SEMESTER – VIII

SEMESTER – VIII

DIGITAL SIGNAL PROCESSING **EC (ID) – 8001**

Course Code	EC (ID) – 8001	Credits: 4	L-3, T-1, P-0
Name of the Course	DIGITAL SIGNAL PROCESSING		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	Max. Time: 3 hrs.	Max. Marks: 100	Min. Pass Marks: 40
Continuous 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.

SECTION – A

Discrete – time signal analysis and linear systems: Signal analysis – signal characteristics – typical discrete – time signals – operation on signals – properties of linear time – invariant digital systems – Fourier transform relationship – sampling analog signals and sampling rate conversion. Z-transform; Properties of Z-transform-inverse, Z-transform – analysis of discrete time systems, convolution

SECTION – B

System function, difference equation

IIR filter design: analog filter approximation, Butter worth, Chebyshev and elliptic filters, bilinear transformations, impulse invariance technique, digital frequency band transformations. FIR filter design: window technique, equiripple approximation technique, frequency sampling technique.

SECTION – C

Discrete Fourier transform (DFT) and inverse Discrete time Fourier Transform: properties – circular convolution. Fast Fourier Transform (FFT): Decimation-in-time (DIT) algorithm-decimation-in-frequency algorithm-FFT, Radix-2 DIT and DIF implementation.

SECTION – D

Finite Register Length Effects: Quantization noise introduced by analog-to-digital conversion-finite register length effects in the realization of IIR and FIR digital filters and in DFT computation. IIR and FIR filter realization scheme

Text Books:

1. *David.K.Defatta, Joseph G, Lucas and William S.Hodgkiss, Digital Signal Processing, John Wiley & sons, 1988.*
2. *Sanjit K and Mitra, Digital Signal Processing, Tata McGraw Hill, 1998.*

Reference Books:

1. *A.V.Oppeheim and R.W.Schaffer, Digital Signal and Processing, Prentice Hall.*
2. *Farooq Hussain, Digital Signal and Processing, Prentice Hall.*

SEMESTER – VIII
MICROWAVE ENGINEERING (EC – 8002)

Course Code	**EC – 8002**	Credits: 4	L-3, T-1, P-0
Name of the Course	**MICROWAVE ENGINEERING**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous 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.

SECTION – A

Wave guides: Introduction, comparison with transmission lines, propagation in TE and TM mode, rectangular wave guide, TEM mode in rectangular wave guide, introduction to circular wave guide, characteristic impedance.

Microwave Components: Directional couplers, tees**,** hybrid ring, s-parameters, attenuators, cavity resonators, mixers and detectors, matched load, phase shifter, wave meter, Ferrite devices: Isolators, circulators, gyrators.

SECTION – B

Microwave tubes: Limitation of conventional tubes, construction, operation and properties of Klystron amplifier, reflex Klystron, magnetron, Traveling wave tube, cross-field amplifier, backward wave oscillator.

SECTION – C

Microwave Solid State Devices: Varactor and step recovery, diodes, Multipliers, Parametric amplifiers, Tunnel diodes, Gunn effect and diodes, MASER, LASER, IMPATT, TRAPATT, PIN, Schottky barrier and Backward diodes, Read diode.
Microwave Antennas.

SECTION – D

Microwave Measurements: Power measurement using calorimeter and bolometers, Measurements of SWR, frequency and wave length, Impedance measurement, Measurement of Noise factor, Microwave bridges.

Propagation of Microwave: Space wave propagation Effect of curvature of Ideal Earth, Various other considerations.

