estimate and control.
Solution of a system of Linear equations by Gaussian- elimination Method.
Diagonalization of Real symmetric Matrix.

Parallel Programming: -
Developing following elementary programs in FORTRAN 77/C for implementation on Parallel machines.
Fork and Node identity
Expression evaluation
Matrix Addition
Matrix Multiplication
Linear curve fit
Gaussian elimination
Simpson's 1/3rd rule.

Name of the Course	**Core Java Lab**		
Course Code	**IT-6009**	Credits-1	L-0, T-0, P-2
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 50	Min. Pass Marks: 20	Max. Time: 3 Hrs.
Internal Assessment: (based on Continuous Lab Work Assessment: 20%, Experiment Performance: 30%, Attendance 10%, Viva: 40%)			Max Marks: 50 Min. Pass Marks: 25

Instructions

For Paper Setters/ For Candidates:

Laboratory examination will consist of two parts:

1. Performing a practical examination assigned by the examiner. (25 marks)
2. Viva-voce examination. (25marks)

Viva-voce examination will be related to the practical performed/projects executed by the candidate related to the paper during the course of the semester.

Course Outcome:

Upon completion of the course students should be able to:

1. Write an application that demonstrates some static method of characterclass.
2. Create a string buffer object to illustrate how to-
   (a) Display capacity and length of string buffer
   (b) Insert character at thebeginning.
   (c) Append & Reverse the string.
3. Write a program that display all the factors of a number entered by user: e.g. If entered 8 it would response with 2 &4.
4. Write an application that defines sphere class with three constructors first from accepts no arguments. It assume that sphere is centred at origin & has radius of one unit. The record from accept one double value and represents radius and entered at origin, third from accepts four double arguments and specify radius andorigin.
5. Write down a programme to implement polymorphismusing
   (a) Overloading
   (b) Overriding
6. Write a programme that illustrate how to use throw statement, create class that has static method main (), a (), b (), c () and d (). Mmain invokes a (), a () invokes b (), b () invokes c () and so on. Method d () declares an array with ten elements and then attempts to access 20^{th} element. Therefore array index out of bond exception isgenerated.
7. Write an application that execute two threads one after another, Create threads byimplementing.
   (a) ThreadClass
   (b) RunnableInterface.
8. Write a Multithreaded programme that simulate a set of grasshoppers jumping around in a bod. Each grasshopper jumps to a different location.
   Every 2 to 12 seconds. Display the new location of grasshopper after each of these jumps.
9. Write down programme in java to implement following injava.

(a) LinkedList
(b) Vector Class
(c) Hashtable
(d) Enumeration

10. Write a programme to implement Applet that displays a different Images based on the days of week. The Applet should accept seven parameters that identify the Image file.

Semester-VII

Name of the Course	**Android Application Development**		
Course Code	**IT – 7001**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for thecourse.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators isallowed.

Course Objectives:

- Covers introductory mobile application development for the Android Operating System using XML and Java.
- Includes developing simple applications that could run on Android phones and tablets.
- Covers Android application development phases, terminologies, application design, and coding.

Section	**Course Content**
Section-A	Introduction to Android Operating System: Android OS design and Features – Android development framework, SDK features, Installing and running applications on Eclipse platform, Creating AVDs, Types of Android applications, Best practices in Android programming, Android tools Android application components – Android Manifest file, Externalizing resources like values, themes, layouts, Menus etc, Resources for different devices and languages, Runtime Configuration Changes Android Application Lifecycle – Activities, Activity lifecycle, activity states, monitoring state changes
Section-B	Android User Interface: Measurements – Device and pixel density independent measuring units. Layouts – Linear, Relative, Grid and Table Layouts.User Interface (UI) Components – Editable and non editable Text Views, Buttons, Radio and Toggle Buttons, Checkboxes, Spinners, Dialog and pickers. Event Handling – Handling clicks or changes of various UI components. Fragments – Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments to Activity, adding, removing and replacing fragments with fragment transactions, interfacing between fragments and Activities, Multi-screen Activities
Section-C	Intents and Broadcasts: Intent – Using intents to launch Activities, Explicitly starting new Activity, Implicit Intents, Passing data to Intents, Getting results

	from Activities, Native Actions, using Intent to dial a number or to send SMS. Broadcast Receivers – Using Intent filters to service implicit Intents, Resolving Intent filters, finding and using Intents received within an Activity Notifications – Creating and Displaying notifications, Displaying Toasts
Section-D	Persistent Storage: Files – Using application specific folders and files, creating files, reading data from files, listing contents of a directory Shared Preferences – Creating shared preferences, saving and retrieving data using Shared Preference Database – Introduction to SQLite database, creating and opening a database, creating tables, inserting retrieving and deleting data, Registering Content Providers, Using content Providers (insert, delete, retrieve and update) Advanced Topics: Alarms – Creating and using alarms. Using Internet Resources – Connecting to internet resource, using download manager Location Based Services – Finding Current Location and showing location on the Map, updating location

Course Outcomes:

Upon completion of the course students should be able to:

- **CO1:** Install and configure Android application development tools.
- **CO2:** Design and develop user Interfaces for the Android platform.
- **CO3:** Save state information across important operating system events.
- **CO4:** Apply Java programming concepts to Android application development.

Textbook And Reference Books

1. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox) , 2012
2. Android Application Development for Java Programmers, James C Sheusi, Cengage Learning, 2013
3. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox), 2013

Name of the Course	**E-Commerce and ERP**		
Course Code	**IT – 7002**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for thecourse.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Course Objectives:
- ❖To familiarize students with ecommerce, its uses and with ERP.

Section	Course Content
Section-A	**Introduction and Concepts:** Networks and Commercial Transactions – Internet and other novelties: networks and electronic transactions today, Model for commercial transactions; Internet environment – Internet advantage, worlds wide web and other Internet Sales venues; online commerce solutions. **Electronic Payment Methods:** Updating traditional transactions; secure online offline secure processing; private data networks, Security protocols.
Section-B	**Electronic Commerce Providers:** On-line Commerce options; Company profiles, Electronic Payment System: Digital payment system; First virtual Internet payment system; cyber cash model. On-line Commerce environments; E-commerce Servers. Digital Currencies Operational process of Digicash, Ecash Trail; Using Ecash; Smart cards; **Electronic Data interchange:** basics, EDI versus Internet and EDI over Internet. Strategies, Techniques and Tools, Shopping techniques and online selling techniques
Section-C	**ERP – an Enterprise Perspective:** Production finance, Personnel disciplines and their relationships, Transiting environment, MIS Integration for disciplines, Information / workflow, Network Structure, Client Server Integrator System, Virtual Enterprise. **ERP – Resource Management Perspective** :Functional and Process of Resource, Management, Introduction to basic Modules of ERP System: HRD, Personnel Management, Training and Development, Skill Inventory, Material Planning and Control, Inventory, forecasting, Manufacturing, Production Planning, Production Scheduling, Production Control, Sales and Distributions,

	Finance, Resource Management in global scenario.
Section-D	**ERP – Information System Perspective:** Functional to OLAP (Online Analysis and Processing), TP, OAS, KBS, MRP, BPR, SCM, REP, CRM, and Information CommunicationTechnology. **ERP – Key Managerial Issues:** Concept Selling, IT Infrastructure, Implication, of ERP System on business Organization, Critical success factors in ERP System, ERP Culture Implementation Issues, resistance to change, ERP Selection issues, return on Investment, pre and post Implementation Issues.

Course Outcomes:

CO1: The students should be able to effectively identify and demonstrate ecommerce types and ERP implementation.

Textbook And Reference Books

1. Ravi lalakota, Andrew Whinston: Frontiers of Electronics Commerce, 1996, AddisonWesley.
2. V.K.GargandN.K.VenkitaKrishna:EnterpriseResourcePlanning– Concepts and practice, 1998, PHI.
3. John Antonio, Fernandz: The SAP/3 Handbook,TMH.
4. Denial Amor: The E-Business Revolution, AddisonWelsey.
5. From Edi to E-Commerce: A Business Initiative: Sokol TMH.
6. Greenstein and Feinman: E-Commerce,TMH.
7. Diwan, Sharma: E-CommerceExcel.
8. Asset International " Net Commerce",TMH.
9. E-Commerce – Jaffrey F. Rayport, Bernard J. Jaworski, 2002,TMH.
10. Bajan and Nag: E-Commerce: The cutting Edge of Business,TMH.
11. Electronic Commerce –Security, Risk Management and Control, Greenstein, Geinman, 2002,TMH.

