# S. E. (Information Technology) Sem.-IV

| Course Code | Course Name | Teaching Scheme | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|---|---|
| | | Th | Pract | Tut | Th. | Pract/ | Tut | Total |
| SEITC401 | Applied Mathematics-IV* | 4 | | 1 | 4 | | 1 | 5 |
| SEITC402 | Computer Networks | 4 | | | 4 | | | 5 |
| SEITC403 | Computer Organization and Architecture* | 4 | | | 4 | | | 4 |
| SEITC404 | Automata Theory | 3 | | 1 | 3 | | 1 | 4 |
| SEITC405 | Web Programming | 4 | | | 4 | | | 5 |
| SEITC406 | Information Theory and Coding | 4 | | 1 | 4 | | 1 | 5 |
| SEITL402 | Computer Networks | | 2 | | | 1 | | |
| SEITL405 | Web Programming | | 2 | | | 1 | | |
| | Total | 23 | 4 | 3 | 23 | 2 | 3 | 28 |

# Examination Scheme

| Course Code | Course Name | Theory | | | | | Term work | Pract/ Oral | Total |
|---|---|---|---|---|---|---|---|---|---|
| | | Internal Assessment | | | END SEM EXAM | EXAM DURATION (in Hrs) | | | |
| | | TEST1 | TEST 2 | AVG. | | | | | |
| SEITC401 | Applied Mathematics-IV* | 20 | 20 | 20 | 80 | 3 | 25 | -- | 125 |
| SEITC402 | Computer Networks | 20 | 20 | 20 | 80 | 3 | 25 | 25 | 150 |
| SEITC403 | Computer Organization and Architecture* | 20 | 20 | 20 | 80 | 3 | 25 | 25 | 150 |
| SEITC404 | Automata Theory | 20 | 20 | 20 | 80 | 3 | 25 | -- | 125 |
| SEITC405 | Web Programming | 20 | 20 | 20 | 80 | 3 | 25 | 25 | 150 |
| SEITC406 | Information Theory and Coding | 20 | 20 | 20 | 80 | 3 | 25 | -- | 125 |
| | Total | 120 | 120 | 120 | 480 | | 150 | 75 | 825 |

* Common with Computer Engineering.

Tutorials will be evaluated as term work.

| Subject Code | Subject Name | Teaching Scheme | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|---|---|
| | | Theory | Pract. | Tutorial | Theory | TW/ Pract. | Tutorial | Total |
| SEITC401 | Applied Mathematics - IV * | 04 | -- | 01 | 04 | - | 01 | 05 |

| Subject Code | Subject Name | Examination Scheme | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Theory Marks | | | | Term Work | Practical | Oral | Total |
| | | Internal assessment | | | End Sem. Exam | | | | |
| | | Test1 | Test2 | Avg. | | | | | |
| SEITC401 | Applied Mathematics –IV* | 20 | 20 | 20 | 80 | 25 | - | - | 125 |

**Course Objective:**

This course will present matrix theory, Similar matrices and it's application to find the matrics function. Present methods of computing and using eigen values and eigen vectors. Set up and directly evaluate contour integrals Cauchys integral theorem and formula in basic and extended form. Present Taylor and Laurents series to find singularities zero's and poles also presents residues theory and it's applications. Present theory of probability, Baye's Theorem, Expectation and Moments and it's application. Present probability distribution such as binomial, Poisson and normal distribution with their properties. Present sampling theory and it's application for small and large sample. Present methods of computing optimization using simplex method.

**Student Learning Outcomes:**

Students in this course will apply the method of solving complex integration and computing residues. Use residues to evaluate various contour integrals. Demonstrate ability to manipulate matrices and compute eigen values and eigenvectors.

Students in this course will apply the Procedure and methods to solve technical problems.

