UNIVERSITY OF KERALA

B. TECH. DEGREE COURSE
(2013 SCHEME)

SYLLABUS FOR
VIII SEMESTER
INFORMATION TECHNOLOGY
# SCHEME -2013

**VIII SEMESTER**

**INFORMATION TECHNOLOGY (F)**

<table>
<thead>
<tr>
<th>Course No</th>
<th>Name of subject</th>
<th>Credits</th>
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<th>C/A Marks</th>
<th>Exam Duration Hrs</th>
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**13.804 Elective III**

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<th>Course No</th>
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<td>13.804.1</td>
<td>Soft Computing (FR)</td>
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<td>13.804.2</td>
<td>Cloud Computing (FR)</td>
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<td>13.804.3</td>
<td>Advanced Microprocessors (F)</td>
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<td>13.804.4</td>
<td>Network Programming (F)</td>
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**13.805 Elective IV**

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<th>Course No</th>
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<tr>
<td>13.805.1</td>
<td>Robotics and Computer Vision (FR)</td>
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<td>13.805.2</td>
<td>Graph Theory (FR)</td>
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<td>13.805.3</td>
<td>Natural Language Processing (FR)</td>
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<td>13.805.4</td>
<td>Distributed Systems (F)</td>
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Course Objective:

- To represent knowledge symbolically in a form suitable for automated reasoning.
- Getting familiar with the knowledge modeling concepts and knowledge representation languages developed for the web

Module – I

Introduction: Concept of Knowledge, Representation, Reasoning, Knowledge-based systems, Need of Knowledge representation and Reasoning, Role of logic.

Language of first order logic: Syntax, Semantics, Pragmatics

Expressing Knowledge: Knowledge Engineering, Vocabulary, Basic Facts, Complex Facts, Terminological Facts, Entailments, Abstract Individuals

Module – II

Describing web resources: RDF – Basic idea- XML-based syntax -RDF Schema- Basic ideas-language – axiomatic semantics for RDF and RDF Schema – Direct inference system for RDF and RDFS – Querying in SPARQL.

Module – III

Web Ontology Language: OWL and RDF/RDFS – Sub languages of OWL- Description of OWL language – Layering of OWL -Examples.

Module – IV

Logic and Inference: Monotonic Rules – Syntax, Semantics, Description Logic Programs – Semantic Web Rules Language, Rule ML

Ontology Engineering: Constructing ontologies manually -Reusing existing ontologies – Ontology mapping.

References:


**Internal Continuous Assessment (Maximum Marks-50)**

- 50% - Tests (minimum 2)
- 30% - Assignments (minimum 2) such as home work, problem solving, quiz, literature survey, seminar, term-project, software exercises, etc.
- 20% - Regularity in the class

**University Examination Pattern:**

- Examination duration: 3 hours    Maximum Total Marks: 100

The question paper shall consist of 2 parts.

**Part A (20 marks)** - Five Short answer questions of 4 marks each. All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

**Part B (80 Marks)** - Candidates have to answer one full question out of the two from each module. Each question carries 20 marks.

**Course Outcome:**

After successful completion of this course, the student will be able to design, describe and utilize web ontologies, define logic semantics and inferences and use ontology engineering approaches in semantic applications.
13.802 E-COMMERCE AND E-SECURITY (F)

Teaching Scheme: 2(L) - 1(T) - 0(P)  
Credits: 3

Course Objectives:

- To understand the basic concepts in e-commerce and e-payment
- To understand the threats and countermeasures involved in providing electronic security

Module – I


Module – II

E-payment  : Payment systems – debit vs. credit, payment instructions, electronic wallet, smart cards.
Payment transaction security  – user anonymity, location untraceability, payment transaction untraceability, confidentiality and non-repudiation of payment transaction, dual signature, freshness of transaction messages.
Electronic check security - Payment authorization transfer, proxies.

Module – III

Digital money security  : Blind signature, exchanging coins, protection against double spending, protection against forging and stealing coins.
Web security  : HTTP messages, HTTP headers leaking information, HTTP cache security, SSL tunneling, SHTTP, web client security, anonymous routing.