Text Books:-

1. Microwave devices and circuits: Samuel Liao, PHl.
2. Microwave devices and Radar Engg: M.Kulkarni, Umesh**.**

SEMESTER – VIII

DIGITAL SIGNAL PROCESSING LAB EC (ID) – 8005

Course Code	**EC (ID) – 8005**	Credits: 2	L-0, T-0, P-3
Name of the Course	**DIGITAL SIGNAL PROCESSING LAB**		
Lectures to be delivered	**39 hours of Lab sessions**		
Semester End Examination	**Max. Time = 3 hrs.**	**Max. Marks : 50**	**Min. Pass Marks: 20**
Laboratory	**Continuous Assessment (based on Lab work 30%, Lab record 25%, Viva 25%, Attendance 20%)**	**Max. Marks: 50**	**Min. Pass Marks: 25**

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:
i) Performing a practical examination assigned by the examiner (25 marks).
ii) Viva-voice examination (25 marks).

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

LIST OF EXPERIMENTS: -

Perform the experiments lab using DSP:

1. To represent basic signals (Unit step, unit impulse, ramp, exponential, sine and cosine)
2. To develop program for discrete convolution.
3. To develop program for discrete correlation.
4. To understand stability test.
5. To understand sampling theorem.
6. To design analog filter (low-pass, band-pass, band-stop).
7. To design digital IIR filters (low-pass, high pass, band-pass, band-stop)
8. To design FIR filter using windows technique.
9. To design a program to compare direct realization values of IIR digital filter.
10. To develop a program for computing parallel realization values of IIR digital filter.
11. To develop a program for computing cascade realization values of IIR digital filter.

12.To develop a program for computing inverse Z-transform of a rational transfer function.

SEMESTER – VIII

MICROWAVE ENGINEERING LAB (EC – 8006)

Course Code	**EC – 8006**	Credits: 2	L-0, T-0, P-3
Name of the Course	**MICROWAVE ENGINEERING LAB**		
Lectures to be delivered	**39 hours of Lab sessions**		
Semester End Examination	**Max. Time = 3 hrs.**	**Max. Marks: 50**	**Min. Pass Marks: 20**
Laboratory	**Continuous Assessment (based on Lab work 30%, Lab record 25%, Viva 25%, Attendance 20%)**	**Max. Marks: 50**	**Min. Pass Marks: 25**

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

i) Performing a practical examination assigned by the examiner (25 marks).
ii) Viva-voice examination (25 marks).

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

LIST OF EXPERIMENTS: -

1. Study of wave-guide components.
2. To study the characteristics of reflex Klystron and determine it's timing range.
3. To measure frequency of microwave source and demonstrate relationship among guide dimensions, free space wavelength and guide wavelength.
4. To measure VSWR of unknown lad and determine its impedance using a smith chart.
5. To match impendence for maximum power transfer using slide screw tuner.
6. To measure VSWR, insertion losses and attenuation of a fixed and variable attenuator.
7. To measure coupling and directivity of direction couplers.
8. To measure insertion loss, isolation of a three port circulator.
9. To measure the Q of a resonant cavity.
10. To study the V-I characteristics of GUNN diode.

SEMESTER – VIII
CELLULAR AND SATELLITE COMMUNICATION (EC (ID) – 8014)

Course Code	**EC (ID) – 8014**	Credits: 4	**L-3, T-1, P-0**
Name of the Course	**CELLULAR AND SATELLITE COMMUNICATION**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

1. **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.
2. **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.

SECTION – A

Mobile Telephone Service, Evolution of cellular Telephone, Fundamental Concepts of Cellular Telephone, Fundamental Concepts of Cellular Telephone, Frequency Reuse, Interference, segmentation & Dualization, Cellular System Topology, Roaming & Handoffs, Cellular Telephone network Components, Cellular Cell processing.

SECTION- B

First Generation Analog Cellular Telephone, Second Generation Analog Cellular telephone, Personal Comm. Systems, digital Cellular telephone, CDMA Cellular Radio network, Globle Systems for Mobile communication.

SECTION – C

Principle of Satellite Comm., Kepler's law, Geosynchronous Satellite, Antenna look angles, Satellite classifications spacing and Frequency allocation, Satellite antenna Radiation patterns, Footprints, Satellite link models, Parameter & Equations.

