PANJAB UNIVERSITY, CHANDIGARH

Scheme of Examination and Syllabi for B.E. 3rd, 4th, 5th, 6th, 7th and 8th semester in INFORMATION TECHNOLOGY
(Academic Session 2011 – 2012)
**PROPOSED SCHEME OF EXAMINATION AND SYLLABI FOR B.E. (Information Technology) 3rd – 8th semesters Academic Session 2011-12**

1. The scheme of Examination and syllabi of B.E. (Information Technology) for Third to Eight Semesters for academic session 2011-12 is as follows:

### Second Year - Third Semester

<table>
<thead>
<tr>
<th>Sub code</th>
<th>Sub name</th>
<th>Scheme of Teaching</th>
<th>Scheme of Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>L</td>
<td>T</td>
</tr>
<tr>
<td>AS301</td>
<td>Engg. Maths-III</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>IT322</td>
<td>Analog &amp; Digital Comm.</td>
<td>3</td>
<td>1</td>
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<tr>
<td>IT372</td>
<td>Analog &amp; Digital Comm. (Prac)</td>
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<td>0</td>
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<tr>
<td>IT323</td>
<td>E-commerce</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>IT324</td>
<td>Object Oriented Programming</td>
<td>3</td>
<td>1</td>
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<tr>
<td>IT374</td>
<td>Object Oriented Programming (Prac)</td>
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<td>0</td>
</tr>
<tr>
<td>IT325</td>
<td>Digital Electronics</td>
<td>3</td>
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<tr>
<td>IT375</td>
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### Second Year - Fourth Semester

<table>
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<td></td>
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<td>T</td>
</tr>
<tr>
<td>ASC405</td>
<td>Cyber laws &amp; IPR</td>
<td>3</td>
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<tr>
<td>IT421</td>
<td>Data Structures and Algorithm</td>
<td>3</td>
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<tr>
<td>IT471</td>
<td>Data Structures and Algorithm (Prac)</td>
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<td>0</td>
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<tr>
<td>IT422</td>
<td>Computer Networks</td>
<td>3</td>
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<tr>
<td>IT472</td>
<td>Computer Networks(Prac)</td>
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<td>0</td>
</tr>
<tr>
<td>IT423</td>
<td>Microprocessor</td>
<td>3</td>
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<tr>
<td>IT473</td>
<td>Microprocessor (Prac)</td>
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<tr>
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<td>Computer Architecture &amp; Organization</td>
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### Third Year - Fifth Semester

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<tr>
<td>IT501</td>
<td>Web Technologies</td>
<td>3</td>
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<tr>
<td>IT551</td>
<td>Web Technologies(Prac)</td>
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<tr>
<td>IT502</td>
<td>Data Base Management Systems</td>
<td>3</td>
<td>1</td>
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<tr>
<td>IT552</td>
<td>Data Base Management Systems(Prac)</td>
<td>0</td>
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<tr>
<td>IT503</td>
<td>Wireless Communication</td>
<td>3</td>
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<tr>
<td>IT553</td>
<td>Wireless Communication(Prac)</td>
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<td>0</td>
</tr>
<tr>
<td>IT504</td>
<td>Operating System</td>
<td>3</td>
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<tr>
<td>IT554</td>
<td>Operating System (Prac)</td>
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<tr>
<td>IT505</td>
<td>System Software</td>
<td>3</td>
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<tr>
<td>IT506</td>
<td>Industrial Training (After 4th Semester)</td>
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### Third Year - Sixth Semester

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<tr>
<td>IT601</td>
<td>Computer Graphics</td>
<td>3</td>
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<tr>
<td>IT651</td>
<td>Computer Graphics(Prac)</td>
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<tr>
<td>IT602</td>
<td>Software Engineering</td>
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<tr>
<td>IT652</td>
<td>Software Engineering(Prac)</td>
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<tr>
<td>IT603</td>
<td>Network Security &amp; Cryptography</td>
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<tr>
<td>IT653</td>
<td>Network Security &amp; Cryptography(Prac)</td>
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<tr>
<td>IT604</td>
<td>Multimedia Systems</td>
<td>3</td>
<td>1</td>
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<tr>
<td>IT654</td>
<td>Multimedia Systems (Prac)</td>
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<td>IT605</td>
<td>Enterprise Resource Planning</td>
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## SCHEME OF EXAMINATION FOR B.E. (I.T.) for Academic Session 2011-12

### Fourth Year - Seventh Semester

<table>
<thead>
<tr>
<th>Theory Paper Code</th>
<th>Subj Name</th>
<th>Hours/Week</th>
<th>Marks Uni.</th>
<th>Int. Ass.</th>
<th>Hours/Week</th>
<th>Marks Uni.</th>
<th>Int. Ass.</th>
<th>Practical Paper Code</th>
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<tbody>
<tr>
<td>IT711</td>
<td>Multimedia Systems</td>
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<td>100</td>
<td>50</td>
<td>3</td>
<td>50</td>
<td>50</td>
<td>IT761</td>
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<tr>
<td>IT712</td>
<td>Digital Signal Processing</td>
<td>3</td>
<td>100</td>
<td>50</td>
<td>3</td>
<td>50</td>
<td>50</td>
<td>IT762</td>
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<tr>
<td>IT713</td>
<td>Unix Network Programming</td>
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<td>100</td>
<td>50</td>
<td>3</td>
<td>50</td>
<td>50</td>
<td>IT763</td>
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<tr>
<td>IT714</td>
<td>Elective-I</td>
<td>3</td>
<td>100</td>
<td>50</td>
<td>3</td>
<td>50</td>
<td>50</td>
<td>IT764</td>
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<tr>
<td><strong>Project I</strong></td>
<td></td>
<td><strong>--</strong></td>
<td><strong>--</strong></td>
<td><strong>--</strong></td>
<td>5</td>
<td>100</td>
<td>50</td>
<td>IT765</td>
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<tr>
<td></td>
<td>Training of 4 Weeks after 6th Semester Exams (Int Ass):100 Marks</td>
<td><strong>12</strong></td>
<td><strong>400</strong></td>
<td><strong>200</strong></td>
<td><strong>17</strong></td>
<td><strong>300</strong></td>
<td><strong>250</strong></td>
<td>IT766</td>
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**Elective I**
- Reliability Engineering
- Soft Computing
- Artificial Intelligence
SCHEME OF EXAMINATION FOR B.E. (I.T.) for Academic Session 2011-12

Fourth Year - Eighth Semester

<table>
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<tr>
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<tr>
<td>IT811</td>
<td>Advanced Database Management Systems</td>
<td>3</td>
<td>100</td>
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<tr>
<td>IT812</td>
<td>Visual Programming</td>
<td>3</td>
<td>100</td>
<td>50</td>
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<td>50</td>
<td>50</td>
<td>IT862</td>
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<tr>
<td>IT813</td>
<td>Embedded System Design</td>
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<td>100</td>
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<td>3</td>
<td>50</td>
<td>50</td>
<td>IT863</td>
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<tr>
<td>IT814</td>
<td>Elective II</td>
<td>3</td>
<td>100</td>
<td>50</td>
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<tr>
<td>Seminar I</td>
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<td>--</td>
<td>--</td>
<td>--</td>
<td>4</td>
<td>--</td>
<td>100</td>
<td>IT865</td>
</tr>
<tr>
<td>Project II</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>6</td>
<td>200</td>
<td>150</td>
<td>IT 866</td>
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<tr>
<td>Grand Total: 1250</td>
<td>12</td>
<td>400</td>
<td>200</td>
<td></td>
<td>16</td>
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OR OPTION 2