Name of the Course	**Advance Java**		
Course Code	**IT – 7003**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Course Objectives:

- To familiarize students with EE, Beans and JSP technologies

Section	**Course Content**
Section-A	Java EE: Introduction Enterprise Architecture, their types and Goals, Introducing Java EE platform, Architecture of Java EE and concepts, Web Applications and Java EE 5. JDBC: Introduction to JDBC, Components of JDBC, JDBC Specifications and Architecture, JDBC Drivers, JDBC API, Implementing a Simple JDBC example.
Section-B	Servlets: Features of Java Servlets, Servlet API, Servlet Life Cycle, Servlet Configuration, A simple Example of Servlet. Session Handling and Event Handling:- Introduction to Sessions, Session Tracking Mechanisms with examples, Events, Event Handling and Types of Servlet EventsTools, Shopping techniques and online selling techniques
Section-C	Introduction to JSP: Overview of JSP Technology, JSP Architecture, JSP Page Life-Cycle, JSP Elements (Directives, Scripting Elements, Action Elements, Implicit Objects and Comments), Using JSP Best Practices. Brief introduction to JSP Tags, JSTL (JSP Standard Tag Library) and Filters.
Section-D	Enterprise Java Beans: EJB 3.0 Fundamentals, EJB Architecture and Concepts, Classifications and Configurations of EJBs. XML:- Introduction and XML Basics, XML Syntax, Declaration, XML Elements and Attributes, XMLParser.

Course Outcomes:

CO1: The students should be able to
CO2: Develop apps in jsp
CO3: Develop apps in EJB

CO4: Work with JavaEE and make applications.
Textbook And Reference Books **1.** Java Server Programming, Black Book, Kogent Solutions Inc.,2010. **2.** Head First Servlets and JSP, Willey EsternPublications **3.** Head First EJB Willey EsternPublications

Name of the Course	**Wireless Communication**		
Course Code	**EC-7041**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for thecourse.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators isallowed.

Course Objectives:

- To provide an overview of Wireless Communication networks area and its applications in communication engineering.
- To appreciate the contribution of Wireless Communication networks to overall technological growth.
- To explain the various terminology, principles, devices, schemes, concepts, algorithms and different methodologies used in Wireless Communication Networks.
- To enable students to compare and contrast multiple division techniques, mobile communication systems, and existing wireless networks.

Section	**Course Content**
Section-A	**Introduction to Wireless Communication System:** Evolution of mobile radio communication, examples of wireless comm. system, paging system, Cordless telephone system. Comparison of various wireless systems, GSM **Modern Wireless Communication System:** Second generation cellular networks, third generation wireless networks, wireless in local loop, wireless local area networks, blue tooth and personal area networks.
Section-B	**Introduction to Cellular Mobile System:** Spectrum Allocation, basic cellular system, Performance Criteria. Operation of Cellular System, Analog cellular system, Digital Cellular System. **Cellular System Design Fundamentals:** Frequency Reuse, Channel assignment strategies, handoff strategies. Interference and System capacity,Improving Coverage and capacity.
Section-C	**Multiple Access Techniques for Wireless Communication:** Introduction to Multiple Access, FDMA, TDMA, Spread Spectrum Multiple Access, Space division multiple access, packet ratio, capacity of a cellularsystem. Wireless Networking: Difference between wireless and fixed telephone networks, Development of Wireless Networks, Wireless Data Services,

	Common Channel Signaling, ISDN (Integrated Service Digital Network, Advanced Intelligent Networks
Section-D	**Intelligent Cell Concept and Application: Intelligent cell concept, Application of Intelligent –** cell system, In Building Communication, CDMA Cellular Radio Networks, VSAT-Review of latest cellular technologies(GPS)

Course Outcomes:

The students should be able to-

- **CO1:** Understand fundamentals of wireless communications.
- **CO2:** Analyze security, energy efficiency, mobility, scalability, and their unique characteristics in wireless networks.
- **CO3:** Demonstrate basic skills for cellular networks design.
- **CO4:** Apply knowledge of TCP/IP extensions for mobile and wireless networking.

Textbook And Reference Books

1. Wireless Communication: Theodore S. Rappaport:Pearsons.
2. Mobile Cellular Telecommunication: W.C.Y.Lee: McGrawHill.
3. Mobile Communications: Jochen Schiller;Pearson.

Name of the Course	**Advance Java Lab**		
Course Code	**IT-7004**	Credits-1	L-0, T-0, P-2
Total Lectures	15 (2 Hr Each)		
Semester End Examination	Max Marks: 50	Min. Pass Marks: 20	Max. Time: 3 Hrs.
Internal Assessment: (based on Continuous Lab Work Assessment: 20%, Experiment Performance: 30%, Attendance 10%, Viva: 40%)			Max Marks: 50 Min. Pass Marks: 25

Instructions

For Paper Setters/ For Candidates:

Laboratory examination will consist of two parts:

1. Performing a practical examination assigned by the examiner. (25 marks)
2. Viva-voce examination. (25marks)

Viva-voce examination will be related to the practical performed/projects executed by the candidate related to the paper during the course of the semester.

Course Outcome:

Upon completion of the course students should be able to:

1. To create a user interface which inputs user's Name, email-ID, City etc. to store in the database through JDBC using SQL server or MSAccess.
2. To display Juggler Bean by setting its properties and events.
3. To display the applet designed by the user in BeanBox.
4. To create a user interface using swings which displays pop-up window containing list of courses, option buttons for inputting Male or Female, Check Boxes to display the choices of various institutes and menubars using event handling. Put the other controls accordingly.
5. To display a stop watch which rings the alarm at the time specified by the user usingmultithreading?
6. To create a user defined bean which may be used as Font selector in other applications?
7. To study the various types of beans and their corresponding properties:

a)Jelly bean b) Tick Tock Bean c) Change Reporter Bean d) Our Button Bean

8. To design an online polling system usingPHP.
9. To create a web form containing required details for entering theuser's datafor registering himself using javascript.
10. To create a chat server using RMI or socketprogramming.

Name of the Course	**E-Commerce Lab**		
Course Code	**IT-7005**	Credits-1	L-0, T-0, P-2
Total Lectures	15 (2 Hr Each)		
Semester End Examination	Max Marks: 50	Min. Pass Marks: 20	Max. Time: 3 Hrs.
Internal Assessment: (based on Continuous Lab Work Assessment: 20%, Experiment Performance: 30%, Attendance 10%, Viva: 40%)			Max Marks: 50 Min. Pass Marks: 25

Instructions

For Paper Setters/ For Candidates:

Laboratory examination will consist of two parts:

1. Performing a practical examination assigned by the examiner. (25 marks)
2. Viva-voce examination. (25marks)

Viva-voce examination will be related to the practical performed/projects executed by the candidate related to the paper during the course of the semester.

Course Outcome:

Upon completion of the course students should be able to:

This laboratory will be self-exploratory in nature with the undertaking of case studies such as by culling information from the Internet on

Pay roll

Back office accounting

Supply chain

Order Processing

Shipments

Web and Value addition to traditional business

Study of packages such as SAP oracle.

At the end of the laboratory a student is expected to make a presentation of his exploration in the area of e-commerce and ERP.

Name of the Course	**Project-I**		
Course Code	**IT-7006**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50
Instructions			
For Paper Setters/ For Candidates: Seminar / Viva will be conducted on the project done by the candidate			
This project work shall be carried out by the students during the entire semester under the guidance of Supervisor allotted by the institute and its viva will be conducted at the end of the semester.			

Name of the Course	**Vocational Training**		
Course Code	**IT-7016**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50
Instructions			
For Paper Setters/ For Candidates: This six week training will be related to Industrial Projects / Software Projects to be undertaken under the guidance of Faculty preferably at Industry / Software Park / Incubation Centre or related areas. This may also be undertaken within the Institute. The training will be undertaken during vacation. Student is supposed to submit the project report at the end of the training. Evaluation will be based on Project Report, presentation and comprehensive Vive-voce examination related to the project.			

PROFESSIONAL ELECTIVE-I

Name of the Course	**Software Maintenance**		
Course Code	**IT-7010**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Course Objectives:

- Apply software maintenance fundamentals, including terminology; the nature of and need for maintenance; maintenance costs; evolution and categories of maintenance.
- Incorporate key issues in software maintenance, to include technical issues; management issues; cost estimation; and software maintenance measurement.
- Utilize the best practices maintenance process
- Exercise best practices techniques for maintenance

Section	**Course Content**
Section-A	**Fundamentals:** Meaning of software maintenance, software change, ongoingsupport, economic implications of modifying software, the nomenclature and image problem, software maintenance framework, potential solutions to maintenance problem. **Maintenance Process models:** Definitions, critical appraisal of traditional process models, maintenance process models. **Program understanding:** Aims of program comprehension, maintainers and their information needs, comprehension process models, mental models, program comprehension strategies, factors that affect understanding, implication of comprehension theories and studies.
Section-B	**Reverse Engineering:** Definitions, purposes and objectives, level of reverse engineering, supporting techniques, benefits. **Reuse and reusability:** Definitions, objectives and benefit of reuse, approach to reuse, domain ANALYSIS, COMPONENTS engineering, reuse process model, factors that impact upon reuse. **Maintenance measures:** Definitions, objectives of software maintenance, example measures, guidelines for selecting maintenance measures.
Section-C	**Configuration management:** Definitions, configuration management, change control, documentation. Management and organizational issues, Management

	responsibilities, enhancing maintenance productivity, maintenance teams, personnel education and training, organizational modes
Section-D	**Building and sustaining maintainability:** Quality assurance, fourth generation languages, object-oriented paradigms. **Maintenance tools:** Criteria for selecting tools, taxonomy of tools, program understanding and reverse engineering, testing, configuration management, other tasks, Past present and future of software maintenance.