SECTION – D

FDM/FM Satellite Systems, Multiple accessing – FDMA, TDMA, CDMA, Channel Capacity Special purpose Comm. Satellites, INTELSAT, VSAT (data broad – band Satellite), MSAT. LEOs (lower Earth Orbit Satellite), Defence Satellites.

Reference books:

1. Advanced Electronic Communications Systems: Wayne Tomasi.
2. Electronic Communications: Dennis Roddy & John Coolen.

SEMESTER – VIII
AI & EXPERT SYSTEM (EC – 8010)

Course Code	**EC – 8010**	Credits: 4	L-3, T-1, P-0
Name of the Course	**AI & EXPERT SYSTEM**		
Lectures to be delivered	52 (1 Hr Each) (L = 39, T = 13 for each semester)		
Semester End Examination	Max. Time: 3 hrs.	Max. Marks: 100	Min. Pass Marks: 40
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		Max. Marks: 50	

Instructions

1. 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.
2. 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.

Section-A

Introduction to AI: Problems, Techniques and programming Languages. Introduction to LISP : List manipulations, functions, predicates, and conditionals , input , output and logical variables, iteration and recursion. Lists and arrays. Introduction to PROLOG .

Problems, Problems Spaces & Search: Defining a problem as a space, search, production systems, problem characteristics, production system characteristics, issues in the design of search programs.

Section-B

Heuristic Search Techniques:

Generate – and – test, Hill Climbing, best – first search (A*), Problem Reduction (AO*), constraint satisfaction, Means End Analysis.

Knowledge Representation Issues: Representations and Mappings, approaches to knowledge representations, issues of knowledge representations, the frame problem

Section-C

USING PREDICATE LOGIC: Representing simple facts in logic representing instance & its relationships, computable functions and predicates, resolution natural deduction.

REPRENTING KNOWLEDGE USING RULES: Procedural vs. declarative knowledge, logic programming, forward and backward searching, matching, control knowledge,

Section-D

GAME PLAYING AND SEARCH: Introduction Min-Max Algorithm, alpha-beta cut off. Examples of games.
EXPERT SYSTEM: Component of an expert system, categories of an Expert System, stages in development of Expert System, Expert System Development Tools. Expert System Architecture, Frames.

TEXT BOOKS:

- Patterson, D.W.: INTRODUCTION TO ARTIFICIAL INTELLIGENCE & EXPERT SYSTEM, Prentice hall of India, New Delhi
- Rich, E & Knight, K: ARTIFICIAL INTELLIGENCE, Tata McGraw Hill Pub Co, New Delhi
- Nilson, N.J.: PRINCIPLES OF ARTIFICIAL INTELLIGENCE, Narosa Pub, House
- References:
- Schmildt, H: ARTIFICIAL INTELLIGENCE, USING c, McGraw Hill
- Winston, P.H.: ARTIFICIAL INTELLIGENCE, Addition - Wesley

SEMESTER – VIII
NEURAL NETWORKS AND FUZZY LOGIC (EC – 8011)

Course Code	**EC – 8011**	Credits : 4	**L-3, T-1, P-0**
Name of the Course	**NEURAL NETWORKS AND FUZZY LOGIC**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

1. **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.
2. **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.

SECTION – A

Neural Network characteristics, History of development in Neural Networks Principles, Artificial Neural Net terminology, Model of a neuron, topology, learning types of learning, supervised, unsupervised, re-enforcement learning.

SECTION- B

Basic Hopfield Model, the perceptron, linear separability, Basic learning laws: Hebb's rule, Delta rule, Widrow & Hoff LMS, learning rule, correlation learning rule, instar and outstar learning rules.

Unsupervised learning, competitive learning, K-means clustering algorithm, Kohonen's feature maps.

SECTION – C

Radial Basis Function neural networks, basic learning laws in RBF nets, Recurrent networks, recurrent back propagation, Real Time Recurrent learning algorithm.