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<tr>
<th>Paper Code</th>
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<th>Duration</th>
<th>Marks Uni. Exam</th>
<th>Int. Ass.</th>
<th>Grand Total</th>
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<tbody>
<tr>
<td>IT817</td>
<td>Industrial Training</td>
<td>6 months</td>
<td>650</td>
<td>600</td>
<td>1250</td>
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Elective II
Software Testing and Quality assurance
Network Management
Network Administration

Student can exercise option 1 or option 2 according to the following:

A student may opt for one semester training in lieu of subjects of 8th Semester. The marks for six months training will be equal to the total marks of 8th Semester study. A student can opt for six month semester training under following conditions:-

a. The student got selected for job in campus placement and the employer is willing to take that student for the training.
b. The student got offer of pursuing training from reputed government research organization/govt. sponsored projects/govt. research institution provided that student should not be paying any money to get trained. For pursuing this training student needs the prior approval from the Chairperson/Coordinator of the respective department/branch.
SYLLABUS FOR B.E. (I.T.)
THIRD SEMESTER

Paper Title:  Engineering Mathematics-III
Paper Code: AS301                      MM: 50                      Credits: 4

Course Duration: 45 Lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Part-A

Sequences and Series:          (08)

Linear Algebra:           (07)
Concept of linear independence and dependence, Rank of a matrix: Row – Echelon form, System of linear equations: Condition for consistency of system of linear equations, Solution by Gauss elimination method. Inverse of a matrix: Gauss – Jordan elimination method (Scope as in Chapter 6, Sections 6.3 – 6.5, 6.7 of Reference 1).
Eigen values, eigen vectors, Cayley – Hamilton theorem (statement only). Similarity of matrices, Basis of eigenvectors, diagonalization (Scope as in Chapter 7, Sections 7.1, 7.5 of Reference 1).

Part-B

Complex Functions:          (08)
Definition of a Complex Function, Concept of continuity and differentiability of a complex function, Cauchy – Riemann equations, necessary and sufficient conditions for differentiability (Statement only). Study of complex functions: Exponential function, Trigonometric functions, Hyperbolic functions, real and imaginary part of trigonometric and hyperbolic functions, Logarithmic functions of a complex variable, complex exponents (Scope as in Chapter 12, Sections 12.3 – 12.4, 12.6 – 12.8 of Reference 1).
Laurent Series of function of complex variable, Singularities and Zeros, Residues at simple poles and Residue at a pole of any order, Residue Theorem (Statement only) and its simple applications (Scope as in Chapter 15, Sections 15.1 – 15.3 of Reference 1). (07)
Conformal Mappings, Linear Fractional Transformations (Scope as in Chapter 12, Sections 12.5, 12.9 of Reference 1).

References:

**Paper Title: Analog and Digital Communication**

Paper Code: **IT 322**  MM: 50  Credits: 4

Course Duration: 45 Lectures of one hour each.

**Note:** Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

**Part-A**

**Amplitude Modulation & Demodulation and Systems** (08)

**Frequency Modulation & Demodulation and Systems** (07)
Principles and generation of FM and PM signals, FM Transmitter and FM receiver with various stages

**Pulse Modulation & Demodulation** (08)
Principles, generation and detection of PAM, PWM, PPM & PCM signals, noise in pulse modulation system, companding, delta modulation, adaptive delta modulation systems.

**Part-B**

**Digital modulation techniques** (07)
PSK, FSK, MSK, QAM. Error calculations for PSK, FSK, MSK, QAM, Shannon’s limit, Signal to Noise Ratio

**Multiplexing and Multiple Access** (07)
Allocation of communication Resources, FDM/FDMA, TDM/TDMA, CDMA, SDMA, Multiple Access Communications and Architecture, Access Algorithms.

**Spread Spectrum Techniques** (08)
Spread Spectrum Overview, Pseudonoise Sequences, Direct Sequence and Frequency Hopped Systems, Synchronization of DS and FH systems, Jamming Considerations, Commercial Applications
Books Recommended:

1. Principles of Communication Systems by Taub and Schilling (Tata McGraw Hill), Edi 2\textsuperscript{nd}.
2. Communication Signals and Systems by S. Haykins(Wiley), Edi 4\textsuperscript{th}.
4. Digital Communications by J.G. Proakis, (Tata McGraw Hill), Edi 4\textsuperscript{th}.
5. Electronic Communication Systems by George Kennedy and B. Davis( McGraw Hill), Edi 4\textsuperscript{th}.
6. Communication Systems Analog and Digital by R.P. Singh, S.D. Sapre, TMH, Edi 9\textsuperscript{th}.
7. Electronic Communications by Dennis Roddy and John Coolen (PHI), Edi 4\textsuperscript{th}.

Paper Title: Analog and Digital Communication (Practical)

Paper Code: IT 372 MM: 50 (Int. Exam.) Credits: 2

1. To measure the modulation Index of AM signals using Trapezoidal Method.
2. To study the voltages and waveforms of various stages of an AM Superheterodyne Receiver.
3. To measure the sensitivity and selectivity of a Superheterodyne Radio Receiver.
4. To measure the fidelity of an AM Superheterodyne radio Receiver.
5. To study DSB/SC AM signal and its demodulation using Product Detector Circuit
   (i) with dedicated wire
   (ii) with antenna
6. To study the Frequency modulation and Demodulation circuits.
7. To study the Pulse Code Modulation (PCM) and de-modulation circuits.
8. To study the Time Division Multiplexing (TDM) and De-multiplexing circuits.
9. To study delta and Sigma Delta modulation, demodulation circuits.

Paper Title: E-Commerce

Paper Code: IT 323 MM: 50 Credits: 3

Course Duration: 45 Lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Part A

Introduction:

Network Infrastructure for E-Commerce: (11)

Part B

Web Security: (12)

Electronic Payments: (11)
Overview, The SET protocol, Payment Gateway, certificate, digital tokens, Smart card, credit card, magnetic strip card, E-Checks, Credit/Debit card based EPS, online Banking. EDI Application in business, E-Commerce Law, Forms of Agreement, Govt. policies and Agenda.

References:
2. Pete Lohsin, John Vacca “Electronic Commerce”, New Age International
3. Goel, Ritendra “E-commerce”, New Age International
5. Bajaj and Nag, “E-Commerce the cutting edge of Business”, TMH

Paper Title: Object Oriented Programming
Paper Code: IT324 MM: 50 Credits: 4

Course Duration: 45 Lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Part A

Principles of Objected Oriented Programming (03)
Advantages of OOP, comparison of OOP with Procedural Paradigm

C++ Constructs (03)
Tokens, Expressions and control structures, various data types, and data structures, Variable declarations, Dynamic Initializations, Operators and Scope of Operators, Typecasting, Unformatted and formatted console I/O Operations
Functions (05)
Classes and Objects: Prototyping, Referencing the variables in functions, Inline, static and friend functions. Memory allocation for classes and objects. Arrays of objects, pointers to member functions.

Constructors and Destructors (05)
Characteristics and its various types, Dynamic Constructors, Applications, Order of Invocation, C++ garbage collection, dynamic memory allocation.

Polymorphism (05)
Using function and Operator overloading, overloading using friend Functions, type conversions from basic data types to user defined and vice versa.

Part-B

Inheritance (06)
Derived classes, types of inheritance, various types of classes, Invocation of Constructors and Destructors in Inheritance, aggregation, composition, classification hierarchies, metaclass/abstract classes.

Pointers (05)
Constant pointers, Use of this Pointer, Pointer to derived and base classes, virtual functions, Bindings, Pure virtual Functions and polymorphism.

I/O Operations and Files (04)
Classes for files, Operations on a file, file pointers.

Generic Programming With Templates (06)
Definition of class template, Function Templates, Overloading Template Functions, Class templates and member functions templates with parameters, Standard C++ classes, persistent objects, streams and files, namespaces, exception handling, generic classes, standard template library: Library organization and containers, standard containers, algorithm and Function objects, iterators and allocators, strings, streams, manipulators, user defined manipulators and vectors.