## Detailed Syllabus:

| Sr.No. | Details | Hrs |
|---|---|---|
| Module 01 | Complex Integration<br>1.1 Complex Integration – Line Integral, Cauchy's Integral theorem for simply connected regions, Cauchy's Integral formula(without proof)<br>1.2 Taylor's and Laurent's series ( without proof)<br>1.3 Zeros, poles of f(z), Residues, Cauchy's Residue theorem<br>1.4 Applications of Residue theorem to evaluate Integrals of the type $\int_0^{2\Pi} f(\sin\theta,\cos\theta)d\theta, \int_{-\infty}^{\infty} f(x)dx$. | (10) |
| Module 02 | Matrices:-<br>2.1 Eigen values and eigen vectors<br>2.2 Cayley-Hamilton theorem(without proof)<br>2.3 Similar matrices, diagonalisable of matrix.<br>2.4 Derogatory and non-derogatory matrices ,functions of square matrix. | (08) |
| Module 03 | Correlation<br>3.1Scattered diagrams, Karl Pearson's coefficient of correlation, covariance, Spearman's Rank correlation.<br>3.2 Regression Lines. | (04) |
| Module 04 | Probability<br>4.1 Baye's Theorem,<br>4.2 Random Variables:- discrete & continuous random variables, expectation, Variance, Probability Density Function & Cumulative Density Function.<br>4.3 Moments, Moment Generating Function.<br>4.4 Probability distribution: binomial distribution, Poisson & normal distribution. (For detail study) | (08) |
| Module 05 | Sampling theory<br>5.1 Test of Hypothesis, Level of significance, Critical region, One Tailed and two Tailed test, Test of significant for Large Samples:-Means of the samples and test of significant of means of two large samples.<br>5.2 Test of significant of small samples:- Students t- distribution for dependent and independent samples.<br>5.3 Chi square test:- Test of goodness of fit and independence of attributes, Contingency table. | (08) |
| Module 06 | Mathematical Programming<br>6.1 Types of solution, Standard and Canonical form of LPP, Basic and feasible solutions, simplex method.<br>6.2 Artificial variables, Big –M method (method of penalty).<br>6.3 Duality, Dual simplex method.<br>6.4 Non Linear Programming:-Problems with equality constrains and inequality constrains<br>(No formulation, No Graphical method). | (10) |

**Term work:**
Term work shall consist of minimum four SCILAB practicals and six tutorials.
SCILAB practicals : 08 marks
Tutorials : 12 marks
Attendance : 05 marks
**Total : 25 marks**

**Recommended Books:**


1. Higher Engineering Mathematics by Grewal B. S. 38th edition, Khanna Publication 2005.
2. Operation Research by Hira & Gupta,S Chand.
3. A Text Book of Applied Mathematics Vol. I & II by P.N.Wartilar & J.N.Wartikar, Pune, Vidyarthi Griha Prakashan., Pune.
4. Probability and Statistics for Engineering, Dr. J Ravichandran, Wiley-India.
5. Mathematical Statistics by H. C Saxena, S Chand & Co.


**Reference Books:**


1. Advanced Engg. Mathematics by C. Ray Wylie & Louis Barrett.TMH International Edition.
2. Mathematical Methods of Science and Engineering by Kanti B. Datta, Cengage Learning.
3. Advanced Engineering Mathematics by Kreyszig E. 9th edition, John Wiley.
4. Operations Research by S.D. Sharma Kedar Nath, Ram Nath & Co. Meerat.
5. Engineering optimization (Theory and Practice) by Singiresu S.Rao, New Age International publication.
6. Probability by Seymour Lipschutz, McGraw-Hill publication.


**Theory Examination:**

- Question paper will comprise of 6 questions, each carrying 20 marks.
- Total 4 questions need to be solved.
- Q.1 will be compulsory, based on entire syllabus wherein sub questions of 2 to 3 marks will be asked.
- Remaining question will be randomly selected from all the modules.