Module – IV


References:

Internal Continuous Assessment (Maximum Marks-50)

50% - Tests (minimum 2)
30% - Assignments (minimum 2) such as home work, problem solving, quiz, literature survey, seminar, term-project, software exercises, etc.
20% - Regularity in the class

University Examination Pattern:

Examination duration: 3 hours       Maximum Total Marks: 100

The question paper shall consist of 2 parts.

Part A (20 marks) - Five Short answer questions of 4 marks each. All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

Part B (80 Marks) - Candidates have to answer one full question out of the two from each module. Each question carries 20 marks.

Course Outcome:

At the end of the course, the student will have a good understanding of the fundamental principles governing e-commerce, e-payment and the security threats and solutions involved.
13.803 EMBEDDED SYSTEMS (F)

Teaching Scheme: 2(L) - 1(T) - 0(P)  
Credits: 3

Course Objectives:

- To impart knowledge on the hardware and software aspects of an embedded system.
- To develop skills on how to design an embedded system, its constraints, programming, programming environment and the fundamentals of real time systems and real time Operating systems.

Module – I

Introduction - Definition and classification – Microprocessor Vs Microcontrollers- Processors and hardware units in an embedded system – Software embedded into the system – Embedded system-on-chip - Processor and memory organization. Internal serial communication devices - Parallel port devices - Timer and counting devices - I²C, CAN, USB and advanced serial high-speed bus - PCI, PCI-X and advanced buses - Sensors and Actuators, Device drivers -Interrupt servicing mechanism.

Module – II

Programming concepts - Assembly language vs. high level language - C Program Elements - Queues, stacks and lists - Concepts of embedded programming in C++ - C compilers – Cross compiler – Optimization of memory usage.
Software Development Tools: Embedded Program Development - Downloading the Hex File to the Non Volatile Memory –Hardware Simulator.

Module – III


Module – IV

Real time OS: Real-time operating systems - Features of Real-time operating systems, RTOS services - Structures - Resource management – File system organization and implementation – I/O subsystems – Interrupt handling – Task scheduling models - Handling of interrupt latency and deadlines - Performance metrics.

References:


**Internal Continuous Assessment** *(Maximum Marks-50)*

- 50% - Tests *(minimum 2)*
- 30% - Assignments *(minimum 2)* such as home work, problem solving, quiz, literature survey, seminar, term-project, software exercises, etc.
- 20% - Regularity in the class

**University Examination Pattern:**

*Examination duration: 3 hours  Maximum Total Marks: 100*

The question paper shall consist of 2 parts.

**Part A (20 marks)** - Five Short answer questions of 4 marks each. All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

**Part B (80 Marks)** - Candidates have to answer one full question *(question may contain subdivisions)*, out of the two from each module. Each question carries 20 marks.

**Course Outcome:**

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

- Understand, design, execute and evaluate programs on embedded systems and real time systems that include both hardware and software
- Identify and synthesise of solutions for embedded system problems
13.804.1 SOFT COMPUTING (FR) (Elective III)

Teaching Scheme: 3(L) - 1(T) - 0(P)  

Credits: 4

Course Objective:

- To provide a clear understanding on artificial neural networks and genetic algorithms.
- To solve various crisp and fuzzy set operations.

Module – I


Module – II


Module – III


Module – IV


References:


**Internal Continuous Assessment (Maximum Marks-50)**

- **50% - Tests (minimum 2)**
- **30% - Assignments (minimum 2) such as home work, problem solving, quiz, literature survey, seminar, term-project etc.**
- **20% - Regularity in the class**

**University Examination Pattern:**

*Examination duration: 3 hours Maximum Total Marks: 100*

The question paper shall consist of 2 parts.

**Part A (20 marks)** - Five Short answer questions of 4 marks each. All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

**Part B (80 Marks)** - Candidates have to answer one full question (question may contain subdivisions), out of the two from each module. Each question carries 20 marks.