Introduction: (03)
Object Oriented System, Analysis and Design.

Books Recommended
1. Object Oriented Programming with C++ by Bala Guruswamy, TMH, Edi 2nd.

Reference Books
Paper Title: Object Oriented Programming (Practical)

Paper Code: **IT 374**  MM: 50 (Int. Exam.)  Credits: 2

List of Experiments:
1. Implementation of Functions, Classes and Objects
2. Constructors and Destructors
3. Operator Overloading and Type Conversion
4. Inheritance and Virtual Functions
5. Files
6. Exception Handling and Generic Programming

Paper Title: Digital Electronics

Paper Code: **IT 325**  MM: 50  Credits: 4

Course Duration: 45 Lectures of one hour each.

**Note:** Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

**Part-A**

**Introduction**
(10)

**Number Systems and Codes**
(07)
Decimal, Binary, Hexadecimal, Octal’s complement, 2’s complement, addition and subtraction, weighted binary codes, Error detecting codes, Error correcting codes, Alphanumeric codes.

**Counters & Shift Registers**
(07)
Ripple Counters, Design of Modulo-N ripple counter, Up-Down counter, design of synchronous counters with and without lockout conditions, design of shift registers with shift-left, shift-right & parallel load facilities, Universal shift Registers.

**Part-B**

**Data Converters**
(06)
Sample & Hold switch, D/A converters: weighted type, R-2R Ladder type; A/D Converters: Counter-Ramp type, Dual Slope Type, Successive approximation type, flash type; Specifications of ADC & DAC
**Digital Logic families**
Characteristics of digital circuits: fan in, fan-out, power dissipation, propagation delay, noise margin; Transistor-transistor Logic(TTL), TTL NAND Gate with active pull up, its input and output Characteristics, Types of TTL Gates (Schottky, standard, low power, high speed). Emitter Coupled Logic(ECL), ECL gate, its transfer characteristics, Level translation in ECL & TTL, MOS Gates, MOS Inverter, CMOS Inverter, Rise & Fall time of MOS & CMOS gates, Interfacing TTL & CMOS Circuits, Comparison of Characteristics of TTL, ECL, MOS & CMOS logic circuits, Tristate Logic & its applications.

**Semiconductor Memories & Programmable Logic**
ROM, PROM, EPROM, EEPROM; RAM: Static RAM, Typical Memory Cell, Memory Organisation, Dynamic RAM cell, Reading, & Writing Operation in RAM, PLA, PAL & FPGA.

**Books Recommended:**
4. Integrated Electronics by Millman & Halkias, (Tata McGraw-Hill), Edi 1st
5. Digital System Principles & Applications by R J Tocci (PHI), Edi 8th.

**Paper Title: Digital Electronics (Practical)**

Paper Code: **IT 375**

**Note:** Do any eight experiments.

1. To Study data sheets and truth tables of AND, OR, NOR, NAND, NOT and XOR Gates.
2. To verify the truth tables of RS, D, JK and T Flip Flops
3. To fabricate and test the truth table of half/full adder.
4. To design and implement a Modulo-N Counter
5. To Design and implement a Universal shift register
8. To convert 8 bit Digital data to Analog value using DAC
9. To convert Analog value into 8 bit Digital data using ADC
10. To design and fabricate the given sequential circuits using Flip-flops as memory elements.
SYLLABUS FOR B.E. (I.T.)
FOURTH SEMESTER

Paper Title: Cyber Laws & IPR

Paper Code: ASC 405          MM: 50                Credits: 3

Course Duration: 45 Lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Part-A

Basics of Computer & Internet Technology (08)
Internet, ISP & domain name; Network Security; Encryption Techniques and Algorithms; Digital Signatures.

Introduction to Cyber World (02)
Introduction to Cyberspace and Cyber Law; Different Components of cyber Laws; Cyber Law and Netizens.

E-Commerce (07)
Introduction to E-Commerce; Different E-Commerce Models; E-Commerce Trends and Prospects; E-Commerce and Taxation; Legal Aspects of E-Commerce.

Part-B

Intellectual Property Rights (12)
IPR Regime in the Digital Society; Copyright and Patents; International Treaties and Conventions; Business Software Patents; Domain Name Disputes and Resolution.

IT Act, 2000 (12)
Aims and Objectives; Overview of the Act; Jurisdiction; Role of Certifying Authority; Regulators under IT Act; Cyber Crimes-Offences and Contraventions; Grey Areas of IT Act.

Project Work (04)
Candidates will be required to work on a project. At the end of the course students will make a presentation and submit the project report.

Books Recommended

2. Cyber Cops, Cyber Criminals & Internet by Keith Merill & Deepti Chopra (IK Inter.), Edi 1st.
Paper Title: Data Structures and Algorithms (Theory)

Paper Code: IT 421        MM: 50        Credits: 4

Course Duration: 45 Lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Part-A

Introduction:
Introduction to data structures; Introduction to Algorithms Complexity;

(01)

Arrays, Stacks & Queues:
Concepts; Basic operations & their algorithms: Transverse, Insert, Delete, Sorting of data in these data structures; Prefix, Infix, Postfix Notations;

(08)

Lists:
Concepts of Link List and their representation; Two way lists; Circular link list; Basic operations & their algorithms: Transverse, Insert, Delete, Searching and Sorting of data in List; Storage Allocation & Garbage Collection; Linked stack and queues; Generalized List; sparse matrix representation using generalized list structure;

(10)

Part-B

Trees:
Binary Trees and their representation using arrays and linked lists; Trees and their applications; Binary tree transversal; Inserting, deleting and searching in binary trees; Heap & Heap Sort; General Trees; Thread binary tree; Height balance Tree (AVL); B-Tree.

(08)

Graphs and their applications:
Graphs; Linked Representation of Graphs; Graph Traversal and spanning forests; Depth first search; Breadth first search.

(08)

Sorting & Searching:
Insertion sort; Selection sort; Merging; Merge sort; Radix sort; Sequential & Binary Search; Indexed Search; Hashing schemes; Binary search Tree.

(10)

Books Recommended:
1. Data Structure Using C and C++ by A. Tanenbaum, Y. Langsam, M. J. Augenstei
   (PHI), 5th Edition.
2. Theory and problems of Data Structures by Seymour Lipschutz (McGraw Hill),

Paper Title: Data Structures and Algorithms (Practical)

Paper Code: IT 471 MM: 50 (Int. Exam.) Credits: 2

List of Programs:

1. **Implementation of Array Operation**: Traversal, Insertion & Deletion at and from a given location; Sparse Matrices; Multiplication, addition.
2. **Stacks**: Implementation of Push, Pop; Conversion of Infix expression to Postfix, Evaluation of Postfix Expressions.
3. **Queues**: Adding, Deleting Elements; Circular Queue: Adding and Deleting elements.
4. **Implementation of Linked Lists**: Inserting, deleting, inverting a linked list. Implementation of stacks and queues using linked lists; Polynomial addition, Polynomial multiplication.
6. **Graphs**: BFS & DFS
7. Implementation of sorting and searching algorithms.
8. **Hash Tables Implementation**: Searching, inserting and deleting, searching & sorting techniques.

Paper Title: Computer Networks

Paper Code: IT422 MM: 50 Credits: 4

Course Duration: 45 Lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

**Part-A**

**Introduction:**
Basic concepts of computer networks, switching; multiplexing; Network Hardware: LAN, MAN, WAN, Wireless networks, Internet; Network Software: Layer, Protocols, interfaces and services; Reference Model: OSI/TCP/IP and their comparison.