Introduction to counter propagation network, CMAC network, ART networks.

SECTION – D

Fuzzy logic: Basic concepts of Fuzzy logic, Fuzzy Vs Crisp set, Linguistic variables, membership functions, operations of fuzzy sets, fuzzy IF-THEN rules, variable inference techniques, de-fuzzification techniques, basic fuzzy inference algorithm, Applications of fuzzy system, useful tools supporting design.

Reference books:

1. Fuzzy Systems Design Principles, Building Fuzzy IF-THEN Rule Bases By Riza C.Berkin & Trubatch. IEEE Press ISBN 0-7803-1151-5.
2. Yegna narayanam – Artificial Neutral Networks.
3. Bart Kosko – Neural Networks & fuzzy logic.
4. Simon Haykin – Neutral Networks.
5. Ross.T. – Fuzzy Logic.

SEMESTER – VIII
COMMUNICATION SYSTEMS (EC – 8020)

Course Code	**EC – 8020**	Credits: 4	**L-3, T-1, P-0**
Name of the Course	**COMMUNICATION SYSTEMS**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

3. **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.
4. **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.

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, Raleigh scattering losses, Absorption losses, mode coupling losses, bending losses, combined losses. Effects of Dispersion on Pulse Transmission, intermodal dispersion, material dispersion, wave guide dispersion, total dispersion, fiber optic communication system.

BOOKS:

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

SEMESTER – VIII

RELIABILITY OF ELECTRONICS COMMUNICATION SYSTEM (EC-8021)

Course Code	**EC-8021**	Credits-4	**L-3, T-1, P-0**
Name of the Course	**Reliability Of Electronics Communication System**		
Lectures to be Delivered	**52 (1 Hr Each) (L=39, T=13 for each semester)**		
Semester End Examination	**Max Marks: 100**	**Min Pass Marks: 40**	**Maximum Time: 3 hrs**
Continuous Assessment (based on sessional test (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			**Max Marks: 50**

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D and 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 and 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.
2. **For Candidates:** Candidates are required to attempt five question in all selecting one question from each of the section A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators is allowed.

Section A

Basic Definitions, concept and need for reliability, inherent value of reliability in modern system, hazard rate, and failure density function, mean time to failure & repair. Relationship between basic variables, analytical form of reliability function. Derivation for the exponential distribution function and Webiull distribution.

Section B

Different type and modes of failures, causes of failure in different systems, systems structures, series, parallel, stand by, K-out-of-n configuration their reliability analysis.

Reliability evaluation techniques applicable to general non-series parallel system. Markov processes for repairable & nonrepairable system & their applications in reliability analysis..

Section C

Maintainability, analysis of down time, Repair Time Distribution, Stochastic Point Processes, System Repair Time, Reliability under Preventive Maintenance, State Dependent Systems With Repair Maintenance Requirements.

Availability, concepts & definitions, Exponential Availability model, System availability, Inspection & Repair availability model, design trade-off Analysis.

Section D

Data collection & Empirical Methods- Data collection, Empirical methods, static life estimation.

Reliability Testing- Product testing, Reliability Life testing, Test time calculations, Burn in testing, Acceptance testing, accelerated life testing, experimental design, Competing failure models.

Books:

1. Concepts in Reliability by L.S. Sri Nath.
2. Reliability Engineering by Balaguruswamy:
3. Reliability and Maintainability Engineering by Charles E. Ebeling.

OPEN ELECTIVE

SEMESTER-VIII

COMPUTER SOFTWARE TESTING (CS-8020)

Course Code	**CS-8020**	Credits: 4	L-3, T-1, P-0
Name of the Course	**COMPUTER SOFTWARE TESTING**		
Lectures to be delivered	52 (1 Hr Each) (L = 39, T = 13 for each semester)		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	Min. Pass Marks: 40
Continuous 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.

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.