**Note:** The question paper shall contain at least 30% analytical/problem solving questions.

**Course Outcome:**

After the successful completion of the course students will be able to:

- Have a clear understanding on artificial neural networks.
- Perform crisp and fuzzy set operations.
- Identify various Defuzzification methods
- Explain various genetic algorithms.
- Apply genetic algorithm to solve real world problems.
13.804.2 CLOUD COMPUTING (FR) (Elective III)

Teaching Scheme: 3(L) - 1(T) - 0(P)  
Credits: 4

Course Objective:

- To understand the design of cloud services.
- To understand the concept of virtualization
- To apply different cloud programming models as per need.
- To be able to set up a private cloud.
- To learn to design the trusted cloud computing system

Module - I


Module – II


Module – III


Module – IV


References:

5. George Reese, *Cloud Application Architectures: Building Applications and Infrastructure in the Cloud*, O'Reilly.

**Internal Continuous Assessment (Maximum Marks-50)**

50% - Tests (minimum 2)
30% - Assignments (minimum 2) such as home work, problem solving, quiz, literature survey, seminar, term-project etc.
20% - Regularity in the class

**University Examination Pattern:**

*Examination duration: 3 hours  Maximum Total Marks: 100*

The question paper shall consist of 2 parts.

**Part A (20 marks)** - Five Short answer questions of 4 marks each. All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

**Part B (80 Marks)** - Candidates have to answer one full question (question may contain sub-divisions), out of the two from each module. Each question carries 20 marks.

**Note:** The question paper shall contain at least 30% analytical/problem solving questions.

**Course Outcome:**

After the successful completion of the course students will be able to:

- Have a clear understanding on cloud computing and virtualization techniques.
- Address core issues of cloud computing such as security, privacy, and interoperability.
- Design cloud services and setup a private cloud.
- Design compute and storage clouds based on applications.
- Understand the characteristics and services provided by cloud.
13.804.3 ADVANCED MICROPROCESSORS (F) (Elective III)

Teaching Scheme: 3(L) - 1(T) - 0(P)  
Credits: 4

Course Objective:

- To introduce students to modern microprocessors
- To understand the architecture, programming and interfacing of advanced microprocessors

Module – I

Microprocessors – Internal architecture, real and protected modes, addressing modes, Using assembly language with C/C++ - using data structures, 32 bit applications, mixed assembly, C++ objects.
Programming – Modular programming, using keyboard and video display, data conversions, disk files.

Module – II

Memory interface – 16,32 and 64 bit memory interfaces, memory banks, dynamic RAM – DRAM controllers.
Basic I/O interface – Programmable peripheral interface, programmable interval timer, ADC and DAC converters.
Direct memory access, DMA-controlled I/O. Interrupts, programmable interrupt controller.

Module – III

Arithmetic coprocessor – data formats, programming.
Pipelined Execution – superscalar execution.
Pentium – Memory and I/O systems, timing, superscalar architecture, memory management, Pentium Pro.
PowerPC Processors: 600 Series, 700 Series, and 7400 G4

Module – IV

Pentium II – Memory and I/O systems, timing, software changes.
Pentium III – Chipsets, bus.
Pentium 4 and Core 2 – Memory interface, hyper-threading, multiple core technology, performance-monitoring registers, 64-bit extension.
64Bit Computing - G5: PowerPC 970 - understanding caching and performance.
References:


**Internal Continuous Assessment (Maximum Marks-50)**

50% - Tests (minimum 2)

30% - Assignments (minimum 2) such as home work, problem solving, quiz, literature survey, seminar, term-project etc.

20% - Regularity in the class

**University Examination Pattern:**

*Examination duration: 3 hours  Maximum Total Marks: 100*

The question paper shall consist of 2 parts.

**Part A** (20 marks) - Five Short answer questions of 4 marks each. All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

**Part B** (80 Marks) - Candidates have to answer one full question (question may contain sub-divisions), out of the two from each module. Each question carries 20 marks.

**Note:** The question paper shall contain at least 30% analytical/problem solving questions.

**Course Outcome:**

After successful completion of this course,

- The students understand the advances made in microprocessor architecture
- The students understand the basic concepts of programming and interfacing with modern microprocessors.
13.804.4 NETWORK PROGRAMMING (F) (Elective III)

Teaching Scheme: 3(L) - 1(T) - 0(P) Credits: 4

Course Objective:

This course introduces the students to
- Subtleties of TCP/IP Protocols.
- Implementation and internals of protocol software.
- Interaction among protocols in the TCP/IP Suite.

Module – I

Introduction - The structure of TCP/IP Software in an Operating System – Network Interface Layer – Address recovery and Binding.