**Physical Layer:**
Data Link Layer: (09)
Framing; Error control; Error correction & Detection; sliding window protocols (one bit, Go back n, selective repeat); Examples of DLL Protocols-HDLC, SLIP; Medium Access Sub layer: Channel Allocation, MAC protocols -ALOHA, CSMA protocols, Collision free protocols, Limited Contention Protocols, Wireless LAN protocols, IEEE 802.3, 802.4, 802.5 standards and their comparison. Bridges: Transparent, source routing, remote.

Part-B

Network Layer: (09)
Design issues, routing algorithms (shortest path, flooding, flow based, distance vector, hierarchical, broadcast, multicast, for mobile hosts). Congestion control algorithms (Leaky bucket, Token bucket, Choke, Packet, Load shedding).

Transport Layer: (06)
Addressing, establishing and releasing connection, flow control & buffering, multiplexing, crash recovery, Internet Transport protocol (TCP and UDP).

Application Layer: (05)
Network Security; Domain Name System; Simple Network Management Protocol; Electronic Mail.

Books Recommended:
3. Internet working with TCP/IP by Douglas E. Coomer, (PHI), Edi 3rd.

Paper Title: Computer Networks (Practical)

Paper Code: IT472
MM: 50 (Int. Exam.)
Credits: 2

Practicals based on theory.
1. To familiarize with the various basic tools (crimping, krone etc.) used in establishing a LAN.
2. To familiarize with switch (manageable & unmanageable), hub, connecters, cables (cabling standards) used in networks.
3. To familiarize with routers & bridges.
4. To use some basic commands like ping, trace-root, ipconfig for trouble shooting network related problems.
5. To use various utilities for logging in to remote computer and to transfer files from/to remote computer.
6. To develop a program to compute the Hamming Distance between any two code words.
7. To develop a program to compute checksum for an ‘m’ bit frame using a generator polynomial.
8. To develop a program for implementing/simulating the sliding window protocol.
9. To develop a program for implementing/simulating a routing algorithm.
10. To study various IEEE standards (802.3, 802.4, 802.5, 802.11)
11. To develop a program for implementing/simulation the ALOHA protocol

**Paper Title: Microprocessor (Theory)**

Paper Code: **IT 423**  
MM: 50  
Credits: 4

Course Duration: 45 Lectures of one hour each.

**Note:** Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

**Part-A**

**Microprocessor Architecture and Microcomputer Systems:**  (06)  
Microprocessor Architecture, The 8085 MPU: Block Diagram, Pin Diagram, Address/Data Buses, Concept of demultiplexing of Buses, Control and status signals, Registers, Ports, Flags, Instruction Decoding and Execution, memory Interfacing.

**Interfacing I/O Devices**  (06)  
Basic Interfacing Concepts, Interfacing Output Displays, Interfacing Input Devices, Memory-Mapped I/O

**Programming the 8085:**  (07)  

**Programming Techniques with Additional Instructions:**  (06)  
Part-B

Counters and Time Delays: (06)
Counters and Time Delays, Hexadecimal Counter, Modulo Ten, Counter, Generating Pulse Waveforms, Debugging Counter and Time-Delay Programs.

Stack and Subroutines: (04)
Stack, Subroutine, Conditional Call and Return Instructions.

Interrupts: The 8085 Interrupt, 8085 Vectored interrupts. (03)

General –Purpose Programmable Peripheral Devices: (07)
Block Diagram, Working and Control word of: The 8255A Programmable Peripheral Interface, The 8259 A Programmable Interrupt Controller, Programmable communications interface 8251.

Books Recommended
1. Microprocessor Architecture, Programming and Applications with the 8085 by Ramesh S.Gaonkar, PHI, Edi 3rd

Reference Books:
1. Advanced Microprocessors & Interfacing by Badri Ram, Tata McGraw Hill, Edi 1st.
3. Microprocessors and Interfacing programming and Hardware by Douglas V. Hall, TMH, Edi 2nd

Paper Title: Microprocessor(Practical)

Paper Code: IT 473 MM: 50 (Int. Exam.) Credits: 2

1. Familiarization of 8085 kits.
2. Verification of arithmetic and logic operations using above kits.(At least 5 programs)
3. Development of interfacing circuits of various control applications based on 8085.
4. Application of assembly language using 8085 instructions set to develop various programs.
5. Applications of data movement instructions to develop relevant programs.
Paper title: Computer Architecture & Organization

Course Duration: 45 Lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Part-A

Design Methodology (04)
System design, Design levels- Gate level, Register level, Processor level.

Basic Computer Organization & Design (08)
Instruction codes, common bus system, computer instruction, Design of basic computer, Design of accumulator logic.

Control Design (08)
Basic concepts, Hardwired control, Micro programmed control, Design of control unit.

Central Processing Unit (08)

Part-B

Input-Output Organization (06)
I/O interface, Modes of transfer, Priority interrupts, DMA, I/O processor.

Memory Organization (06)
Memory hierarchy, Main memory, Auxiliary memory, Associative memory. Cache memory, virtual memory, Memory management H/W.

Parallel Processing (05)
Introduction, Multiprocessors, Interconnection structure.

Books Recommended
2. Computer System Architecture by Morris Mano, Edi 3rd PHI

Reference Books
SYLLABUS FOR B.E. (I.T.)
FIFTH SEMESTER

Paper title: Web Technologies

Paper Code: IT 501
Max. Marks: 100
Time: 3 hours

Course Duration: 45 lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Part-A

Internet Basics:
Internet; Communication on the Internet; Internet services; types of accounts; Internet Domains; NIC; IP addresses; Web Servers; review of TCP/IP; HTTP; telnet; ftp; WWW concepts; web site creation concepts; web commerce; internet telephony.

HTML:
HTML basics; HTML tags; text formatting; text styles; lists: ordered, unordered and definition lists; layouts; adding graphics; tables; linking documents; images as hyperlinks; frames and layers; DHTML, style sheets.

Java Script:
Advantages of JavaScript; writing JavaScript into HTML; JavaScript data types, variables, operators and expressions; arrays and functions in JavaScript; condition checking; loops; dialogue boxes.

Part-B

Advanced Java Script:
JavaScript document object model; JavaScript assisted style sheets; events handling in JavaScript; browser objects; form objects; built-in and user defined objects; cookies.

ASP:
Origin of ASP; how ASP works; ASP Objects, Application object; ASP Error object; Request object; Response object; server object; session object; Scripting objects; Active Server Components; ActiveX Data Objects, Comparison with CGI-Perl, JSP and PHP.

Books Recommended:
1. Web Enabled Commercial Application Development Using HTML, DHTML, Java Script, Perl CGI by Ivan Bayross, BPB, Edi 2nd
Paper title: Web Technologies (Practical)

Paper Code: **IT 551**  Max. Marks: 75  Time: 3 hours

**Practical based on theory.**

Paper title: Data Base Management Systems

Paper Code: **IT 502**  Max. Marks: 100  Time: 3 hours

Course Duration: 45 lectures of one hour each.

**Note:** Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

**Part-A**

**Data Base Concept:**
Data Base Vs file oriented approach, Basic DBMS terminology, Data independence, General Architecture of a Data Base Management Software, Components of DBMS.

(04)

**Data Base Design:**
Introduction to Data Models, Entity Relationship Model, Entities, Attributes, E-R Diagrams, Conceptual Design of a relational data base model.

(05)

**Data Normalization:**
Introduction, Keys, First Normal Form, Second Normal form, Third Normal form, Boyce Codd Normal form, Denormalization, case studies of Data Normalization

(06)

**Transaction Processing Concepts:**
Schedules and recoverability, serializability, locking techniques, timestamp ordering, granularity, multiversion concurrency control.