Course Outcomes:

The students should be able to

- **CO1:** describe key techniques and standards in software testing,
- **CO2:** explain and evaluate strategies for software testing for both complete program life cycles and individual phases,
- **CO3:** be able to develop correct, stable, maintainable and efficient software that extends or improves existing code,
- **CO4:** specify and design test cases and test, debug and optimise programs,
- **CO5:** produce appropriate documentation for test management, including test plans, test schedules and test progress monitoring,
- **CO6:** develop code using test driven development,
- **CO7:** be able to use suitable software developing and testing tools and discuss their range and capabilities

Textbook And Reference Books

1. Software Maintenance: concepts and practice, Armstrong A Takang and Penny A. Grubb, International Thomson Computer press, London.

Name of the Course	**COBOL/XML**		
Course Code	**IT-7011**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for thecourse.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators isallowed.

Course Objectives:

- Learm the basics of Cobra and creating XML documents, transforming XML documents, and validating XML documents.
- Learn the basics and history of XML and how to write your own XML documents.

Section	Course Content
Section-A	**Introduction to Corba:** An overview, CORBA Revisited, The Evolution of CORBA, BOA vs. POA Generation, The invocation Lifecycle, The Object Lifecycle. **CORBA Services Revisited:** Core Services, Database Integration and Transaction processing, Scalability Issues. The Stock Watch Components, The Portfolio Manager Component, Performance Considerations, Performance Implications of IDL Design, Transferring Large Amounts of Data
Section-B	**Object Location:** A Model for Locating Objects, CORBA object Location Services, Other ways to Locate Objects, Selecting an Object Location Mechanism, Selecting Objects For Publication, Measuring, CORBA and Messaging, ORB Support for Messaging, The need for Message – Oriented Middleware, Existing Message-Oriented Middle ware products, Related CORBA Services, Multicast Messaging. **Security:** Security Concepts, Enterprise System Security Requirements and Policies, CORBA Security, Solutions for the Real World.
Section-C	**Database Integration and Transaction Processing:** Object Persistence, Introduction, Accessing Relational Data bases, Object/Relational Mapping, Object Databases, Data Consistency. **Database Integration:** System Architecture, Related OMG Work, Integration Aspects, CORBA Business Objects, ODBMS, CORBA Relationship Service, CORBA Query Service, Application – Specific Solutions, Tradeoffs, Stateless

	Servants, Stateful Servants, Database Adapters, The Billion – Object CORBA System, Transaction in a CORBA Environment, Two-Tier vs. Three-Tier, Architectures, Client – Controlled vs. Server – Controlled Transactions, Server Controlled Transaction, Client – ControlledTransactions. Distributed Transaction Processing: Transaction Processing, CORBA Object Transaction Services, Advanced TransactionModels.
Section-D	**Introduction to XML:** Fundamentals of XML, XML as a Data Format, XML for Web pages, Object Method Parameter Encoding and RPC Protocol, XML and open Exchange, The Flexibility of XML, XML Basics, Digging into the Syntax, XML Anatomy, Elements, Attributes, Test, Entities, Character references, CDATA, Encodings, comments, Processing Instructions, Well-Formed versus valid, XMLNamespaces. **Programming the Document Object Model:** The idea behind the DOM, DOM requirements, Language and Platform Independent, Core DOM for both HTML and XML, Independent of the User Interface, Accessable elements of the documents, Limitation of the DOM, Objects in the DOM, Fundamental DOM Interfaces, Microsoft Parse Error Object, Platform Neutrality of XML and the DOM, Generic Node methods, Wrapper Functions for Manipulating the DOM, specific node interfaces, extended interfaces, Microsoft Specific Extensions. Displaying the Nodes in a Tree Control, SAX. **Using XML Queries and Transformation:** Xapth query syntax, Different Axes, Different Node Tests, Building a Path, Selecting Subsets, Built-in Functions, IES Conformance. XSLT: Working of Transformation, Some Good XSLT Processors, XSLT Elements – Composing the XSLT Style sheet: Pre-defined templates, Elements that Generate output elements, commands, what if several templates Match?, Control of flow, variables and parameters, Top Level setting, Built in functions, Simplified syntax, XSLT Language extensions, The IES Implementations, Tricks for using MSXML2.0. **Giving style to XML:** using CSS in HTML, Using XML, XSLT for adding style, Client side XSLT Styling.

Course Outcomes:

The students should be able to:

- **CO1:** Describe Well-Formed XML.
- **CO2:** Define XML
- **CO3:** Identify Document Type Definitions
- **CO4:** List the different types of XML Schemas

Textbook And Reference Books:

1. Enterprest CORBA, Prentice Hall PTR by Dick Slama, Jason Gaurbis, Perry Russel.

Name of the Course	**Design of Embedded Systems**		
Course Code	**IT-7013**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Course Objectives:

- To have knowledge about the basic working of a microcontroller system and its programming in assembly language.
- To provide experience to integrate hardware and software for microcontroller applications systems

Section	**Course Content**
Section-A	Real Time Operating System overview, exposure to Windows CE, QNX, Micro Kernels and µc/OS of introduction to process models, Interrupt routines in an RTOs environment, encapsulating semaphores and queues, hard real-time scheduling consideration, saving memory space. 16 & 32 bit microprocessor and micro-controller and DSP hardware with reference to Embedded system.
Section-B	Embedded software development tools and compilers host and target machines, linker/locators for embedded software, cross compilers, cross assemblers and tool chairs, gce compiler, basic concept of device drivers, serial communication interface device driver.
Section-C	System synthesis of Hardware / Software co-emulation, Simulation speed of emulators, JTAG OCD.
Section-D	Communication protocol with special reference to embedded system, TCP/IP, VDP wireless protocol, IRDA, Blue tooth IEE 8.8.11.

Course Outcomes:
The students should be able to

CO1: Acquire knowledge about devices and buses used in embedded networking.
CO2: Develop programming skills in embedded systems for various applications.
CO3: Acquire knowledge about basic concepts of circuit emulators.
CO4: Acquire knowledge about Life cycle of embedded design and its testing.

Textbook And Reference Books

- An embedded system primer by David E. Simon, 1999, Addison- Wesley.
- TCP/IP Lean: Web Servers for embedded systems by Jeramy Bentham,2002.

2. Real – time programming: A guide to 32 bit embedded development, Rick Grchan,1999.

Name of the Course	**GIS/Remote Sensing**		
Course Code	**IT-7015**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Course Objectives:

- Acquire knowledge about concepts of Remote sensing, sensors and their characteristics.
- Gain skills in image analysis and interpretation in preparing thematic maps.
- Acquire knowledge in basic concepts of Photogrammetric and Mapping.

Section	**Course Content**
Section-A	Concepts and Foundations of Remote Sensing: Introduction, Energy Sources and Radiation Principles, energy Interactions in the Atmosphere, energy Interactions with Earth Surface Features, Data Acquisition and Interpretation, An Ideal Remote Sensing System, characteristics of Real Remote Sensing System, successful application of Remote Sensing, Land and Geographic Information Systems.
Section-B	Multispectral, Thermal and Hyper spectral Scanning: Introduction, Across-Track Multispecialty Scanning, Along-track Multispecialty Scanning, across – Track Thermal Scanning. Thermal Radiation principles Interpreting Thermal Scanner Imagery, geometry Characteristics of Across-Track Scanner Imagery, Radiometric Calibration of Thermal Scanners, Temperature Mapping with Thermal Scanner Data, FLR Systems, Imaging Spectrometry.
Section-C	Earth Resource Satellites Operating in the Optical Spectrum: Entry History of Space Imaging, Landsat Satellite Program, Orbit Characteristics of Landsat-1, -2 and –3, Sensor Onboard Landsat-1, -2 and –3, Landsat MSS image Interpretation, Orbit characteristics of Landsat-4 and –5, Sensors Onboard Landsat-4 and –5, Landsat TM Image Interpretation, Landsat-6 Planned Mission, Landsat ETM Image Simulation, Landsat-7, SPOT HRV Image Interpretation, APOT-4 and –5, Meteorological Satellites, Ocean Monitoring Satellites, Earth Observing system.