Weightage of marks should be proportional to number of hours assigned to each module.

| Subject Code | Subject Name | Teaching Scheme | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|---|---|
| | | Theory | Pract. | Tutorial | Theory | TW/ Pract. | Tutorial | Total |
| SEITC402 | Computer Networks | 04 | 02 | -- | 04 | 01 | -- | 05 |

| Subject Code | Subject Name | Examination Scheme | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Theory Marks | | | | Term Work | Pract. | Oral | Total |
| | | Internal assessment | | | End Sem. Exam | | | | |
| | | Test1 | Test2 | Avg. of 2 Tests | | | | | |
| SEITC402 | Computer Networks | 20 | 20 | 20 | 80 | 25 | --- | 25 | 150 |

**Course Objectives:**

- To be familiar with the basics of data communication.
- To be familiar with the basics of Computer networks and working of Internet.
- To be familiar with various types of computer networks.
- To have experience in designing communication protocols.
- To be exposed to the TCP/IP protocol suite.
- To understand the working of Packet Switched network (PSN).
- To be familiar with Windows and UNIX networking style.

**Course Outcomes:**

1. Ability to understand principles of LAN design such as topology and configuration depending on types of users accessing the network.
2. Ability to understand design performance issues like different type of network interfaces network components and choosing appropriate network type and media.
3. Ability to understand network industry standards such as: the OSI & TCP models, Routing Protocols, Address Resolution and Reverse Address Resolution Protocols, IP Addressing and Subnetting, MAC Addressing.
4. Ability to work with network tools.
5. Ability to understand the working of network operating system.

## Detailed Syllabus:

| Sr. No. | Module | Detailed Content | Hours |
|---|---|---|---|
| 1 | Introduction | Network Applications, Network Hardware, Network Software, Reference Models. | 04 |
| 2 | The Physical Layer | Guided Transmission Media, Wireless Transmission, Communication Satellites, The Public Switched Telephone Network, The Mobile Telephone System, Cable Television. | 06 |
| 3 | The Data Dink Layer | Data Link Layer Design Issues, Error Detection and correction, Elementary Data Link Protocols, Sliding Window Protocols, Example Data Link Protocols: HDLC: High-Level Data Link Control, The Data Link Layer In The Internet. | 08 |
| 4 | The Medium Access Sub-layer | The Channel Allocation Problem, Multiple Access Protocols, Ethernet, Data Link Layer Switching. | 06 |
| 5 | The Network Layer | Network Layer Design Issues, Routing Algorithms, Congestion Control Algorithms, Quality Of Service, Internetworking, The Network Layer In The Internet: The IP Protocol, IPv4 header, IP Addressesing, Subnetting, Internet Control Protocols, The Interior Gateway Routing Protocol: OSPF, The Exterior Gateway Routing Protocol: BGP. | 10 |
| 6 | The Transport Layer | The Transport Service, Elements Of Transport Protocols,The Internet Transport Protocol: UDP, The Internet Transport protocol: TCP: -Introduction To TCP, The TCP Service Model, The TCP Protocol, The TCP Segment Header, TCP Connection Establishment, TCP Connection Release, Modeling TCP Connection Management, TCP Transmission Policy, TCP Congestion Control, TCP Timer Management, Transactional TCP. | 10 |
| 7 | Case study | Networking using Windows and Linux Operating systems. | 04 |

Text Books:

1. A. S. Tanenbaum,"Computer Networks", 4th edition, Prentice Hall

2. B. F. Ferouzan,"Data and Computer Communication", Tata McGraw Hill.

References:


1. Peterson & Davie, "Computer Networks", 2nd Edition, Morgan Kaufmann.
2. Kurose, Ross, "Computer Networking", Addison Wesley
3. S. Keshav, "An Engg, Approach To Computer Networking", Addison Wesley.
4. W. Richard Stevens, "TCP/IP Volume1, 2, 3", Addison Wesley.
5. D. E. Comer, "Computer Networks And Internets", Prentice Hall.
6. B. F. Ferouzan , "TCP/IP Protocol Suit", Tata McGraw Hill.


Term work

Students are expected to perform 8 programming assignments two case study assignments.

Suggested Practical List

- Network OS installation and configuration.
- Understanding various networking commands like ARP, RARP, ping, tracert, telnet, nslookup.
- Installation and Understanding of Ns-2 simulator.
- Emulation of Sliding window protocol and other data link layer protocols using NS-2.
- Implementation of Routing Algorithms using NS-2.
- Implementation of shortest path algorithms.
- Case Study: Networking using Windows and Linux Operating systems.