Module – II


Module – III


Module – IV


References:


Internal Continuous Assessment *(Maximum Marks-50)*

50% - Tests (minimum 2)
30% - Assignments (minimum 2) such as home work, problem solving, quiz, literature survey, seminar, term-project etc.
20% - Regularity in the class

University Examination Pattern:

Examination duration: 3 hours Maximum Total Marks: 100

The question paper shall consist of 2 parts.
Part A (20 marks) - Five Short answer questions of 4 marks each. All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

Part B (80 Marks) - Candidates have to answer one full question (question may contain subdivisions), out of the two from each module. Each question carries 20 marks.

**Note:** The question paper shall contain at least 30% analytical/problem solving questions.

**Course Outcome:**

At the end of the course, the students will have a good understanding of relationship among TCP/IP protocols and understand the data structures and source code which explains the principles underlying each protocol.
13.805.1 ROBOTICS AND COMPUTERVISION (FR) (Elective IV)

Teaching Scheme: 3(L) - 1(T) - 0(P)  
Credits: 4

Course Objective:  
To familiarize the concepts in image analysis, high-level vision and robotics.

Module - I

History, Present Status and Future Trends of Robotics: robotics and programmable automation, historical background, laws of robotics, robot definitions, robotics systems and robot anatomy, human systems and robotics, specifications of robots, present application status, machine intelligence, computer and robotics—future trends, flexible automation versus robotics technology, safety measures in robotics.

Module - II

Robot Kinematics and Dynamics: Introduction, forward and reverse kinematics (transformation) of three degrees of freedom robot arm, forward and reverse transformation of a four degrees of freedom manipulator in 3-D, homogeneous transformations, kinematic equations using homogeneous transformations, inverse kinematics of robot, robot arm dynamics.

Module - III

Vision as an information processing task, A geometrical framework for vision. 2D and 3D images interpretation, Segmentation, Binary and grey morphology operations, Thresholding, Filtering, Edge and corner detection, Features detection. Contours, Tracking edges and corners, object detection and tracking, Image data compression, Real time Image processing.

Module - IV


References:


**Internal Continuous Assessment (Maximum Marks-50)**

- 50% - Tests (minimum 2)
- 30% - Assignments (minimum 2) such as home work, problem solving, quiz, literature survey, seminar, term-project etc.
- 20% - Regularity in the class

**University Examination Pattern:**

Examination duration: 3 hours  
Maximum Total Marks: 100

The question paper shall consist of 2 parts.

**Part A (20 marks)** - Five Short answer questions of 4 marks each. All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

**Part B (80 Marks)** - Candidates have to answer one full question (question may contain subdivisions), out of the two from each module. Each question carries 20 marks.

**Note:** The question paper shall contain at least 30% analytical/problem solving questions.

**Course Outcome:**

After the successful completion of the course students will be able to:

- Identify the role of inverse kinematics in position controlled robots
- Learn the basics of robotics to perform routine tasks.
- Understands the controls used in robotics.
- Implement various image processing algorithms.
- Identify the components used in computer vision.
13.805.2 GRAPH THEORY (FR) (Elective IV)

Teaching Scheme: 3(L) - 1(T) - 0(P)                Credits: 4

Course Objective:

- To introduce the major concept areas of graph theory.
- To develop an awareness regarding the applications of theorems used in graph theory.
- To provide practical, hands on experience in real world applications of graph theory.

Pre-requisites: 13.303-Discrete Structures

Module – I


Module – II

Combinatorial versus geometric graphs, Planar graphs, Different representation of planar graphs, geometric dual, combinatorial dual, vector spaces of graph, ban2 vectors of a graph, orthogonal vectors and spaces Directed graphs – types of digraphs, Digraphs and binary relation, Euler graphs, trees with directed edges.

Module – III

Graphs theoretic algorithms and computer programming - Algorithm for computer representation of a graph, algorithm for connectedness and components, spanning tree, directed circuits, shortest path, searching the graphs, Isomorphism.

Module – IV

Graphs in switching and cording theory – contact networks, Analysis of contact Networks, synthesis of contact networks, sequential switching networks, unit cube and its graph, graphs in coding theory.

References:


**Internal Continuous Assessment** *(Maximum Marks-50)*

- **50% - Tests (minimum 2)**
- **30% - Assignments (minimum 2) such as home work, problem solving, quiz, literature survey, seminar, term-project etc.**
- **20% - Regularity in the class**

**University Examination Pattern:**

- **Examination duration:** 3 hours  
  **Maximum Total Marks:** 100

The question paper shall consist of 2 parts.