(06)

**Part-B**

**Structured Query Language (SQL):**
Introduction to SQL, Data types, Querying database tables, Conditional retrieval of rows, Working with Null Values, Matching a pattern from a table, Ordering the Result of a Query, Aggregate Functions, Grouping the Result of a Query, Insert statement, Update & Delete statement, Alter & Drop statements, Querying Multiple Tables: Joins, Equi Joins, Inner Joins, Outer Joins, Self Joins; SET Operators: Union, Intersect, Minus; Nested Queries. Functions: Arithmetic, Character, Date and General Functions; Group Functions

(08)

**Data Manipulation and Control:**
Data Definition Language (DDL), Creating Tables, Creating a Table with data from Another table, Inserting Values into a Table, Updating Column(s) of a Table, Deleting
Row(s) From a Table, Dropping a Column, Introduction to VIEWs, Manipulating the Base table(s) through VIEWs, Rules of DML Statements on Join Views, Dropping a VIEW, Inline Views, Materialized Views. Database Security and Privileges, GRANT Command, REVOKE Command, COMMIT and ROLLBACK.

**PL/SQL:**
(06)

**Relational Queries:**
(02)
Relational Algebra and Calculus, Preliminaries, Relational Algebra, Relational Calculus, Expressive Power of Algebra and Calculus, Points to review.

**Books Recommended:**

1. An Introduction to Database Systems by C.J. Date, Pearson, Edi 8th.

**Reference books:**

5. Introduction to Data Base Systems by Desai, Bipin C. (Galgotia Publications), Edi 3rd.

**Paper title: Data Base Management Systems (Practical)**

Paper Code: IT 552 Max. Marks: 75 Time: 3 hours

Practical based on Theory.
Paper Title: Wireless Communication

Paper code: IT 503  Max. Mark : 100  Time: 3 Hours

Course Duration: 45 lecturers of one hour each

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Part-A

Introduction (09)
Evolution of Mobile Communication Systems, Paging systems, cordless telephone systems, cellular telephone systems, comparison of common wireless communication systems.

System Design Fundamentals (13)
Frequency reuse, Channel assignment strategies, handoff strategies, interference, improving coverage and capacity in cellular systems, mechanism for capacity improvement-cell splitting, cell sectoring and microcell zone concept, modulation techniques.

Wireless Systems (08)
GSM, GSM reference architecture and GSM security architecture, CDMA digital cellular standard, IS-95 system.

Part-B

Channel Impairment Mitigation Techniques (05)
Introduction, Power control, Diversity Techniques: Frequency Diversity, Time Diversity, Space Diversity, Path Diversity, Channel Equalization, Rake receiver, Channel coding and interleaving.

Multiple Access Techniques (06)
Simplex, Duplex, Time Division Duplex, Frequency Division Duplex FDMA, TDMA, CDMA, SDMA, OFDM, Hybrid Multiple Access.

Migration to 3G technologies: (04)
WiFi, WiMax, EDGE, Bluetooth, CDMA-2000.

Books Recommended:

Part-A

**Basic Functions and Concepts of Operating Systems:** (05)
Concept of an operating system, batch system, Multi-programmed, Time sharing, Personal Computer System, Parallel system, Real time system, General system Architecture.

**Features and Objectives of Operating Systems:** (11)
System components, operating system services, System calls, System Programs, System Structure, System design and implementation. Concept of process, process states, process state transition, process control block, operations of processes, concurrent processes, deadlocks, scheduling algorithms, scheduling criteria, Process Synchronization.

**Memory Management:** (06)
Logical and physical address space, storage allocation and management techniques, swapping, concepts of multi programming, paging, segmentation, virtual storage management strategies, Demand Paging, Page Replacement Algorithms, Thrashing.

Part-B

**Information Management:** (06)
File concept, Access method, Directory structure, Protection File system structure, Allocation methods, Free space management, Directory implementation, Disk structure, Disk Scheduling, Disk management, Swap space management.

**Distributed-System Structures:** (06)
Network operating system, Distributed operating systems, Remote services, Robustness, Design Issues.

**Distributed file systems and Distributed Coordination:** (06)
Naming and Transparency, Remote file Access, Stateful versus stateless service, File replication, Event ordering, Mutual Exclusion, Atomicity, Concurrency control,
Deadlock Handling, Election Algorithms, Reaching Agreement.

Case Studies: (05)
Unix O.S. Architecture, Operating system services, user perspective, representation of files in Unix system processes and their structure, Input-output system, Memory management, Unix shell, history and evolution of Unix system.

Books Recommended:


Reference books:


Paper title: Operating Systems (Practical)

Paper Code: IT 554 Max. Marks: 75 Time: 3 hours

Practical based on theory.

1. Installation of the Linux operating system
2. Working with text editor ‘vi’
3. Using basic commands-man, who, more, pipe, finger, cat, redirect, ls, cp, mv, rm.
4. Working with directory and plain files-pwd, cd, mkdir, rmdir, lp, wc, date, cal, sort, diff, uniq and grep commands.
5. Using miscellaneous commands-head, tail, cut, copy, paste, spell, find and bc.
6. Working with shell scripts under Korn Shell and using shell variables, print, chmod and calendar commands.
7. Additional features of Korn shell such as profile, kshrc file, history, read and command line editing commands, aliases and special characters in print command
8. Using quotes, relational operators, command substitution, arithmetic functions, shell control statements such as for-in, if-then-elseif-else, while, case, date and script.
9. Working under the Bourne shell-shell scripts, control statements such as test, for, for in, if-then-else-fi, -if-then-elif-fi, while, until, case, relational operators and expressions.
Course Duration: 45 lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Part-A

Introduction: (06)
System software and machine architecture. Simplified Instructional Computer (SIC), Traditional CISC and RISC Machines.

Assemblers: (08)

Macro Processors: (08)
Basic Macro processor functions, Machine-Independent Macro processor features, Design options.

Part-B

Loader and Linkers: (07)

Compilers: (10)

Operating Systems (06)
Basic operating system functions, Machine dependent operating system features, Machine independent operating system features, Operating System Design options.

Text Book

Reference Books
SYLLABUS FOR B.E. (I.T.)
SIXTH SEMESTER

Paper Title: Computer Graphics

Paper code: IT 601
Max. Marks : 100
Time: 3 Hours

Course duration: 45 lecturers of one hour duration each

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Part-A

Introduction to computer graphics
Applications of computer graphics, Picture representation, color table, Video Display Devices- Raster Scan Systems, Random Scan Systems, Input Devices, Output primitives

Raster Scan Graphics:
Scan conversion, Frame buffer, Bresenham's line and circle drawing algorithms, Scan-Line Polygon Fill Algorithm, Inside-Outside Tests, Boundary-Fill Algorithm, Flood-Fill Algorithm, Antialiasing and Halftoning, Character Generation, Attributes of lines

Segments:
Segments table, creating deleting and renaming segments, visibility, image transformations.

Transformations:
Geometric Transformations: Matrices, Translation, Scaling, Rotation, Homogeneous Coordinates, Composite Transformation Matrix, Coordinate Transformation, Rotation about an arbitrary point, Inverse Transformations, Other transformations.

Part-B

Windowing and clipping:

Three Dimension:
3D geometry, 3D primitives, 3D transformations, rotation about arbitrary axis, parallel projection, perspective projection, viewing parameters, conversion to view plane coordinates

Hidden Line and surface:
Back face removal algorithms, hidden line methods
Text Book:

Reference Books:

Paper Title: Computer Graphics (Practical)

Paper code: IT 651 Max. Marks : 75 Time: 3 Hours

Practical based on theory.

Paper title: Software Engineering

Paper Code: IT 602 Max. Marks : 100 Time: 3 Hours

Course duration: 45 lecturers of one hour duration each

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Part-A

Software Evolution (06)

Project Management Concepts (04)

S/W Project Planning (04)
Project estimation, Empirical Estimation Models, COCOMO Model.

Risk Management (04)
Reactive Vs Proactive risk strategies, s/w Risks, Risk Identification, Projection, Risk Mitigation, Monitoring and Management.
S/W Quality Assurance (06)
S/w quality concept, SQA- S/w quality assurance activities, reviews, SQA plan, ISO 9000 Quality standards, ISO approach to quality assurance systems.