Section-D	Digital Image Processing: Image Rectification and Restoration, Image Enhancement, contrast Manipulation, spatial Feature Manipulation, Multi-Image Manipulation, Image Classification, Supervised classification, The Classification Stage, The Training Stage, Unsupervised Classification, The output Stage, Post classification Smoothing, Classification Accuracy Assessment, Data Merging and GIS Integration. Microwave Sensing: Introduction, Radar Development, SLAR System Operation, Spatial Resolution of SLAR system, Geometric Characteristics of SLAR Imagery.

Course Outcomes:

The students should be able to

CO1: Analyse the principles and components of photogrammetric and remote sensing.

SEMESTER-VIII

Name of the Course	**Data Warehouse andDataMining**		
Course Code	**IT-8001**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for thecourse.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators isallowed.

Course Objectives:

- This course will introduce the concepts of data ware house and data mining, which gives a complete description about the principles, used, architectures, applications, design and implementation of data mining and data ware housing concepts.

Section	**Course Content**
Section-A	Data ware housing Definition, usage and trends, DBMS vs. Data warehouse, data marts, metadata, Multidimensional data mode, data cubes, Schemas for Multidimensional database: stars, snowflakes and fact constellations. Data warehouse process & architecture, OLTP vs. OLAP, ROLAP vs. MOLAP types of OLAP, servers, 3 – Tier data warehouse architecture, distributed and virtual data warehouses, data warehouse manager.
Section-B	Data mining definition & task, KDD versus data mining, data mining techniques, tools and applications**,**DBMS versus Data Mining,Data Mining application areas,Issues and challenges in Data Mining. Data mining query languages, data specification, specifying knowledge, hierarchy specification, pattern presentation & visualization specification, Data mining techniques, tools and applications. Association rules, apriorl algorithm
Section-C	Clustering techniques:Clusteringparadigms,partitionalgorithm,hierarchical clustering, Decision tree knowledge discovery through neural Networks & Generic Algorithm, Rough Sets, Support Victor Machines and Fuzzy techniques.
Section-D	Mining Complex data objects, Spatial databases, Multimedia databases, Time series and sequence data; mining text Databases and mining World Wide Web.

Course Outcomes:
The students should be able to
CO1: Understand the functionality of the various data mining and data warehousing

component

CO2: Appreciate the strengths and limitations of various data mining and data warehousing models

CO3: Explain the analyzing techniques of various data

CO4: Describe different methodologies used in data mining and data ware housing.

Textbook And Reference Books:

1. Data warehousing in Real World; Sam Anahory& Dennis Murray; 1997, Pearson
2. DataMining–Concepts&Techniques;JiaweiHan&MichelineKamber–
3. 2001, Morgan Kaufmann.
4. Data Mining Techniques; Arun Pujar; 2001, University Press;Hyderabad.
5. Data Mining; Pieter Adriaans&DolfZantinge; 1997,Pearson
6. Data Warehousing, Data Mining and OLAP; Alex Berson, 1997, McGrawHill
7. Data Warehousing System; Mallach;2000, McGrawHill
8. Building the Data Warehouses; W.H. Longhman, C.Klelly, John Wiley & Sons.
9. Developing the Data Warehouses; W.H. Longhman, C.Klelly, John Wiley & Sons.
10. Managing the Data Warehouses; W.H. Longhman, C.Klelly, John Wiley & Sons.
11. Decision support Systems & Data Warehouses, Ravindernath, B., New Age International Publishers, New Delhi.

Name of the Course	**Project-II**		
Course Code	**IT-8004**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters/ For Candidates:
Viva-voce examination will be related to the project executed by the candidate during the course of semester.

Aim of the project:

Project is one of the culmination points of the learning process, which puts to test the acquired ability of the candidate to independently take charge of the project or system development. The effort should be made to open up a window of opportunity with the industry the project can proceed in three steps using software engineering methodology
Preparation of required document Preparation of Design Document
Writing of Code and its testing with demonstration cases.
An Effort should be made by the institute faculty to liaison with the industry and conduct three reviews to meet the dead lines and satisfactory completion of the project.

Following format for documentation for the project be followed:

Forwarding Page

1. Title of the Project
2. Objectives.
3. Definitions of KeyTerm
   - ❖ Approach to Problemsolving
   - ❖ Limitations. Ifany
4. OutputGenerated
5. Details of Hardware platformused
6. Details of software Toolsused
7. Implementation Issues (Clearly defining the area ofApplication)
8. Miscellaneous
9. Signature of Candidate &date

Project-II Recommended Chapters/sections (Not Mandatory but only Guidelines)

1. Microscopic Summary
2. Details of candidate and Supervisor along with certificateof
   - ❖ Originalwork;
   - ❖ Assistance. Ifany;
   - ❖ Credits;
3. Aims andObjectives

4. Approach to project and TimeFrame
5. Project Design Description with Appendices tocover
   - ❖ Flow Charts/ Data Flow diagram- Macro/ Micro Level
   - ❖ Source Code; If any
   - ❖ Hardware platform
   - ❖ Software tools;
   - ❖ SecurityMeasures
   - ❖ QualityAssurance
   - ❖ Auditability
6. Test Date and Result

Study of writing and presentation must follow the guidelines for effective3 technical writing. Times for submission.

Project must be submitted by the day of last paper in semester end examination Seminar/ Viva a comprehensive seminar/ viva-voce should be conducted as part of evaluation.

❖At the time of seminar/ viva-voce the industry guide/ supervisor may be invited.

Name of the Course	**General Proficiency**		
Course Code	**IT-8016**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters/ For Candidates:

Aim of this course is to judge the overall development of the candidate as a professional in the respective branch of skill and fitness to the profession
To test the general fitness of candidate for the pr4ofession of Engineering
A comprehensive viva-voce examination will be conducted by a committee of five members of the institute.
Director/ Principal of the institute
Head of the concerned branch of Engineering.
An eminent professional from industry/ Public Sector/ Technical; Institute nominated by the Director/ Principal.
A member drawn from among the faculty of Applied Science & Humanities.
A Faculty member of the concerned branch of engineering.

The topic of the Group Discussion will decided by the Committee as C
Due weightage be given to technical papers presented at National, International level, Prizes won by the candidate both in curricular and extra curricular activities. Extra curricular activities should include participation in clubs, NCC/ NSS organizational capacity, physical education, Yoga, community service, Technology for a common man and overall conduct.

OPEN ELECTIVES

Name of the Course	**Communication System**		
Course Code	**EC-8020**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Course Objectives:

- The main objective of this course is to understand and implement the basic analog and digital communication techniques/ circuits with the help of theoretical and practical problem solving.

Section	**Course Content**
Section-A	PULSE COMMUNICATION: Information In a communication system, coding, noise in an information carrying channel, Types of pulse modulation, Pulse Amplitude modulation (PAM), Pulse Width Modulation (PWM), Pulse Position Modulation (PPM), Pulse code Modulation (PCM), Telegraphy (& Telex), Telemetry.
Section-B	BROADBAND COMMUNICATION SYSTEMS: Frequency division multiplexing, Time division multiplexing, Short & Medium Haul systems – Coaxial Cables, Fiber Optic Links, Microwave Links, Tropospheric scatter links, Long Haul Systems – Submarine cables, Satellite communications.
Section-C	SATELLITE COMMUNICATION: Introduction, Orbits, Station keeping, Orientation of Satellite, Transmission Path, It's losses & noise consideration, Satellite Systems, Saturation flux Density, effective Isotropic radiated Power, SPADE,TDMA.
Section-D	FIBER OPTIC COMMUNICATION: Introduction, Principle of light transmission in a fiber, Effect of Index profile on Propagation, Modes Of propagation, Number of modes via fiber, Single mode propagation, Rayleigh scattering losses, Absorption losses, mode coupling losses, bending losses, combined losses. Effects of Dispersion on Pulse Transmission, intermodal dispersion, material dispersion, waveguide dispersion, total dispersion, fiber optic communication system.

Course Outcomes:

The students should be able to

CO1: Basic working of communication system

CO2: Analog Modulation Techniques and their comparative analysis and applications suitability.

CO3: Process of Modulation and Demodulation.

CO4: Types, characterization and performance parameters of transmission channels.

CO5: Analog to digital conversion and Digital data transmission.

CO6: Multiplexing Techniques.

CO7: Basic working principles of existing and advanced communication technologies

Textbook And Reference Books:

1. Electronics communication systems by Kennedy & Davis,TMH.
2. Electronics Communication by Dennis Roddy & JohnCoolen.

Name of the Course	**Non-Conventional Electrical Power Generation**		
Course Code	**EE-8008**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Course Objectives:

- To exploit renewable energy resources and effective technologies.