**Part A (20 marks)** - Five Short answer questions of 4 marks each. All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

**Part B (80 Marks)** - Candidates have to answer one full question (question may contain sub-divisions), out of the two from each module. Each question carries 20 marks.

**Note:** The question paper shall contain at least 30% analytical/problem solving questions.

**Course Outcome:**

After the successful completion of the course students will be able to:

- Demonstrate knowledge of fundamental concepts in graph theory, including properties and characterization of bipartite graphs and trees, Euclidian and Hamiltonian graphs.
- Understand and apply some of the classical theorems of graph theory.
- Represent real life situations with mathematical graphs.
- Develop algorithms for connectedness and components, spanning tree, directed circuits, shortest path, searching the graphs, Isomorphism.
- Solve real world problems by applying graph theoretic results and algorithms.
13.805.3 NATURAL LANGUAGE PROCESSING (FR) (Elective IV)

Teaching Scheme: 3(L) - 1(T) - 0(P)  
Credits: 4

Course Objective:

- To impart conceptual and application level aspects of Natural Language Processing.

Module – I


Module – II

Statistical Machine Translation (MT), Statistical Alignment Models and Expectation Maximization (EM) and its use in statistical MT alignment models; complete statistical MT system decoding and A* Search.

Module – III

Information Extraction (IE) and Named Entity Recognition (NER). Information sources, rule-based methods, evaluation (recall, precision). Introduction to supervised machine learning methods. Naive Bayes (NB) classifiers for entity classification, Maximum Entropy Classifiers

Module – IV

Syntax and Parsing for Context-Free Grammars (CFGs): Parsing, treebanks, attachment ambiguities. Context-free grammars. Top down and bottom-up parsing, empty constituents, left recursion, and repeated work, Probabilistic CFGs.

References:


Internal Continuous Assessment *(Maximum Marks-50)*

50% - Tests (minimum 2)

30% - Assignments (minimum 2) such as home work, problem solving, quiz, literature survey, seminar, term-project etc.

20% - Regularity in the class
University Examination Pattern:

Examination duration: 3 hours  Maximum Total Marks: 100

The question paper shall consist of 2 parts.

Part A (20 marks) - Five Short answer questions of 4 marks each. All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

Part B (80 Marks) - Candidates have to answer one full question (question may contain sub-divisions), out of the two from each module. Each question carries 20 marks.

**Note:** The question paper shall contain at least 30% analytical/problem solving questions.

Course Outcome:

After the successful completion of the course students will be able to:

- Understand the basics of Natural Language Processing and thereby figure out ambiguity and uncertainty that exist in languages.
- Apply the concept of N-gram models to solve problems.
- Become aware of the significance of Information Extraction and Named Entity Recognition in Natural Language Processing.
- Evaluate information retrieval methods using the concepts of precision and recall.
- Be thoroughly knowledgeable regarding syntax and parsing for Context Free Grammars.
13.805.4 DISTRIBUTED SYSTEMS (F) (Elective IV)

Teaching Scheme: 3(L) - 1(T) - 0(P)                  Credits: 4

Course Objective:
This course enables the students to

- Describe important characteristics of distributed systems and the salient architectural features of such systems.
- Describe the features and applications of important standard protocols which are used in distributed systems.
- Characterize different implementation paradigms for distributed systems.

Module – I


Module – II

Interprocess Communication: the API for Internet protocol – external data representation and marshalling – client server communication - group communication-Case study: inter process communication in Unix. Distributed objects and remote invocation: communication between distributed objects – remote procedure call – Events and notification.

Module – III


Module – IV


References:


Internal Continuous Assessment (Maximum Marks-50)

50% - Tests (minimum 2)

30% - Assignments (minimum 2) such as home work, problem solving, quiz, literature survey, seminar, term-project etc.

20% - Regularity in the class

University Examination Pattern:

Examination duration: 3 hours  
Maximum Total Marks: 100

The question paper shall consist of 2 parts.

Part A (20 marks) - Five Short answer questions of 4 marks each. All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

Part B (80 Marks) - Candidates have to answer one full question (question may contain sub-divisions), out of the two from each module. Each question carries 20 marks.