**Theory Examination:**

- Question paper will comprise of 6 questions, each carrying 20 marks.
- Total 4 questions need to be solved.
- Q.1 will be compulsory, based on entire syllabus wherein sub questions of 2 to 3 marks will be asked.
- Remaining question will be randomly selected from all the modules.

Weightage of marks should be proportional to number of hours assigned to each module.

| Subject Code | Subject Name | Teaching Scheme | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|---|---|
| | | Theory | Pract. | Tut. | Theory | TW/Pract | Tut. | Total |
| SEITC403 | Computer Organization and Architecture * | 04 | 02 | - | 04 | 01 | - | 05 |

| Subject Code | Subject Name | Examination Scheme | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Theory Marks | | | | TW | Pract | Oral | Total |
| | | Internal Assessment | | | End Semester Exam | | | | |
| | | Test1(T1) | Test2(T2) | Average of T1 & T2 | | | | | |
| SEITC403 | Computer Organization and Architecture * | 20 | 20 | 20 | 80 | 25 | - | 25 | 150 |

**Pre-requistes: Fundamentals of Computer, Digital Logic Circuits, Programming Languages (C, C++, Java)**

**Course Educational Objectives (CEO):**

| | |
|---|---|
| **CEO 1** | To conceptualize the basics of organizational and architectural issues of a digital computer. |
| **CEO 2** | To analyze performance issues in processor and memory design of a digital computer. |
| **CEO 3** | To understand various data transfer techniques in digital computer. |
| **CEO 4** | To analyze processor performance improvement using instruction level parallelism |

**Course Learning Outcomes:**

| | |
|---|---|
| **A** | Ability to understand basic structure of computer. |
| **B** | Ability to perform computer arithmetic operations. |
| **C** | Ability to understand control unit operations. |
| **D** | Ability to design memory organization that uses banks for different word size operations. |
| **E** | Ability to understand the concept of cache mapping techniques. |
| **F** | Ability to understand the concept of I/O organization. |
| **G** | Ability to conceptualize instruction level parallelism. |

**Detail Syllabus:**

| Module | Detailed Contents | Hours |
|---|---|---|
| 1 | **Overview of Computer Architecture & Organization:**<br>Introduction of Computer Organization and Architecture. Basic organization of computer and block level description of the functional units. Evolution of Computers, Von Neumann model. Performance measure of Computer Architecture. Introduction to buses and connecting I/O devices to CPU and Memory, bus structure. | **04** |
| 2 | **Data Representation and Arithmetic Algorithms:**<br>Number representation: Binary Data representation, two's complement representation and Floating-point representation. IEEE 754 floating point number representation. Integer Data computation: Addition, Subtraction. Multiplication: Signed multiplication, Booth's algorithm.<br>Division of integers: Restoring and non-restoring division<br>Floating point arithmetic: Addition, subtraction | **10** |
| 3 | **Processor Organization and Architecture:**<br>CPU Architecture, Register Organization , Instruction formats, basic instruction cycle. Instruction interpretation and sequencing.<br>Control Unit: Soft wired (Micro-programmed) and hardwired control unit design methods. Microinstruction sequencing and execution. Micro operations, concepts of nano programming.Introduction to RISC and CISC architectures and design issues. Case study on 8085 microprocessor: Features, architecture, pin configuration and addressing modes. | **12** |
| 4 | **Memory Organization:**<br>Introduction to Memory and Memory parameters. Classifications of primary and secondary memories. Types of RAM and ROM, Allocation policies, Memory hierarchy and characteristics.<br>Cache memory: Concept, architecture (L1, L2, L3), mapping techniques. Cache Coherency, Interleaved and Associative memory.<br>Virtual Memory: Concept, Segmentation and Paging , Page replacement policies. | **12** |
| 5 | **I/O Organization and Peripherals:**<br>Input/output systems, I/O modules and 8089 IO processor.<br>Types of data transfer techniques: Programmed I/O, Interrupt driven I/O and DMA. Peripheral Devices: Introduction to peripheral devices, scanner, plotter, joysticks, touch pad. | **6** |
| 6 | **Introduction to parallel processing systems:**<br>Introduction to parallel processing concepts, Flynn's classifications, pipeline processing, instruction pipelining, pipeline stages, pipeline hazards. | **4** |

**Text Books:**

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, "Computer Organization", Fifth Edition, Tata McGraw-Hill.
2. John P. Hayes, "Computer Architecture and Organization", Third Edition.
3. William Stallings, "Computer Organization and Architecture: Designing for Performance", Eighth Edition, Pearson.
4. B. Govindarajulu, "Computer Architecture and Organization: Design Principles and Applications", Second Edition, Tata McGraw-Hill.