Part-B

S/W Configuration Management (05)
Baselines, S/w configuration Items, SCM process, Version control, Change control.

Design (06)
Design Concepts and principles, Modular Design, Design Methods.

S/W Testing Methods (06)
Testing Fundamentals, test case design, White box testing, Black Box testing, Testing Strategies, Verification & validation, Unit, Integration, Validation, System Testing.

Computer aided S/W Engineering (04)
CASE, Building blocks For Case, Integrated Case Environment.

Books Recommended

Reference Books

Paper Title: Software Engineering (Practical)
Paper Code: IT 652 Max. Marks 75 Time:3 Hours

Practical based on theory.

Paper title: Network Security & Cryptography

Paper Code: IT 603 Max. Marks: 100 Time: 3 hours

Course duration: 45 lecturers of one hour duration each

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Part-A

Basic Encryption and Decryption: (05)
Attackers and Types of threats, challenges for information security, Encryption Techniques, Classical Cryptographic Algorithms: Monoalphabetic Substitutions such as
the Caesar Cipher, Cryptanalysis of Monoalphabetic ciphers, Polyalphabetic Ciphers such as Vigenere, Vernam Cipher

**Stream and Block Ciphers:**
(07)

**Number theory and basic Algebra:**
(04)
Modular Arithmetic, Euclidean algorithm, Random number generation

**Key Management Protocols:**
(04)
Solving Key Distribution Problem, Diffie-Hellman Algorithm, Key Exchange with Public Key Cryptography.

**Part-B**

**Public Key Encryption Systems:**
(08)

**Hash Algorithms:**
(05)
Hash concept, description of Hash Algorithms, Message Digest Algorithms such as MD4 and MD5, Secure Hash Algorithms such as SH1 and SHA2

**Network Security:**
(04)

**Web Security:**
(04)

**Firewalls:**
(04)
Firewall Design principles, trusted systems, Virtual Private Networks.

**Books Recommended**


**Reference Books:**


Paper title: Network Security & Cryptography (Practical)

Paper Code: IT 653  Max. Marks: 75  Time: 3 hours

Practical based on theory.

Paper Title: Multimedia Systems

Paper Code: IT 604  Max. Marks: 100  Time: 3 hours

Course duration: 45 lecturers of one hour duration each

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

Part-A

Introduction: (05)

Multimedia Technology: (06)

Storage Media: (05)
Magnetic and Optical Media, RAID and its levels, Compact Disc and its standards, DVD and its standards, Multimedia Servers.

Audio: (05)
Basics of Digital Audio, Application of Digital Audio, Digitization of Sound, Sample Rates and Bit Size, Nyquist's Sampling Theorem Typical Audio Formats Delivering Audio over a Network, Introduction to MIDI (Musical Instrument Digital Interface), Components of a MIDI System Hardware Aspects of MIDI, MIDI Messages
Part-B

**Image, Graphics and Video:**

**Video and Audio Compression:**

**Multimedia Communication:**
Building Communication network, Application Subsystem, Transport Subsystem, QOS, Resource Management, Distributed Multimedia Systems

**Books Recommended:**

**Reference Books:**

**Paper Title: Multimedia Systems (Practical)**

Paper code: IT 654 Max. Marks: 75 Time: 3Hrs

**Practical related to all of the following**
1. Multimedia Authoring Systems
2. Programming in Multimedia Authoring Systems
3. Creating Presentation using Flash Media
4. Designing Hypertext and Hypermedia Systems
5. SMIL
6. Programming in Multimedia API in any Language
7. Programming of Various Compression Standards
8. Multimedia System Design Project For Application areas such as Education, Sales, Medical, Communication, Marketing etc
Paper title: Enterprise Resource Planning

Paper Code: IT 605  Max. Marks: 100  Time: 3 hours

Course Duration: 45 lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part-A and two from Part-B.

**Part-A**

**Introduction to ERP:** (03)
Introduction, Evolution of ERP, What is ERP, Reasons for the growth of the ERP market, The Advantages of ERP.

**Enterprise – An Overview:** (03)

**ERP and Relation Technologies:** (06)
Introduction, Business Process Reengineering (BPR), Management Information Systems (MIS), Decision Support System (DSS), Executive Information System (EIS), Data Warehousing, Data Mining, On-line Analytical Processing (OLAP), Supply Chain Management.

**ERP – A Manufacturing Perspective:** (09)
Introduction, ERP, CAD/CAM, Materials Requirement Planning (MRP), Bill of Material (BOM), Closed Loop MRP, Manufacturing Resource Planning (MRP-II), Distribution, Requirement Planning (DRP), JIT and Kanban, Computer-Aided-Design/Computer-Aided-Manufacturing (CAD/CAM), Product Data Management (PDM), Data Management, Benefits of PDM, Make-to-order (MTO) and Make-to-Stock (MTS), Assemble-to-order (ATO), Engineer-to-order (ETO), Configure-to-order (CTO).

**Part-B**

**ERP Modules:** (06)
Introduction, Finance, Plant Maintenance, Quality Management, Material Management

**Benefits of ERP:** (06)
Introduction, Reduction of Lead-Time, On-time Shipment, Reduction in Cycle Time, Improved Resource Utilisation, Better Customer Satisfaction, Improved Supplier Performance, Increased Flexibility, Reduced Quality Costs, Improved Information Accuracy & Decision-making capability

**ERP Market:** (03)
ERP Implementation Lifecycle:

Vendors, Consultants and Users:
Introduction, In-house Implementation – Pros and Cons, Vendors, Consultants, End-Users.

Future Directions in ERP:

Books Recommended:
SYLLABUS FOR B.E. (Information Technology) Seventh Semester

Paper Title: Multimedia Systems

Paper Code: IT 711  Max. Marks: 100  Time: 3 hours

Course duration: 45 lecturers of one hour duration each

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part - A

Introduction: (05)

Multimedia Technology: (06)

Storage Media: (05)
Magnetic and Optical Media, RAID and its levels, Compact Disc and its standards, DVD and its standards, Multimedia Servers.

Audio: (05)
Basics of Digital Audio, Application of Digital Audio, Digitization of Sound, Sample Rates and Bit Size, Nyquist's Sampling Theorem, Typical Audio Formats Delivering Audio over a Network, Introduction to MIDI (Musical Instrument Digital Interface), Components of a MIDI System, Hardware Aspects of MIDI, MIDI Messages

Part - B

Image, Graphics and Video: (06)

Video and Audio Compression: (12)
Compression, Simple Audio Compression Methods, Psychoacoustics, MPEG Audio Compression

**Multimedia Communication:**
Building Communication network, Application Subsystem, Transport Subsystem, QOS, Resource Management, Distributed Multimedia Systems

**Books Recommended:**

**Reference Books:**

**Paper Title: Multimedia Systems**

Paper code: **IT 761**
Max. Marks 50  
Time: 3Hrs

**Practicals related to all of the following:**

1. Multimedia Authoring Systems
2. Programming in Multimedia Authoring Systems
3. Creating Presentation using Flash Media
4. Designing Hypertext and Hypermedia Systems
5. SMIL
6. Programming in Multimedia API in any Language
7. Programming of Various Compression Standards
8. Multimedia System Design Project For Application areas such as Education, Sales, Medical, Communication, Marketing etc

**Paper Title: Digital Signal Processing**

Paper code: **IT 712**
Max. Marks: 100  
Time: 3 hours

Course duration: 45 lecturers of one hour duration each

**Note:** Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

**Part - A**

**Introduction to Digital Signal Processing**
Applications and advantages of DSP. Sampling theorem, concept of frequency in discrete time signals.
Discrete Time Signals and Systems
Classification of signals, standard signals and classification of discrete time systems. Linear Time Invariant systems and their representation by difference equations and structures.