Section	Course Content
Section-A	**Energy situation and renewable energy sources:** Global Energy scenario, World Energy consumption, Energy in developing countries, fire wood crisis, Indian energy scene, Non conventional renewable energy sources, potential of renewable energy sources.
Section-B	**Wind Energy**: Origin of wind, Basic principle of wind energy, conversion, component of wind energy conversion system, type of windmills, Wind electrical Generations in India. **Solar Energy:** Introduction, solar radiation, solar energy collector, solar thermal power generation, low temperature application of solar energy.
Section-C	**Geo-thermal Power Plants**: Introduction, Geothermal sources, comparison of Geo thermal energy with other energy forms, development of Geothermal power in India. **Physical and thermochemical methods of bioconversion**: Introduction, biomass definition and potential, physical method of bio conversion, thermo chemical methods.
Section-D	**Wave, Tidal and OTEC:** Introduction, Basic principle of tidal power, Wave energy, component of Tidal power plant, Ocean Thermal Energy Conversions, advantages and disadvantages of tidal power generation. **Small and Mini Hydro power System**: Introduction, site development, generation and electrical equipment, system of regulation of Hydroelectric Power in India.

Course Outcomes:
The students should be able to

CO1:	Demonstrate the generation of electricity from various Non-Conventional sources of energy, have a working knowledge on types of fuel cells.
CO2:	Estimate the solar energy, Utilization of it, Principles involved in solar energy collection and conversion of it to electricity generation.

Textbook And Reference Books:

1. Renewable Energy Sources – MaheshwarDyal.
2. Small and mini Hydropower system by Tata Mc GrawHill.
3. An Introduction to power plant technology –G.D.Rai.
4. Solar Energy – Suhas.P.Sukhatma, Tata Mc GrawHill.
5. Modern Power Plant Engg. –Joel

Name of the Course	**Energy Assessment And Auditing**		
Course Code	**EE-8009**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Course Objectives:

- To impart basic knowledge to the students about current energy scenario, energy conservation, audit and management.
- To inculcate among the students systematic knowledge and skill about assessing the energy efficiency, energy auditing and energy management

Section	**Course Content**
Section-A	**ENERGY MANAGEMENT PRINCIPLES**: Systems of Energy flow, principles of Energy flow and Energy conservation, Energy and money, Energy and growth, flow of energy in ecological system, Energy efficiency and demand side management (DSM), Economic evaluation.
Section-B	**ENERGY AUDIT**: Concepts and benefits of Energy Audit, Types of Energy Audits, National Energy Plan and its impact on energy conservation, Energy accounting and analysis, Energy audits of building systems, electrical systems, maintenance and energy audits.
Section-C	**MEASURING INSTRUMENTS**: Temperature measuring instruments, combustion system measuring instruments, measurement of heating, ventilation and air conditioning system performance.
Section-D	**ENERGY CONSERVATION IN INDIAN SCENARIO:** Energy demand and consumption in Indian industries, potential for energy efficiency in Indian industry, government's role in energy conservation and energy efficiency, Energy conservation techniques – conservation in energy intensive industries, economic evaluation of conservation techniques.

Course Outcomes:
The students should be able to

CO1: Students will be able to use the *energy audit* methods learnt to identify the areas deserving tighter control to save *energy* expenditure. Students will be able to carry out the cost- benefit analysis of various investment alternatives for meeting the *energy* needs of the organization.
Textbook And Reference Books: **1.** Handbook of Energy Audits by Albert Thuman– Fairman PressInc. **2.** Energy basis for man and nature by Howard T.Odum&Elisbeth.C.Odum

Name of the Course	**Computer Software Testing**		
Course Code	**CS-8020**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Course Objectives:

- To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
- To discuss various software testing issues and solutions in software unit test; integration, regression, and system testing.
- To learn how to planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, generate a testing report.
- To expose the advanced software testing topics, such as object-oriented software testing methods, and component-based software testing issues, challenges, and solutions.
- To gain software testing experience by applying software testing knowledge and methods to practice-oriented software testing projects.

Section	**Course Content**
Section-A	**Fundamentals of Testing types**: First, second and later cycles of testing. Objectives and limits of testing. Overview of S/W development stages, Planning and Design stages and testing during these stages. Glass box code, Regression and Black box testing Software errors, Categories of software error. **Reporting and analyzing bugs**: Problem reports, Content and characteristics of Problem Report, analysis and tactics for analyzing a reproducible bug. Making a bug reproducible.
Section-B	**Problem Tracking System:** Objective of Problem Tracking system, tasks of the system, problem tracking overview, users of the tracking system, mechanics of the database. **Test Case Design:** Characteristics of a good test, equivalence classes and boundary values, visible state transitions, Race condition and other time dependencies, load testing, Error guessing, Function equivalence testing, Regression testing, General issues in configuring testing, printer testing

Section-C	**Localization and User Manual testing:** Translated test expands, Character sets, keyboards, Text filters, Loading, saving, importing and exporting high and low ASCII, Operating system language, Hot keys, Error message identifiers, Hyphenation rules, Spelling rules, Sorting rules, Uppercase and lower case conversion, Printers, Sizes of paper, CPU's and video, Rodents Data formats and setup options, Rulers and measurements, Culture-bound Graphics and output, European product compatibility, Memory availability, automated testing, Testing user manuals, Effective documentation, documentation tester's objective, How testing documentation contributes to software reliability.
Section-D	**Testing Tools and Test Planning:** Fundamental tools, Automated acceptance and regression standards, Translucent box testing, Overall objective of the test plan: Product or tool? Detailed objective, type of test, strategy for developing components of test planning documents, components of test planning documents, documenting test materials.

Course Outcomes: The students should be able to

- **CO1:** Have an ability to apply software testing knowledge and engineering methods.
- **CO2:** Have an ability to design and conduct a software test process for a software testing project.
- **CO3:** Have an ability to identify the needs of software test automation, and define and develop a test tool to support test automation.
- **CO4:** Have an ability understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods.
- **CO5:** Have an ability to use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects.

Textbook And Reference Books:

1. Testing Computer Software, by CemKanern , Jack Falk, Hunk Quoe Nguyen,1999, Pub:Wiley,(Second edition).

Name of the Course	**Computer Networks and Security**		
Course Code	**CS-8021**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Course Objectives:
- ❖To develop an understanding of computer networking basics.
- ❖To develop an understanding of different components of computer networks, various protocols, modern technologies and their applications

Section	**Course Content**
Section-A	**Introduction to computer networks**: Uses of computer networks, Types, LAN, MAN, WAN, wireless networks, Network Topologies, Networks software, Protocol hierarchies, design issues of layers interfaces and services, The OSI reference model, The TCP/IP reference model. Transmission media, Wireless transmission.
Section-B	Narrow band ISDN, Broadband ISDN and ATM, Virtual circuit switching, Types of switching. Elementary data link protocol- an Unrestricted simplex protocol, a simplex stop and wait protocol, sliding window protocol, a protocol using Go back-N, a protocol using selective repeat. IEEE standards 802.3 and Ethernet, IEEE standard 802.4 token bus, IEEE standard 802.5 token ring.
Section-C	**Network security:** Basic encryption and decryption- Ecryption, decryption and cryptosystems, Plain text and Cipher text, Encryption Algorithms, Cryptanalysis. **Introduction to Ciphers:** Monoalphabatic substitutions such as Caesar Cipher, Cryptanalysis of Monoalphabatic Ciphers, Polyalphabatic Ciphers such as Vigenere Tableaux, Cryptanalysis of Polyalphabatic Ciphers, Perfect substitution Cipher such as Cryptanalysis of Monoalphabatic Ciphers, Verman Cipher, Stream and BlockCipher.
Section-D	**Operating System, Database and Program Security: O**perating system security-Security policies, Models of security, Security features of ordinary operating system, Security features of trusted Operating system.

	Database Security: Security requirements of database, Reliability and Integrity, Protection of sensitive data, Inference problem: Direct and Indirect attacks. **Program security:** Kinds of malacious code, How viruses attach and gain control, Homes for viruses, Virus signatures, Preventing virus infection.

Course Outcomes:

The students should be able to

- **CO1:** identify some of the factors driving the need for network security
- **CO2:** identify and classify particular examples of attacks
- **CO3:** define the terms vulnerability, threat and attack
- **CO4:** identify physical points of vulnerability in simple networks
- **CO5:** compare and contrast symmetric and asymmetric encryption systems and their vulnerability to attack, and explain the characteristics of hybrid systems.