**Reference Books:**

1. Dr. M. Usha, T. S. Srikanth, "Computer System Architecture and Organization", First Edition, Wiley-India.
2. "Computer Organization" by ISRD Group, Tata McGraw-Hill.
3. Ramesh Gaonkar, "Microprocessor Architecture, Programming and Applications with the 8085, Fifth Edition,Penram.

**Oral examination will be based on the above syllabus.**

There will be at least two assignments covering the above syllabus. Journal must include at least 2 assignments.

**Term Work**: 25 Marks (Total marks) = 15 Marks (Experiment and Case Studies) + 5 Marks (Assignments) + 5 Marks (Attendance)

**Note:** The faculty should conduct eight programming practical / experiments based on the above syllabus including two case studies on recent developments covering the above contents.
All the programs should be implemented in C/C++/Java under Windows or Linux environment.
Experiments can also be conducted using available open source tools.
**8085 microprocessor should be included only as a sample case study. No questions in University Exams / Class Tests should be asked on 8085 microprocessor.**

**SUGGESTED LIST OF COA PRACTICAL / EXPERIMENTS :**

1. To study Full Adder (7483).
2. To study ALU (74181).
3. To study MASM (Micro Assembler).
4. A program for hexadecimal addition and multiplication.
5. A program for binary multiplication.
6. A program for Hamming code generation , detection and correction.
7. A program for Booth's multiplication
8. A program for LRU page replacement algorithm.
9. A program for FIFO page replacement algorithm.
10. A program to simulate the mapping techniques of Cache memory.

10.1 Direct Mapped cache
10.2 Associative Mapped cache
10.3 Set Associative Mapped cache

11. A program to simulate memory allocation policies.
    11.1 First-fit algorithm
    11.2 Best-fit algorithm

12. A program to implement serial communication (PC - PC communication).
13. A program to implement parallel communication. (PC - Printer communication).
14. A program for printer simulation.
15. A program for keyboard simulation.

**Theory Examination:**

- Question paper will comprise of 6 questions, each carrying 20 marks.
- Total 4 questions need to be solved.
- Q.1 will be compulsory, based on entire syllabus wherein sub questions of 2 to 3 marks will be asked.
- Remaining question will be randomly selected from all the modules.

Weightage of marks should be proportional to number of hours assigned to each module.

| Subject Code | Subject Name | Teaching Scheme | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|---|---|
| | | Theory | Practical | Tutorial | Theory | TW/ Practical | Tutorial | Total |
| **SEITC404** | Automata Theory | 03 | | 01 | 03 | -- | 01 | 04 |

| Subject Code | Subject Name | Examination Scheme | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Theory Marks | | | | Term Work | Practical | Oral | Total |
| | | Internal assessment | | | End Sem. Exam | | | | |
| | | Test 1 | Test 2 | Avg. of 2 Tests | | | | | |
| **SEITC404** | Automata Theory | 20 | 20 | 20 | 80 | 25 | --- | -- | 125 |

**Course Objectives:**

To build up mathematical fundamentals required to understand the theory of computation

1. To formalize mathematical models of computation: basic machines, deterministic and non deterministic machines and pushdown machines and Turing Machines.
2. To learn fundamentals of formal grammars and languages.
3. Develop understanding of different types of Turing machines, their use, capabilities & limitations.
4. Understand the concept of Undecidability

**Course Outcomes:** After completing the course successfully, students will be able to:

**1.** Design different types of machines.
**2.** Compare different types of languages and machines
**3.** Use the pumping lemma and closure properties to prove that some problems cannot be solved by particular machines.
**4.** Understand Power and Limitations of theoretical models of Computation.
**5.** Match constraints of a language to power of machines.