Z- Transform
Definition of direct, inverse z-transform and its properties. System function of a LTI system. Inverse z-transform by power series expansion and partial fraction expansion.

Frequency Analysis
Fourier series and transform of discrete time signals and properties (DTFT). Discrete Fourier Transform and its properties. Fast Fourier Transform algorithms, decimation in time and decimation in frequency algorithms (radix 2).

Part – B

Realization of FIR & IIR Systems:
Direct forms, cascade and parallel form IIR structures. Direct form, cascade and linear phase FIR structures.

Design of Digital Filters:
Comparison of Analog and Digital filters, Comparison of IIR and FIR filters. FIR Filters and linear phase requirement. FIR filters design using the window technique. IIR Filters and their design using the impulse invariance technique and bilinear transformation. Finite word length effects.

DSP Processors
Introduction to DSP Processors, architecture of TMS 320CXX and ADSP 21XX

Books Recommended:

Paper Title: Digital Signal Processing (Practical)

Paper code: IT762 Max. Marks 50 Time: 3Hrs

Practical based on theory.
Paper Title: Unix Network Programming

Paper Code: IT713 Max Marks 100 Time: 3 hrs

Course Duration: 45 lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part - A

Overview of the UNIX Operating System (05)
Various commands of Unix Shell Programming, features of Korn shell, Bourne shell and C shell.

Unix Model (05)
Basic definitions- kernel, process, system calls, environment list, shadow passwords, shells, IDs, permissions; Input and Output- open, creat, close, read, write, lseek, dup and dup2, fcntl, ioctl System Calls; Process control- fork, exit, exec, wait, wait3 System Calls, process relationships, file sharing; Daemon Processes.

Inter process Communication (09)
Introduction, File and Record Locking, Advisory vs Mandatory locking, other Unix locking techniques, Pipes, FIFOs, Streams & messages, Namespaces, Message Queues, Semaphores, Shared memory, Sockets & TLI.

Part - B

Communication Protocol: (08)

Berkeley Sockets: (07)

System V Transport Layer interface: (06)
Introduction, Transport End Point Addresses, Elementary TLI functions, Advanced TLI functions, Streams, TLI Implementation.

Brief overview: (05)
Ping Routines, Internet Ping Client, TFTP- protocol, security, data formats, connections, Remote Login- Terminal Line disciplines, Pseudo-terminals, Terminal modes, Control terminals.
Books Recommended:

Paper Title: Unix Network Programming
Paper code: IT 763  Max. Marks 50  Time: 3Hrs
Practical based on theory.

ELECTIVE-I

Paper Title: Reliability Engineering
Paper Code: IT714  Max. Marks: 100  Time: 3 hours
Course Duration: 45 lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part - A

Basic Reliability Models:  (03)
The Reliability Function, Mean Time to Failure, Hazard Rate Function, Bathub Curve, Conditional Reliability.

Constant Failure Rate Model:  (03)
The Exponential Reliability Function, Failure Modes, Applications. The Two-Parameter Exponential Distribution, Poisson Process, Redundancy and the CTR Model.

Time- Dependent Failure Models  (04)
The Weibull Distribution, The Normal Distribution, the Log Normal Distribution.

Reliability of Systems  (05)

State- Dependent Systems  (04)
Physical For Reliability  
Covariate Models, State Models Static Models , Dynamic Models, Physics of failure Models

Part - B

Design for Reliability  
Reliability Specification and Systems Measurements, Reliability Allocation, Design Methods, Failure Analysis, System Safety and Fault Tree Analysis.

Maintainability  

Availability  
Concepts and definitions, Exponential Availability model, System availability, Inspection and repair Available Model, Design trade-off Analysis.

Reliability Testing  

Books Recommended:
1. Reliability and maintainability Engg. by Charles E. Ebeling( Tata McGraw Hill), Edi 1\textsuperscript{st}.
2. Reliability Engineering by Govil, Edi 2\textsuperscript{nd}.
3. Reliability Engineering by K.K.Aggarwal, Edi 3\textsuperscript{rd}.

Paper Title: Reliability Engineering (Practical)

Paper code: IT764  Max. Marks 50  Time: 3Hrs

Practical based on theory.
Paper title: Soft Computing

Paper Code: IT714 Max. Marks: 100 Time: 3 hours

Course Duration: 45 lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part - A

Neural Networks: (05)

Fuzzy Logic: (04)

Operations on Fuzzy Sets: (05)
Compliment, Intersections, Unions, Combinations of Operations, Aggregation Operations.

Fuzzy Arithmetic: (06)

Part – B

Fuzzy Logic: (05)

Uncertainty based Information: (05)
Information & Uncertainty, Nonspecificity of Fuzzy & Crisp Sets, Fuzziness of Fuzzy Sets.

Introduction of Neuro-Fuzzy Systems: (05)
Architecture of Neuro Fuzzy Networks.

Application of Fuzzy Logic: (04)
Medicine, Economics etc.

Genetic Algorithm: (06)
An Overview, GA in problem solving, Implementation of GA.
Books Recommended:

Reference:

Paper Title: Soft Computing (Practical)
Paper code: IT764 Max. Marks 50 Time: 3 Hrs
Practical based on theory.

Paper Title: Artificial Intelligence
Paper Code: IT714 Max. Marks: 100 Time: 3 hours

Course Duration: 45 lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part – A

Introduction: (06)
Artificial Intelligence and its applications, Artificial Intelligence Techniques, criteria of success, Intelligent Agents, Nature and structure of Agents, Learning Agents

Problem solving techniques: (09)
State space search, control strategies, heuristic search, problem characteristics, production system characteristics., Generate and test, Hill climbing, best first search, A* search, Constraint satisfaction problem, Mean-end analysis, Min-Max Search, Alpha-Beta Pruning, Additional refinements, Iterative Deepening

Knowledge representation: (08)
Mapping between facts and representations, Approaches to knowledge representation, procedural vs declarative knowledge, Forward vs. Backward reasoning, Matching, conflict resolution, Non-monotonic reasoning, Default reasoning, statistical reasoning, fuzzy logic Weak and Strong filler structures, semantic nets, frame, conceptual dependency, scripts.
Part – B

Planning: (06)
The Planning problem, planning with state space search, partial order planning, planning graphs, planning with propositional logic, Analysis of planning approaches, Hierarchical planning, conditional planning, Continuous and Multi Agent planning

Learning: (10)
Forms of Learning, inductive learning, Decision trees, Computational learning theory, Logical formulation, knowledge in learning, Explanation based and relevance based learning, statistical learning, Learning with complete data and hidden variables, instance based learning, Neural Networks

Introduction to Natural Language processing and Expert system: (06)

Books Recommended:

References:

Paper Title: Artificial Intelligence (Practical)

Paper code: IT764 Max. Marks 50 Time: 3Hrs

1. Program Related to Problem Solving techniques of AI
   o Breadth First Search
   o Depth First Search
   o Heuristic Search
   o Best Search
   o Min-Max Search with alpha-beta pruning
   o Tic-Tac-Toe problem
   o N-Queens and N-Knight problem
   o Unification Algorithm

2. Introduction to AI Languages such as LISP, PROLOG
3. Representing Knowledge using RuleML
4. Using semantic Web
5. Knowledge of using Neural Networks, Fuzz logic, genetic algorithms
6. Other new AI Techniques
Syllabus for B.E. (Information Technology) Eighth Semester

Paper title: Advanced Database Management Systems

Paper Code: IT 811  Max. Marks: 100  Time: 3 hours

Course Duration: 45 lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part - A

Review of basic DBMS concepts:
ER model, Normalization, Query Languages (01)

Transaction Management: (03)
Transaction concept, state, serializability, Recoverability, Implementation of Isolation, Testing for serializability.