Text Book:

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

SEMESTER – VIII
COMPUTER NETWORKS AND SECURITY (CS-8021)

Course Code	**CS-8021**	Credits: 4	L-3, T-1, P-0
Name of the Course	**COMPUTER NETWORKS AND SECURITY**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	Max. Time: 3 hrs.	Max. Marks: 100	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

1. **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.
2. **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.

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 Block Cipher.

SECTION-D

Operating System, Database and Program Security: Operating 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.

TEXT BOOKS:

- Computer Networks by Tenanbaum(3rd Edition)
- Data ans computer communication by Black
- Data communication and Networking by FORAUZAN
- "Security in Computing(Second edition)", Charles P. Pfleeger, 1996, Prentic-Hall International, Inc.,
- "Appliec Cryptography protocols, Algorithms, and Source code in C(Second Edition)", Bruce Schneier, 19975, John Wiley and Sons, inc.,

REFERENCE BOOKS:

- "Security Technologies for the World Wide Web", Rolf Oppliger, Artech House, Inc,
- "Digital Certificates Applied Internet Security", Jalal Feghhi and Peter Williams, Addison Welsley Longman, Inc,

- "The World Wide Web Security FAQ", World Wide Web Consortism, [online] Available at http://www.w3.org/ Security/Faq/www-securityfaq.html
- Cryptographic Message Syntax Standards, RSA Laboratories,[online] Available at http://www.rsasecurity.com/rsalabs/ pkcs/pkcs-7/index.html

SEMESTER – VIII

NON CONVENTIONAL ELECTRICAL POWER GENERATION (EE-8008)

Course Code	**EE-8008**	**Credits : 4**	**L-3, T-1, P-0**
Name of the Course	**NON CONVENTIONAL ELECTRICAL POWER GENERATION**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions:

1. **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.
2. **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.

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.

BOOKS

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

SEMESTER – VIII
ENERGY ASSESSMENT AND AUDITING (EE-8009)

Course Code	**EE-8009**	**Credits : 4**	**L-3, T-1, P-0**
Name of the Course	**ENERGY ASSESSMENT AND AUDITING**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

1. **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.
2. **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.

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.

BOOKS

1. Handbook of Energy Audits by Albert Thuman – Fairman Press Inc.
2. Energy basis for man and nature by Howard T.Odum & Elisbeth.C.Odum.

Semester-VIII

Development of Knowledge Management (IT-8012)

Course Code	IT-8012	Credits-4	L-3, T-1, P-0
Name of the Course	Development of Knowledge Management		
Lectures to be Delivered	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min Pass Marks: 40	Maximum Time: 3 hrs
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D and 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 and 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.
2. **For Candidates:** Candidates are required to attempt five question in all selecting one question from each of the section A, B, C and 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)

Semester-VIII

Professional Issues in IT (IT-8013)

Course Code	IT-8013	Credits-4	L-3, T-1, P-0
Name of the Course	Professional Issues in IT		
Lectures to be Delivered	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min Pass Marks: 40	Maximum Time: 3 hrs
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D and 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 and 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.
2. **For Candidates:** Candidates are required to attempt five question in all selecting one question from each of the section A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators is allowed.

Section A

Legal Issues: Introduction to legal concepts, Basic outline of Criminal and Civil Laws, Concepts relating to laws of Contract and Commercial Law, substantive Legal Issues, intellectual property issues, Cyber crime, Data protection principles and implications of the European Union Data protection Directive, Confidentially and privacy, Intellectual property rights, copyrights and Industrial Property, patents, trade Marks and laws relating to designs.
Software protection and privacy, Dealing with copyright, Originality, Exception to Copyright infringement, Employees and freelance programs, devices to overcome protection Software Licensing, Methods of Licensing, Copyright and electronic publishing, copyright problems posed by electronic publishing.