## Detailed Syllabus:

| Sr. No | Detail contents | Number of Hours |
|---|---|---|
| 1. | **Basic Mathematical Fundamentals:** Sets, Logic, Functions, Relations and Languages, pigeonhole principle, mathematical induction. | 02 |
| 2. | **Introduction and Finite Automata:** Alphabets, Strings, Languages, Finite Automata (FA), acceptance of strings, and languages, Deterministic Finite Automata (DFA) and Non Deterministic Finite Automata (NFA), transition diagrams and Language recognizers. Conversions and Equivalence: Equivalence between NFA with and without ε- transitions, NFA to DFA conversion, minimization of FSM, equivalence between two FSM's, Finite Automata with output- Moore and Mealy machines. | 06 |
| 3. | **Regular Expressions & Languages:** FA and Regular Expressions, Conversion from RE to FA and FA to RE, Pumping lemma for regular languages, Closure properties of regular languages, Equivalence and minimization of Automata. | 05 |
| 4. | **Context Free Grammars and Languages:** CFG, Leftmost, Rightmost derivations, Ambiguity in grammars and languages. Simplification of Context Free Grammars, Chomsky normal form (CNF), Greiback normal form (GNF), Pumping Lemma for Context Free Languages. | 04 |
| 5. | **Push Down Automata:** Definition and languages of PDA, Equivalence& conversion of CFG's and PDA's, Deterministic PDA. | 06 |
| 6. | **Turing Theory:** Turing Machines, definition, model, design of TM, Variations of TM: Multitape TMs, Non Deterministic TM, Universal TM, The Church-Turing thesis. | 08 |
| 7. | **Undecidability and Recursively enumerable languages: Recursive and** Recursively enumerable languages, Context-Sensitive Languages and the Chomsky Hierarchy.<br><br>Unsolvable Problems: Halting Problem, Post's Correspondence Problem (PCP). | 05 |

**TERM WORK**

Journal work should comprise of writing 10 assignments based on the above syllabus.
Use of JFLAP software is desirable for experimenting with formal languages: topics including nondeterministic finite automata, nondeterministic pushdown automata, multi-tape Turing machines, several types of grammars.

**TEXT BOOKS**

1. Kavi Mahesh, **"Theory of Computation A Problem Solving Approach"**, Wiley India

2. John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, **"Introduction to Automata Theory, Languages and Computation",** Pearson Education.

3. J.C.Martin, **"Introduction to languages and the Theory of Computation"**, TMH.

**REFERENCES**

1. Daniel I.A. Cohen, "**Introduction to Computer Theory"**, John Wiley & Sons.

2. Michael Sipser, **"Theory of Computation",** Cengage Learning.

3. N.Chandrashekhar& K.L.P. Mishra, "Theory of Computer Science, Automata Languages & Computations", PHI publications.

**Theory Examination:**

- Question paper will comprise of 6 questions, each carrying 20 marks.
- Total 4 questions need to be solved.
- Q.1 will be compulsory, based on entire syllabus wherein sub questions of 2 to 3 marks will be asked.
- Remaining question will be randomly selected from all the modules.

Weightage of marks should be proportional to number of hours assigned to each module.

| Subject Code | Subject Name | Teaching Scheme | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|---|---|
| | | Theory | Practical | Tutorial | Theory | TW/ Practical | Tutorial | Total |
| SEITC405 | Web Programming | 04 | 02 | -- | 04 | 01 | -- | 05 |

| Subject Code | Subject Name | Examination Scheme | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Theory Marks | | | | Term Work | Practical | Oral | Total |
| | | Internal assessment | | | End Sem. Exam | | | | |
| | | Test 1 | Test 2 | Avg. of 2 Tests | | | | | |
| SEITC405 | Web Programming | 20 | 20 | 20 | 80 | 25 | --- | 25 | 150 |

**Objective:**

As the part played by Internet in our daily life increases so does the importance of methods and means of Web site realization. This course is devoted to acquire knowledge and skills for creation of Web site considering both client- and server-side programming.