Textbook And Reference Books:

1. Computer Networks by Tenanbaum(3rd Edition)
2. Data ans computer communication byBlack
3. Data communication and Networking byFORAUZAN
4. "Security in Computing(Second edition)", Charles P. Pfleeger, 1996, Prentic-Hall International,Inc.,
5. "Appliec Cryptography protocols, Algorithms, and Source code in C(Second Edition)", Bruce Schneier, 19975, John Wiley and Sons,inc.,
6. "The World Wide Web Security FAQ", World Wide Web Consortism, [online] Available athttp://www.w3.org/Security/Faq/www-securityfaq.html
7. Cryptographic Message Syntax Standards, RSA Laboratories,[online] Available athttp://www.rsasecurity.com/rsalabs/pkcs/pkcs-7/index.html

Name of the Course	**ENTREPRENEURIAL DEVELOPMENT & NEW ENTERPRISE MANAGEMENT**		
Course Code	**HU-8020**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Course Objectives:

- Acquire necessary knowledge and skills required for organizing and carrying out entrepreneurial activities, to develop the ability of analysing and understanding business situations in which entrepreneurs act.

Section	**Course Content**
Section-A	Developing Entrepreneurship: Element for program. Developing Entrepreneurship competencies: Need & process of development, social determinants of Entrepreneurship growth. Entrepreneurship development programs. Entrepreneurship orientation & awareness programme. New enterprise creation programme.
Section-B	Existing Entrepreneurship programmes for existing enterprising for survival & growth. Evolution of various EDP programme in India. Managing growth & transition, the organization life cycle, chasing Entrepreneurship roles.
Section-C	Entrepreneurship & new venture opportunities. Planning for new ventures. Concept of planning paradigm – pre-start-up, early growth & later growth stage.
Section-D	Incentive & subsidies available for Entrepreneurship growth. Guidance for project report preparation. Location, Environmental and managerial problems of new enterprise management. Managing family business. Some case studies of family run business in India.

Course Outcomes:

The students should be able to

CO1: Master oral and visual presentation skills and establish a foundation of confidence in the skills necessary to cause others to act.

CO2: Entrepreneurship and Innovation minors will be able to find problems worth solving.

Text Books:

3. Qian, X., Koerner, R., and Gray, D.H., Geotechnical Aspects of Landfill Design and Construction, Prentice Hall, 2002.
4. Datta, M., Waste Disposal in Engineered Landfills, Narosa Publishers, 1998.
5. Gulhati, S.K. and Datta M., Geotechnical Engineering, McGraw Hill, 2005.

Reference Books:

1. Daniel, D.E., Geotechnical Practice for Waste Disposal, Chapman and Hall, 1993.
2. Sarsby, R., Environmental Geotechnics, Thomas Telford, 2000.
3. Bagchi, A., Design, Construction and Monitoring of Landfills, Wiley Interscience, 1994.
4. Vick, S.G., Planning, Analysis and Design of Tailings Dams, John Wiley & Sons, 1970
5. Yong, R. N., Catheriene, M and Fukue, M,Geoenvironmental Sustainability, CRC Press, 2007.

Name of the Course	**Accounts And Financial Management**		
Course Code	**HU-8021**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Course Objectives:

- Provide an in-depth view of the process in financial management of the firm.
- Develop knowledge on the allocation, management and funding of financial resources

Section	**Course Content**
Section-A	**Accounting:** Principle, Concepts and conventions, double entry system of accounting, introduction of basic books of accounts of sole proprietary concern, control accounts for debtors and creditors, closing of books of accounts and preparation of trial balance. **Final Accounts:** Trading, Profit and Loss Accounts and balance sheet ofsole proprietary concern with normal closing entries. Introduction to manufacturing account, Final accounts of Partnership firms, Limited company.
Section-B	**Financial Management:** Meaning and role. **Ration Analysis:** Meaning, advantages, limitations, types of rations and their usefulness. **Fund Flow Statement:** Meaning of the terms – fund flow and fund working capital cycle, preparation and interpretation of the fund flow statement
Section-C	**Costing:** Nature, Importance and basic principles, Budget and budgetary control: Nature and scope, importance, method of finalization of master budget and functional budgets. **Marginal Costing:** Nature, Scope and importance, break – even analysis, its uses and limitations, construction of break-even chart, practical application of marginal costing.
Section-D	**Standard Costing:** Nature and Scope, Computational and analysis of variances with reference to material cost, labor cost and overhead cost, interpretation of the variances.

	Introduction to computerized accounting system: coding logic and codes required, master files transaction files; introduction to documents used for data collection, processing of different file sand output obtained

Course Outcomes:

The students should be able to

CO1: Demonstrate an understanding of the overall role and importance of the finance function. Demonstrate basic finance management knowledge.

CO2: Communicate effectively using standard business terminology.

Textbook And Reference Books:

1. Kellock, J.: Elements of Accounting, Heinemann,1978.
2. Rockely, L.E.: Finance for the Non-Accountant, 2nd Edition, and basic books,1976.
3. Levy, and Sarnet: Principle of Financial Management, Prentice – Hall International.

Name of the Course	**Total Quality Management**		
Course Code	**HU-8022**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed

Course Objectives:

- To formulate machine learning problems corresponding to different applications

Section	Course Content
Section-A	Introduction to TQM & ISO 9000, Total Quality Control, Customer Focus & Total waste Elimination (TWE), Quality Assurance Quality of Design & Development, Inspection & Measurement workforce Teams, Benchmarking, TQM for Sales Marketing Management.
Section-B	Business Process Re-engineering & Information Technology, Quality control SQC/ SPC, Technology & Product Quality, Quality for After Sales Services Technology & Product Quality.
Section-C	Organization for Quality, Reliability as quality characteristics, Quality leadership, Quality linked productivity, Total Quality, Culture, Quality and environment, Cost of Quality
Section-D	Cost of Quality, Quality Control for Export Units, Quality Maturity and Discipline, Total commitment for Quality, TQM Implementation, ISOm 9000 series of standards, ISO 9000-1, ISO 9000-2, ISO 9000-3.

Course Outcomes:

The students should be able to

CO1: Tell basic concepts of Total Quality Management. Outline characteristics of Total Quality Management. Explain the basic philosophy of Total Quality Management. Identify concepts

Textbook And Reference Books:

1. TQM & ISO 14000:K.C.Arora.
2. Total Quality Control: Armand V.Feigenbaum.

3. Total Quality Management: Joseph.A.Patrick,Diana.S.Furr.
4. Total Quality Management – Text: Joel E. Ross Cases &Readin
5. Total Quality Control Essentials: Sarv SinghSoin

Name of the Course	**ADVANCED OPERATIONS RESEARCH**		
Course Code	**ME-8019**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Course Objectives:

- Develop ability in the students to understand and analyze managerial problems in industry so that they are able to use resources (capitals, materials, staffing, and machines) more effectively, formulate mathematical models for quantitative analysis of managerial problems.

Section	Course Content
Section-A	**Introduction to Operations Research** Formulation of problems, simplex method problem of degenerals, dual simplex method revised simplex method, bounded variable problems. **Integer Programming** Graphical method, the branch and bound technique, Gomary's ALL-IPP method, transportation model, unbalance in transportation, transhipment problem, and sensitivity analysis in transportation problems.
Section-B	**Dynamic Programming** Bellman's principle of optimality, examples on the application on routing problem, inventory problem, simplex problem, marketing problem. **Network Analysis** PERT and CPM, probability of achieving completion data, cost analysis, graph reduction theory, updating, resource allocation, resource smoothing.
Section-C	**Inventory Method:** Variables in an inventory problem, inventory problem, inventory models with penalty, storage and quantity discount, safety stock, inventory models with probability, demand, multi item deterministic model. **Queuing Theory** Poison arrivals and exponential service times, waiting time and idle time cost, single channel multi channel problem. Monte technique applied to queuing problems, Poisson arrivals and service time.

Section-D	**Decision Theory Game** Examples on the application of theory of games 2 XM and MX2 Problems, graphic dominance and linear programming method for different problems, decision trees **Replacement Models** Replacement of items that deteriorate, gradually, fail suddenly, group placement policy, concept of system reliability.

Course Outcomes:

The students should be able to

CO1: Can built and discuss solution methods of Integer Linear Programming.
CO2: Solve integer programming model with branch-and-bound technique.
CO3: Explain the use of integer programming problems.
CO4: Can built and disuss solution methods of Assignment problems.
CO5: Can built and disuss solution methods of Network problems.

Text Books:

1. Kumar Gupta, Prem and Hira, D.S., "Operations Research", S Chand & Company Limited,1986.
2. warup, Kanti, Gupta, P.K. and Manmohan, "Operations Research", Sultan Chand & Sons, New Delhi1988.
3. Srinath L.S., "PERT & CPM Principles and Applications", Affiliate East West Press (P) Limited, New Delhi,1975.