Section B

Multimedia, Licensing and related issues: protection of Databases, Trade Marks and passing off, Internet related issues, Contract issues and Law, Basic understanding of the Types of Agreements in large Computerization projects – Implementation Agreements, License Agreements, Maintenance Agreements etc., Enforcements issues, dispute resolution, arbitration, legislation action.

Section C

Other Professional Issues: Duties of a Professional, Duties to Client, Duties to employer, Duties to profession, Duties to society, Accountability for quality, timeliness and use of resources, human relationships and change management
Avoiding computer misuse, Hacking unauthorized access and types of Computer Crime, Introduction of Viruses, Fraud and types of Computer Fraud, Implications arising from the Draft computers crimes Act (Sri lanka).

Section D

Public interest and social implications, Environmental protection, health and safety issues, Privacy, Ethics and Codes of Professional conduct, the need for professional ethics, characteristics of professions, Integrity & Honesty, competence, professional development, judgment, knowledge of law, relations, standards, independence. Acting with responsibility, professional skill, comply with law, confidently, due care, contribute towards advancements of human welfare.

Public Interest, Public awareness, Basic human rights, Ethics and the Internet, Netiquette and Policy approaches, Professional relationships, Are computer professionals "professionals", Conflicting responsibilities and misconduct, codes of Ethics.

Books: -

1. Professional Issues in Software Engineering (2nd Edition.) Bott. F et al., 1995, UCL Press.
2. (Eds), The Responsible Software Engineer: Selected Readings in IT Professionalism, Myers C., Hall t. and Pitt D., 1997, springer
3. BCS Code of conduct: http://www.bcs.org/docs/01100/1194/pdg/codeofc.pdf
4. BCS Code of Practice: http://www.bcs.org/docs/01100/1194/Cop.htm
5. ACS Code of Ethics: http://203.58.197.209/acs/events admin/static/national/pospaper/acs131.htm
6. ACS Professional Conduct and Professional Practices: **http://203.58.197.209/acs/events admin/static/national/pospaper/code2.htm**

Semester-VIII

Computer Aided Fine Arts (IT-8014)

Course Code	IT-8014	Credits-4	L-3, T-1, P-0
Name of the Course	Computer Aided Fine Arts (IT-8014)		
Lectures to be Delivered	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min Pass Marks: 40	Maximum Time: 3 hrs
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D and 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 and 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.
2. **For Candidates:** Candidates are required to attempt five question in all selecting one question from each of the section A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators is allowed.

Section A

Painting and Drawing Software applications: Drawing Software: Illustration applications (vector graphics), painting applications (bitmapped graphics) Drawing devices: Digitizing tablet, pressure sensitive stylus, mouse, touch screen.

Collect and present examples of the use of digital panting and drawing in contemporary sources. Use drawing and painting software applications creatively to present a range of work.

Section B

Image Manipulation: Software Applications: Any software which will have features like distortion, adjust colour range, contrast, palettes and an range of tools with which to paint and adjust images files.

Digities: Digital photography, scan, digitize.

Object: found objects, natural objects, domestic tools.

Image: Photographs, found images, own visual work, hand written text, word-processed text.

Digitize a range of objects and images in an appropriate file format for further development

Manipulate and present scanned images in a range of way

Section C

Typographic design: Font design software: any software that will enable experimentation with Bitmapped fonts, postscript fonts, and True type fonts.

Typographic Design Software: any software that will enable students to experiment with fonts and font design using a range of tools. Investigate the potential of digital typography

Produce a range of work showing the creative use of typography, Combine typography with image in innovative ways.

Section D

Desk Top publishing and Text Editors: Text Editing Software: Proprietary word processing applications with automated routines e.g. word count, spell checker, formatting styles, font styles, header and footers. Design a range of page layouts using traditional methods, Prepare digital layot grid with common page elements, Prepare image, graphic and text files for the use in page layout, Format document and check for accuracy, and present in an appropriate format for print.