**Outcome:**

Student must be able to:

- Learn basics of web architecture and web development.
- Acquire the knowledge of tools used in industry for web application development.
- Create the web application using tools and techniques learned.

**Topics:**

- Introduction to web technologies
- Client side programming – HTML 5.0, XHTML, CSS, JavaScript
- Server side programming I – ASP.NET and JSP
- Server side programming II -- PHP
- Server side database connectivity
- Web extensions

**Detailed Syllabus**

| Sr. No. | Detail Contents | Weightage | Number of hours |
|---|---|---|---|
| 1 | Introduction to web technologies:<br>Introduction to OSI layers, Web system architecture- 1,2,3 and n tier architecture, URL, domain name system, overview of HTTP and FTP, Cross browser compatibility issues, W3C Validators,Web Site Design Issues: Planning a Web Site – Objective and Goals, Audience, Organizing contents, Publishing of Web Site. Function of Web Server | 05% | 03 |
| 2 | Client Side Programming– HTML 5.0, CSS and JavaScript:<br>Basic HTML, formatting and fonts, Anchors, images, lists, tables, frames and forms, Introduction to CSS, Using CSS for text, background, links and positioning, Introduction to JavaScript, JavaScript language constructs, Objects in JavaScript- Built in, Browser objects and DOM objects, event handling, form validation and cookies. Introduction to JQUERY, The Basics of JQUERY programming, form validation using JQUERY. | 25% | 12 |
| 3 | Server side programming I: ASP.NET and JSP<br>Introduction to c# language,ASP.NET essentials, Life cycle of ASP.NET application,Developing web forms using ASP.NET, Using ASP.NET server controls to create web forms, Session tracking , Introduction to servlet and JSP, life cycle of JSP and servlet, Introduction to basic objects in JSP. | 35% | 16 |
| 4 | Server side programming II: PHP<br>Introduction to PHP- Data types, control structures, built in functions,Building web applications using PHP- tracking users, Introduction to PHP framework. | 10% | 08 |
| 5 | Server side database connectivity:<br>Database connectivity using ADO.Net, JSP &JDBC connectivity with example,PHP and Mysql database connectivity with example. | 20% | 06 |
| 6 | Web Extensions:<br>XML, Introducing XSL, XSL elements, transforming with XSLT, Web feeds (RSS), Introduction to web services. | 05% | 03 |

**Text Books:**

1. "Web Technologies: Black Book", Dreamtech publication
2. "Learning PHP 5", David Sklar, O'Reilly Publication
3. "The Web Warior Guide to Web Programming", Bai, zak, Ekedahl,Farrell, CENGAGE Learning Publication

**Reference Books:**

1. "Internet and world wide web how to program", Deitel&Deitel, Prentice Hall publication
2. "Developing web applications", Ralph Moseley, M.T.Savaliya, Wiley Publication.
3. "Web Programming", Chris Bates, Third edition, Wiley publication
4. "Web Technologies", Uttam K. Roy, Oxford University Press

**Suggested Practical List:**

1. Web pages using HTML 5.0 using Dreamviewer (Preferred) / Any other HTML editor
2. Web pages using JavaScript illustrating the objects in JavaScript
3. Form validation/ event handling using jQuery
4. Web Application development using ASP.NET
5. Database connectivity with ADO.NET
6. Database connectivity using JDBC and JSP
7. Installation and configuration of WAMP server
8. Introduction of PHP framework(Yii,CakePHP, CodeIgniter) and simple application development using the same.
9. Web application development using PHP
10. Database connectivity with PHP
11. A mini project – Complete web site development using
    a. HTML, CSS, JavaScript and ASP.NET OR
    b. HTML, CSS, JavaScript and PHP

**Theory Examination:**

- Question paper will comprise of 6 questions, each carrying 20 marks.
- Total 4 questions need to be solved.
- Q.1 will be compulsory, based on entire syllabus wherein sub questions of 2 to 3 marks will be asked.
- Remaining question will be randomly selected from all the modules.