Name of the Course	**INDUSTRIALMANAGEMENT**		
Course Code	**ME-8020**	Credits-4	L-3, T-1, P-0
Total Lectures	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates: **:**
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Course Objectives:

- ❖Contribute to the success of companies through effective problem solving. Design, develop, implement, and improve integrated systems that include people, materials, information, equipment, and environments

Section	**Course Content**
Section-A	**Management Concept** Management, administration, organization, Difference and relationship between management, administration and organization. Types of organization. Characteristics of management. Origin of principles of management. Beginning of scientific management. Scientific management, principles of management, functions of management, management development. **Personnel Management, Union and industrial relations** Definition and concept. Aims, objectives or functions or personnel management. Principles of good personnel policy. Recruitment and selection of employees. Safety engineering, labour welfare, Promotion, transfer, lay-off and discharge. Trade unions, industrial disputes, settlement of industrial disputes, collective bargaining, union-management relations.
Section-B	**Material, purchase and stores management.** Material management, purchase and procurement, Purchase organization, purchasing procedure. Stores and material control. Receipts and issue of materials. Store records. **Inventory control and management** Inventory, inventory – control, classification, management. Objectives of inventory control, functions of inventories, Economic order quantity, ABC analysis, material requirement planning.

Section-C	**Financial Management** Concept and definition. Purpose of investment. Types of capital. Sources of finance. Book – keeping, terms used in book – keeping. Assets and liabilities. The journal and the ledger. Trading account, capitalization, capital structure, difference between capital, capitalization and capital structure. **Sales and marketing management** Sales management, sales organization, function of sales department, Selling concept v/s marketing concept. Marketing – definition, principles and functions. Marketing research, sales forecasting. Sales promotion. Advertising, international Advertising.
Section-D	**Management by objectives** Definition and concept, objectives. Steps in setting up MBO, advantages of MBO, limitations of MBO. **Management information system** Definition, evolution of MIS, Need/objectives/functions of MIS. Difference between data and information. Need for information, information as an organizational resource. Management information categories. Designing information system. Computer system, components of computer system, integrated information system. Applications of MIS, future ofMIS.

Course Outcomes:

The students should be able to

CO1: After the course the student shall be able to describe basic concepts and theories within the area of industrial management

Textbook And Reference Books:

1. Industrial Management; Spregiel Johan N. York1961
2. Industrial Organization; Kimbell & Kimbell Vakils Fefter& Simons Pvt Ltd. Bombay1971

Name of the Course	**Optimization Methods For Engineering System**		
Course Code	**ME-8021**	Credits-3	L-3, T-1, P-0
Total Lectures	**52 (1 Hr Each) (L = 39, T = 13 for each semester**		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators isallowed

Course Objectives:

CO1: Learn classical optimization techniques and numerical methods of optimization.
CO2: Know the basics of different evolutionary algorithms.
CO3: Explain Integer programming techniques and apply different optimization techniques to solve various models arising from engineering areas.

Section	Course Content
Section-A	Introduction: Engineering Application; Statement of the Optimal Problem; Classification; Optimization Techniques; Classical Method: Single Variable Optimization; Multivariable Optimization Without any Constraints with Equality and Inequality Constraints
Section-B	One-Dimensional Minimization Method: Unimodal Function; Elimination Method Dichotomous Search, Fibonocci and Golden Method; Interpolation Method – Quadratic and Cubic Interpolation Method. Unconstrained Minimization Method: Univariate, Conjugate Directions, Gradient And Variable Metric Method
Section-C	Constrained Minimization Method: Characteristics of a constrained problem; Direct Method of feasible directions; Indirect Method of interior and exterior penalty functions. Geometric Programming: Formulation and Solutions of Unconstrained and Constrained geometric programming problem.
Section-D	Dynamic Programming: Concept of Sub-optimization and the principal of optimality: Calculus, Tabular and Computational Method in Dynamic Programming: An Introduction to Continuous Dynamic Programming. Integer Programming :Gomory's Cutting Plane Method for Integer Linear

	Programming; Formulation & Solution of Integer Polynomial and Non- Linear problems.

Course Outcomes:

The students should be able to

CO1: Explain the fundamental knowledge of Linear Programming and Dynamic Programming problems.

CO2: Use classical optimization techniques and numerical methods of optimization.

Text Books:

1. Optimization (Theory & Application)- S.S. Rao, Wiley Eastern Ltd, New Delhi.
2. Optimization Concepts and Applications in Engineering – Ashok D.Belegundu and Tirupathi R Chandrupatla – Pearson Education 1999, First India Reprint2002.
3. Optimization: Theory and Practice, C.S.G. Beveridge and R.S. Schechter, McGraw Hill, New York.

Reference Books:

1. Daniel, D.E., Geotechnical Practice for Waste Disposal, Chapman and Hall, 1993.
2. Sarsby, R., Environmental Geotechnics, Thomas Telford, 2000.
3. Bagchi, A., Design, Construction and Monitoring of Landfills, Wiley Interscience, 1994.
4. Vick, S.G., Planning, Analysis and Design of Tailings Dams, John Wiley & Sons, 1970
5. Yong, R. N., Catheriene, M and Fukue, M,Geoenvironmental Sustainability, CRC Press, 2007.

PROFESSIONAL ELECTIVES-II

Name of the Course	**GPS and application**		
Course Code	**IT-8006**	Credits-3	L-3, T-1, P-0
Total Lectures	**52 (1 Hr Each) (L = 39, T = 13 for each semester**		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course

For Candidates: **:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Course Objectives:

- This course introduces the fundamental and advanced concepts, and applications of Global Positioning System (GPS)

Section	**Course Content**
Section-A	**Introduction:** Overview of techniques of surveying with satellites, introduction to GPS System, applications of using satellites and GPS for 3D position, velocity, determination as a function of time, interdisciplinary applications (e.g., crystal dynamics, user segment, history of GPS constellation, GPS measurement characteristics, selective availability (SA) and antispoofing (AS).
Section-B	**Satellite orbits and Reference Systems:** Two –Body problem, orbit elements, time system and time transfer using GPS, coordinate systems, GPS orbit design, orbit determination problem, tracking networks, GPS force and measurement models for orbit determination, GPS broadcast ephemeris, precise GPS ephemeris. GPS Observable: Measurement types (C/A code, P-code, L1 and L2 frequencies for navigation, pseudoranges), atmospheric delays (tropospheric and ionospheric), data format(RINEX), data combination (narrow/ wide lane combinations, ionosphere – free combinations, single-, double-, triple – differences), undifferenced models, carrier phase vs integrated Doppler, integer biases, cycle slips, clockerror.
Section-C	**Processing Techniques:** Pseudorange and carrier phase processing, ambiguity removal, least squares method for state parameter determination, relative positioning, and dilution of precision.
Section-D	**Surveying with GPS:** Kinematics positioning, differential GPS (DGPS):

	Traditional DGPS, wide Area Differential GPS (WADGPS), Wide Area Augmentation System (WAAS). GPS Applications: Surveying, geophysics, geodesy, airborne GPS, ground –transportation, space borne GPS orbit determination, attitude control, meteorological and climate research using GPS.

Course Outcomes:

The students should be able to

CO1: Calculate GPS satellite orbit positions and velocities.
CO2: Calculate user position using GPS pseudorange data.
CO3: Calculate and analyze error sources for GPS user position calculations.
CO4: Correct GPS user position errors by using local area Differential GPS.

Text Books:

1. A. Leick: GPS Satellite surveying, 2nd edition, John Wiley * Sons1995.
2. B. Parkinson, J. Spilker: GPS: Theory and Applications, Jr. (Eds), Vol. I & II, AIAA, 370 L Enfant Promensale SW,Washington.
3. A. Kleusberb and P. Teunnisen (Eds): GPS for Geodesy, Springer – Verlag, 1996
4. Elliott D. Kaplan: Understanding GPS – Principles and Applications, Publisher: Artech House, Published: March1996.
5. B. Hofmann – Wellenhof, H. Lichenegger and J. Collins: GPS: Theory and Practice, 4thRevised Edition ($25), Springer, Wien, New York,1997.

Scottie Barnes, Lafe Low: GPS Basic Essentials – Globe Pequot Press.

Name of the Course	**Mobile Computing**		
Course Code	**IT-8007**	Credits-3	L-3, T-1, P-0
Total Lectures	**52 (1 Hr Each) (L = 39, T = 13 for each semester**		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50
Instructions			
For Paper Setters: The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for thecourse.			
For Candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.			

(TITLE APPROVED CONTENTS TO BE DECIDED LATER)

Name of the Course	**Neural Networks**		
Course Code	**ES-8001**	Credits-3	L-3, T-1, P-0
Total Lectures	**52 (1 Hr Each) (L = 39, T = 13 for each semester**		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters: The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Course Objectives:

- The goal of neural network research is to realize an artificial intelligent system using the human brain as the model.