Concurrency Control: (03)
Lock based protocols, time stamp based protocol, validation based protocols, locking.

Crash Recovery: (03)
Failure classification, storage hierarchy, recovery and atomicity, log-based, shadow paging, recovery, buffer management.

Security & Integrity: (03)
Security & integrity violation, authorization & views, security systems in SQL, encryption.

The Extended Entity Relationship Model and Object Model: (04)
The ER model revisited, Motivation for complex data types, User defined abstract data types," and structured types, Subclasses, Super classes, Inheritance, Specialization and Generalization, Constraints and characteristics of specialization and Generalization, Relationship types of degree higher than two.

Object-Oriented Databases: (04)
Overview of Object-Oriented concepts, Object identity, Object structure, and type constructors, Encapsulation of operations, Methods, and Persistence, Type hierarchies and Inheritance, Type extents and queries, Complex objects;

Part – B

Object Relational and Extended Relational Databases: (05)
Database design for an ORDBMS - Nested relations and collections; Storage and access methods, Query processing and Optimization; Systems comparison of RDBMS, OODBMS, ORDBMS.

Parallel Databases: (04)
Architectures for parallel databases, Parallel query evaluation; Parallelizing individual operations, Sorting, Joins;

**Distributed Database:**
Concepts, Data fragmentation, Replication, and allocation techniques for distributed database design; Query processing in distributed databases; Concurrency control and Recovery in distributed databases

**Enhanced Data Models for Advanced Applications:**
Active database concepts. Generalized model, design and implementation issues, potential applications. Temporal database concepts: Time representation, calendars and time dimensions, tuple versioning, attribute versioning.

**Spatial Databases:**
Types of spatial data and queries, application involving spatial data, spatial indexes, indexing based on space filling curves.

**Deductive Databases and Query Processing:**
Introduction to recursive queries, least model semantics, recursive queries with negation, efficient query evaluation.

**Books Recommended:**

**Reference Books:**
3. An Introduction to database systems, Sixth Edition C. J. Date Addison Wesley
Paper Title: Visual Programming

Paper Code: IT 812          Max. Marks: 100          Time: 3 hours

Course Duration: 45 lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part – A

Introduction: (08)

Graphical User Interface Concepts - I: (05)

Graphical User Interface Concepts - II: (04)
Menus, Controls: MonthCalendar, DateTimePicker, LinkLabel, ListBox, CheckedListBox, ComboBox, TreeView, ListView, Datagrid, Gridview, TabControl, Multiple Document Interface (MDI) Windows.

Multithreading and Exception Handling: (05)
Thread States, Lifecycle of a Thread, Thread Priorities and Scheduling, Creating and Executing Threads, Thread Synchronization and Class Monitor, Exception Handling.

Part – B

Graphics and Multimedia: (05)

File Processing and Streams: (05)
Data Hierarchy, Files and Streams, Classes File and Directory, Reading and Writing Sequential Access Files, Serialization.

Data Access: (08)
Data Access Techniques, XML, LINQ, SQL, ADO.NET Object Model, LINQ to SQL, ADO.NET and LINQ, LINQ to XML.

Additional Techniques: (05)
Books Recommended:

References:

Paper title: Visual Programming
Paper Code: IT 862
Max. Marks: 50
Time: 3 hours

Practical based on theory.

Paper title: Embedded System Design
Paper Code: IT 813
Max. Marks: 100
Time: 3 hours

Course Duration: 45 lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part - A

Introduction to Microcontrollers
Comparison of Microprocessors and Microcontrollers. Embedded and external memory devices, CISC and RISC processors, Harvard and Von Neumann Architectures.

Overview of 8 bit Microcontrollers
Overview of 8051, Architecture, addressing modes and instructions. Interrupts, Timer/Counters, Serial Communication and applications. Interfacing Overview of Atmel 89C51 microcontroller.

Part - B

PIC Microcontrollers
Introduction and features, PIC 16C6X/7X: Architecture, Registers, Reset actions, Memory Organization, Instructions, Addressing Modes, I/O Ports, Interrupts, Timers, ADC. Input Capture, Output Compare, Frequency Measurement, Serial I/O Device
Software Development & Tools

Real Time Operating Systems
RTOS Architecture, Task and Task States, Tasks and Data, Semaphores and shared data, Operating System Services: message queues, timer function, events, memory management, interrupt Routines in an RTOS environment, Basic Design Using RTOS

Book Recommended
3. Microcontrollers ( Theory and Applications ) by Ajay Deshmukh, TMH Publishers

Paper title: Embedded System Design & Techniques
Paper Code: IT 863 Max. Marks: 50 Time: 3 hours
Practical based on theory.

ELECTIVE II

Paper Title: Software Testing And Quality Assurance
Paper Code: IT814 Max. Marks: 100 Time: 3 hours
Course Duration: 45 lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

Part– A

Introduction: (07)
Software Quality Assurance Concepts and Standards: (08)

Risk Management and Change Management: (07)

Part– B

Software Testing: (07)

Testing Techniques: (08)

Testing Process: (08)

Books Recommended:

References:

**Paper Title: Network Management**

**Paper Code: IT814**

Max. Marks: 100  
Time: 3 hours

Course Duration: 45 lectures of one hour each.

**Note:** Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

**Part - A**

**Large Enterprise Networks:**
Managing Enterprise Networks, need for network management, SNMP: the de facto network management standard.

**Elements of NMS Development:**
NMS development, data analysis, class design for major NMS features, GUI development, insulating applications from low level code, multiservice switches, MPLS, MPLS and scalability.

**Solving the Network Management Problem:**
Filling the development skills gap, better NMS, MIBs and NEs; Policy based Network Management (PBNM), Network Management policies, Directory Enabled Networking (DEN); IP QoS and the Enterprise.

**Part - B**

**Network Management Software Components:**

**Performance Management in Broadband Networks:**

**Books Recommended:**
1. Network Management, MIBs and MPLS by Stephen B. Morris; Pearson Education, Ed1st.
Course Duration: 45 lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and two from Part B.

**Part - A**

**Introduction to Unix System Administration** (04)
Daily Tasks of a System Administrator, Startup and Shutdown, Periodic Processes, Managing File Systems, Responsibilities to the users, Hardware responsibilities, Types of SunOS Systems.

**Disks and Devices in Unix** (03)
Disk Structure and Partitions, Disk Partitions; Devices- Logical Names, Disk Label and Bootblock, Tapes.

**Unix File System Management** (07)

**Operating Systems Installation** (03)
Installing Solaris 10.0, Post Install Actions, Solaris Patch List, IRIX 5.X; Startup and Shutdown- Booting, Run Levels etc/initdtab, Solaris PROM, Diskless Workstations, Shutdown, Crashes.

**System Configuration** (06)
Kernel configuration; Adding Hardware Special Files in Solaris 10.0, IRIX 5.X, Digital UNIX and Ultrix, Systems Directories,/ -root/ etc- systems. Creating networks and subnets, configuring network interfaces, obtaining network statistics, routing , /user- system programs, libraries, etc; User accounts-admittance, login procedure, Password Aging.

**Part - B**

**Daily Systems Administration** (05)
User and Group Administration, Communicating with systems users, Running programs automatically, corn & at, Admintool, Solstice Adminsuite, Services Managed, The Distributed Systems Administration Daemon.

**Backup Procedures** (04)
Backup Procedures, Backup Strategies, Backup and Restore Commands.

**Network Services** (07)
Overview of Services Access, Service Access Facility, Service Access Controller, Port Monitors, Setting Up a Terminal, Network Port Monitors, Terminal Control,
Network Administration, Network Initialization, Host Names and addresses, Services, Network Programs.

**Security** (06)

**Books Recommended:**

2. Essential UNIX System Administration, Aeleen Frisch, Edi 3rd.