Weightage of marks should be proportional to number of hours assigned to each module.

| Sub Code | Subject Name | Teaching Scheme | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|---|---|
| | | Theory | Practical | Tutorial | Theory | TW/pract | Tutorial | Total |
| SEITC406 | Information Theory and Coding | 4 | | 1 | 4 | -- | 1 | 5 |

| Sub Code | Subject Name | Examination Scheme | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | | Theory | | | | TW | Pr | Oral | |
| | | Internal Assessment | | | End Sem Exam | | | | |
| | | Test 1 | Test 2 | Avg. of Test 1 & 2 | | | | | |
| SEITC406 | Information Theory and Coding | 20 | 20 | 20 | 80 | 25 | -- | -- | 125 |

**Course Objective:**

To introduce to the students the concept of information and entropy of Information

To give the student the concept of compression of information , error control of Information, and securing information through cryptography.

To give the student the mathematical foundation of compression, error control and security of information.

**Course Outcome:**

Ability of students to understand true meaning of Information and Entropy

Ability of students to understand three aspects of information i.e. compression, error control and security.

**Detailed Syllabus:**

| Unit. No | Topics | Number of Hours |
|---|---|---|
| **1** | **Information Theory & Source Coding**<br>1.1. Introduction to Information Theory<br>1.2. Entropy & Types of Entropy<br>1.3. Source Coding<br>1.4. Prefix Coding<br>1.5. Channel Capacity | **8** |
| **2** | **Compression Algorithms**<br>2.1 Optimal Compression<br>2.2 Compression Algorithms<br>2.3 Huffman Coding, Adaptive Huffman Compression<br>2.4 Dictionary Based Compression<br>2.5 Speech Compression<br>2.6 Sliding Window Compression<br>2.7 LZW,RLE<br>2.8 Lossy & Lossless Compression Schemes<br>2.9 Image Compression – GIF,JPEG | **10** |
| 3 | **Error Control Coding Techniques**<br>3.1 Types of Codes<br>3.2 Error Checking & Correcting Codes<br>3.3 Linear Block Codes<br>3.4 Cyclic Codes<br>3.5 BCH Codes<br>3.6 Convolution Codes | **10** |
| **4** | Basic Number Theory<br>4.1 Modular Arithmetic<br>4.2 Solving ax+by=d<br>4.3 Congruences<br>4.4 Chinese Remainder Theorem<br>4.5 Modular Exponentiation<br>4.6 Fermat's Little and Euler Theorem<br>4.7 Prime Number Generation<br>4.8 Random Number Generation<br>4.9 Primitive Roots<br>4.10 Legendre and Jacobi Symbols<br>4.11 Discrete Probability<br>4.12 Discrete Logarithms | **12** |

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| 5 | Cryptographic Techniques<br>5.1 Security Goals, Threats and Attack on Information<br>5.2 Classic Cryptography<br>5.3 Symmetric Key Cryptography – Stream Ciphers, Block Cipher, Stream Cipher,DES,Triple DES,AES<br>5.4 Public and Private Key Cryptography – RSA,Diffie-Hellman<br>5.5 Hash Function – MD5,SHA-1,Digital Signature | 8 |

**Text Books:**


1. "Information Theory, Coding and Cryptography" Ranjan Bose, Tata McGrawHill , Second Edition.
2. "Information Coding Techniques" R Avudaiammal, Tata McGrawHill , Second Edition.
3. "Essentials of Error-Control Coding", Jorge Castineira Moreirra, Wiley-India Edition
4. "Introduction to Cryptogrpahy with Coding theory" Trappe and Washington" Pearson


**References:**


1. Element of information theory: Thomas Cover wiley

2. An introduction to Theory of numbers: Ivan nivan Wiley


**Tutorial:**

Journal work should comprise of writing 10 assignments based on the above syllabus.

**Theory Examination:**

- Question paper will comprise of 6 questions, each carrying 20 marks.
- Total 4 questions need to be solved.
- Q.1 will be compulsory, based on entire syllabus wherein sub questions of 2 to 3 marks will be asked.
- Remaining question will be randomly selected from all the modules.
- Weightage of marks should be proportional to number of hours assigned to each module.