Books: -

1. B. Saraswati, Computerizing Cultures, New Age International Publishers, New Delhi.

Semester-VIII

ENTREPRENEURIAL DEVELOPMENT & ENTERPRISE MANAGEMENT(HU-8020)

Course Code	HU-8020	Credits-4	L-3, T-1, P-0
Name of the Course	ENTREPRENEURIAL DEVELOPMENT & NEW ENTERPRISE MANAGEMENT		
Lectures to be Delivered	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min Pass Marks: 40	Maximum Time: 3 hrs

Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)	Max Marks: 50

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D and 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 and 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.
2. **For Candidates:** Candidates are required to attempt five question in all selecting one question from each of the section A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators is allowed.

SECTION –A

- Developing Entrepreneurship: Element for a 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-startup, 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.

BOOKS:

1. Deshpande, (1980),” Entrepreneurship of small scale industries,” Deep & Deep, New delhi.
2. Peter Kibly,” Entrepreneurship & Economic development ,” The free press ,New York,(1971).
3. Rehman, A.H.M..,Habibur,(1979),” Entrepreneurship & small enterprise development in Bangladesh University of Dacca.
4. Sharma, K.L., (1981), Entrepreneurship & Industrial development in Punjab”,PSE economic analyst , Vol.II, No.2.

5. David H. Holt ,(1998),” Entrepreneurship-New ventura creation,” Prentice Hall , New Delhi.

Semester-VIII

Accounts And Financial Management (HU-8021)

Course Code	HU-7003	Credits-4	L-3, T-1, P-0

Name of the Course	Accounts And Financial Management		
Lectures to be Delivered	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min Pass Marks: 40	Maximum Time: 3 hrs
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D and 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 and 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.
2. **For Candidates:** Candidates are required to attempt five question in all selecting one question from each of the section A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators is allowed.

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 of sole 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, labour 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.

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.

Semester-VIII

Total Quality Management(HU-8022)

Course Code	HU-8022	Credits-4	L-3, T-1, P-0
Name of the Course	Total Quality Management		
Lectures to be Delivered	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min Pass Marks: 40	Maximum Time: 3 hrs

Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)	Max Marks: 50

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D and 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 and 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.
2. **For Candidates**: Candidates are required to attempt five question in all selecting one question from each of the section A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators is allowed.

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.

References:-

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 Singh Soin

SEMESTER – VIII

ADVANCED OPERATIONS RESEARCH (ME – 8019)

Course Code	**ME – 8019**	Credits : 4	L-3, T-1, P-0

Name of the Course	**ADVANCED OPERATIONS RESEARCH**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)	**Max. Marks: 50**		

Instructions

1. **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.
2. **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.

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 technicque, Gomary's ALL-IPP method, transportation model, unbalance in transportation, transshipment problem, 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, waitng 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.

Text Books:

- Kumar Gupta, Prem and Hira, D.S., "Operations Research", S Chand & Company Limited, 1986.
- Swarup, Kanti, Gupta, P.K. and Manmohan, "Operations Research", Sultan Chand & Sons, New Delhi 1988.
- Srinath L.S., "PERT & CPM Principles and Applications", Affiliate East West Press (P) Limited, New Delhi, 1975.

SEMESTER –VII
INDUSTRIAL MANAGEMENT (ME-8020)

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

Instructions

1. **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.
2. **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.

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, integerated information system. Applications of MIS, future of MIS.

SEMESTER – VII

OPTIMIZATION METHODS FOR ENGINEERING SYSTEM (ME-8021)

Course Code	**ME – 8021**	Credits : 4	L-3, T-1, P-0
Name of the Course	**Optimization Methods for Engineering System**		
Lectures to be delivered	**65 (1 Hr Each) (L = 52, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

1. **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 15% of the total marks of the semester end examination for the course.
2. **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.

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.

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 Reprint 2002.

Reference Books:

1. Optimization: Theory and Practice, C.S.G. Beveridge and R.S. Schechter, McGraw Hill, New York.