Section	Course Content
Section-A	Overview of biological neurons: Structure of biological neurons relevant to ANNS. Fundamental concepts of Artificial Neural Networks: Models of ANNS; Fees forward & feedback networks; learning rules; Hebbian learning rule, perception learning rule, delta learning rule, Widrow-Hoff learning rule, correction learning rule, Winner-take all learning rule etc.
Section-B	Single layer Perception classifier: Classification model, Features & Decision regions; training & classification using discrete perception, algorithm, single layer continuous perception networks for linearly separable classifications. Multiplayer Feed forward Networks: linearly non-separable pattern classification, Delta learning rule for multi perception layer. Generalized delta-learning rule. Error back-propagation training, learning factors. Examples
Section-C	Single layer feedback Networks: Basic concepts Hopfield networks, training & Examples. Associative Memories: Linear Association, Basic Concepts of recurrent Auto associative memory: retrieval algorithm, storage algorithm; By directional associative memory, architecture, Association encoding & decoding, Stability.
Section-D	**Self Organizing Networks:** Unsupervised learning of clusters, winner – take – all learning, recall mode, Initialization of weights, severability limitations of weights, severability limitations

Course Outcomes:

The students should be able to

CO1: Understand the context of neural networks and deep learning.

CO2:	Know how to use a neural network.
CO3:	Understand the data needs of deep learning.
CO4:	Have a working knowledge of neural networks and deep learning.
CO5:	Explore the parameters for neural networks

Text Books:

1. Introduction to Artificial Neural System by Jacek M. zurada, 1994, Jaico Publ. House.
2. "Neural Networks: A Comprehensive formulation", SimonHeykin,1998,AW.
3. "Neural Networks", Kosko,1992, PHI
4. "Neural Networks Fundamentals – N.K.Bose, P.Liang,2002.T.M.H.

Name of the Course	**Multilingual Applications**		
Course Code	**IT-8008**	Credits-3	L-3, T-1, P-0
Total Lectures	**52 (1 Hr Each) (L = 39, T = 13 for each semester**		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50
Instructions			
For Paper Setters: The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for thecourse.			
For Candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed			

(TITLE APPROVED CONTENTS TO BE DECIDED LATER)

Name of the Course	**Speech Image& Coding**		
Course Code	**IT-8009**	Credits-3	L-3, T-1, P-0
Total Lectures	**52 (1 Hr Each) (L = 39, T = 13 for each semester**		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50
Instructions			
For Paper Setters: The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for thecourse			
For Candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators isallowed.			

(TITLE APPROVED CONTENTS TO BE DECIDED LATER)

Name of the Course	**Digital Image Processing**		
Course Code	**IT-8011**	Credits-3	L-3, T-1, P-0
Total Lectures	**52 (1 Hr Each) (L = 39, T = 13 for each semester**		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For Candidates:
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Course Objectives:

- To introduce the concepts of image processing and basic analytical methods to be used in image processing.
- To familiarize students with image enhancement and restoration techniques
- To explain different image compression techniques.
- To introduce segmentation and morphological processing techniques.

Section	Course Content
Section-A	**Introduction and Fundamentals to Digital Image Processing:** What is Digital Image Processing, Origin of Digital Image processing, Example that use Digital Image processing, Fundamental steps in Digital Image processing, Components of Digital Image processing system, Image sensing and acquisition, Image sampling, quantization and representation, Basic relationship betweenpixels. Image Enhancement in the Spatial Domain & Frequency domain: Background, Basic gray level transformation, Histogram processing, Basics of Spatial filtering, Smoothing and Sharpening spatial filters, Introduction to Fourier Transform and the Frequency Domain, Discrete Fourier Transform, Smoothing and Sharpening Frequency – Domain filters.
Section-B	**Image Restoration:** Image Degradation/ Restoration Process, Noise models, restoration in presence of noise, Inverse filtering, Minimum mean Square Filtering, geometric menu filter,Geometric transformations. **Colour Image Processing:** Colour Fundamentals, colour models, Basis of full colour image processing, Colour transformations.
Section-C	Image Compression: Fundamentals, Image compression models, Error

	free compression, Lossy compression. Image Segmentation: Detection of Discontinuities. Edge linking and boundary detection, Thresholding, Region oriented segmentation.
Section-D	**Representation, Description and Recognition:** Representation-chain codes, polygonal approximation and skeltons, boundary descriptors-simple descriptor, shape numbers, regional descriptor-simple , topological descriptor, Pattern and Pattern classes – Recognition based on matching techniques. **Recognition:** Pattern and Pattern classes, Decision – Theoretic Methods.

Course Outcomes:

The students should be able to

- **CO1:** Understand the need for image transforms different types of image transforms and their properties.
- **CO2:** Develop any image processing application.
- **CO3:** Understand the rapid advances in Machine vision.
- **CO4:** Learn different techniques employed for the enhancement of images.
- **CO5:** Learn different causes for image degradation and overview of image restoration techniques.
- **CO6:** Understand the need for image compression and to learn the spatial and frequ ency domain techniques of image compression.
- **CO7:** learn different feature extraction techniques for image analysis and recognition

Textbook And Reference Books:

1. Digital Image Processing by Rafael C. Gonzalez &Ricahrd E. Woods-2002, Pearson Education Pvt.Ltd.
2. Digital Image Processing by A.K.Jain, 1995,PHI
3. Two-Tone Image Processing and Recognition, B.B. Choudhari, D.Dutta Majumdar, New Age International Publishers Ltd., NewDelhi

Name of the Course	**Bioinformatics**		
Course Code	**IT-80115**	Credits-3	L-3, T-1, P-0
Total Lectures	**52 (1 Hr Each) (L = 39, T = 13 for each semester**		
Semester End Examination	Max Marks: 100	Min. Pass Marks: 40	Max. Time: 3 Hrs.
Internal Assessment: (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

For Paper Setters:
The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for thecourse

For Candidates: **:**
Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators isallowed

Course Objectives:

- ❖ Knowledge and awareness of the basic principles and concepts of biology, computer science and mathematics.
- ❖ Existing software effectively to extract information from large databases and to use this information in computer modeling.

Section	**Course Content**
Section-A	**Cell and Molecular Biology** Bioinformatics – concept and scope.(2) Cell structure, Cell organelle and their function, Differences between prokaryotic & eukaryotic cells, and plant & animal cells.(3) Nucleic acid: types, structure and function.(2) Protein: structure and function. (2) Basics of DNA replication, transcription and translation.(3)
Section-B	**Genomics** Genome, genome organization in prokaryotes and eukaryotes. (2) Genome analysis: genome mapping, sequencing, fragment assembly and annotation.(4) Basics of sequence alignments, Major alignment tools/ software- BLAST nucleic acid sequence/ gene databases and Gene identification approaches – Gen scan. (5).
Section-C	**Proteomics** Basic steps in protein isolation and purification (using gel chromatography and electrophoresis) and protein sequencing.(4)

	Protein sequence analysis: alignment, Homology search, Prediction of secondary structure, Protein families, Protein motif, Software for protein sequence analysis and protein database.(4) Three dimensional (3D) protein structure prediction, 3D structure databases and Software for 3D protein modelling.(4)
Section-D	**Drug Designing** Molecular basis of a disease, molecular approaches to curing diseases.(3) Drug target identification in genome and proteome, protein –ligand docking in drug design, drug screening, screening of drug databases.(4) Modelling protein-protein and protein- DNA docking.(3) Software for prediction of interaction between drug molecules and drug targets. (3)

Course Outcomes:

The students should be able to

CO1: To get introduced to the basic concepts of Bioinformatics and its significance in Biological data analysis.

CO2: Describe the history, scope and importance of Bioinformatics and role of internet in Bioinformatics

CO3: Explain about the methods to characterize and manage the different types of biological data

Textbook And Reference Books:

1. Cell and Molecular Biology: by E.D.P. De. Robertis and E.M.F. De.Robertis,
2. B.F. Waverly Pvt. Ltd. New Delhi, 1st edition, 1996.
3. Bioinformatics: From Genome to Drugs, Edited by: Thomas Lengauer John Wiley & Sons, July25,2001
4. Structural Bioinformatics, Edited by: Philip E. Bourne, Helge Weissig John Wiley & Sons, October2002.
5. Biological Sequence Analyse: Probabilistic Models of Proteins and Nucleic Acids by Richard Durbin (Author), Sean R. Eddy (Author), Anders Krogh (Author), Graeme Mitchison(Author).
6. Bioinformatics: Sequence and Genome Analysis, Edited by: David W. Mount Cold Spring Harbor Laboratory, 1st edition March 15,2001
7. Bioinformatics: A Practical Guide to the Analysis of Genes and Protein, Second Edition, Edited by: Andreas D. Baxevansis, B.F. Francis Ouellette, Willey- Interscience, 2nd edition, April6,2001