Course Outcome:

After the successful completion of the course students will have:

- A sound understanding of the principles and concepts involved in designing distributed systems.
- The ability to implement a distributed application
- An understanding of the design issues relating to publish-subscribe, peer-to-peer networks
- The ability to analyse Distributed System Architecture.
13.806 SOFTWARE TESTING (F)

Teaching Scheme: 2(L) - 1(T) - 0(P)  
Credits: 3

Course Objective:

This course enables the students to

- Understand the concepts involved in software testing
- Get exposure to various types of testing tools

Module – I


Module – II


Module – III


Module - IV

Managing change - Software configuration management - change management – risk analysis and management. Basics of automation testing – why, when and how to perform automation testing - Factors for choosing a particular tool - overview for the major functional testing tools - Overview of Test management and bug tracking tools..

References:

Internal Continuous Assessment *(Maximum Marks-50)*

50% - Tests (minimum 2)

30% - Assignments (minimum 2) such as home work, problem solving, quiz, literature survey, seminar, term-project etc.

20% - Regularity in the class

University Examination Pattern:

Examination duration: 3 hours  
Maximum Total Marks: 100

The question paper shall consist of 2 parts.

Part A (20 marks) - Five Short answer questions of 4 marks each. All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

Part B (80 Marks) - Candidates have to answer one full question (question may contain sub-divisions), out of the two from each module. Each question carries 20 marks.

Course Outcome:

At the end of the course, the students will have

- A sound understanding of the principles and concepts involved in software testing.

- An understanding of the various tools and procedures used in software testing
13.807 WEB APPLICATIONS LAB (F)

Teaching Scheme: 0(L) - 0(T) - 4(P)  Credits: 4

Course Objective:

This course intends to provide hands-on experience to students in designing and implementing web applications.

Exercises:

1. Implementing and deploying web applications using Servlets, HTML and JSPs.
2. Testing the application on an Application Server.
3. Debugging Web applications locally and remotely.
4. Developing applications in a team environment.
5. Retrieval of data from database using SQL and exchange of information in XML format.

Internal Continuous Assessment (Maximum Marks-50)

40% - Test
40% - Regular lab work and proper maintenance of lab records
20% - Regularity in the class

University Examination Pattern:

Examination duration: 3 hours   Maximum Total Marks: 150
Questions based on the list of exercises prescribed.
Marks should be awarded as follows:

20% - Algorithm/Design
20% - Implementing / Conducting the work assigned
30% - Output/Results and inference
30% - Viva voce

Candidate shall submit the certified fair record for endorsement by the external examiner.

Course Outcome:

At the end of the course, the students would have acquired the necessary hands-on skills to design, implement and deploy web applications.
13.808 PROJECT WORK AND VIVA VOCE (F)

Teaching Scheme: 0(L) - 0(T) - 5(P)  
Credits: 5

Course Objective:

- To provide motivation for the students to solve real world problems using mathematics and engineering principles.
- To motivate students to participate in group discussions and thereby exchange ideas.
- To serve as platform to identify research issues in existing systems.

PROJECT WORK:

The project should be based on the core subjects of the discipline. The work can be carried out in the department under the supervision of a faculty member or with the help of an external organization. In the latter case, the motivation of the organizations should be purely academic and they should provide an external guide whose qualifications should be on par with that of a faculty member. An internal guide will be consistently interacting with the external guide and monitoring the progress of the project. There should be a mid-semester and end-semester evaluation of the project. The student has to submit a thesis in the prescribed format, duly certified by the internal guide and external guide (if any).

For the award of the sessional marks, the project report and the power point presentation of the project work shall be assessed by a panel consisting of the Head of the Department, project coordinator, project guide, and a senior faculty member. The Head of the Department shall be the chairman of the panel. The students may be assessed individually and in groups.

VIVA VOCE:

In the viva voce, the student’s performance will be evaluated based on the project work, the seminar presented and the knowledge of the courses in the whole curriculum. The distribution of the marks will be in the ratio 2:1:2, respectively.

At the time of viva-voce examination, the project work has to be evaluated in addition to assessing the students’ knowledge in the field of Computer Science and Engineering and other related and advanced topics. He/she is expected to present his/her academic records including project report, seminar report, etc. at the time of viva-voce examination. Evaluation is a serious process that is to be conducted under the equal responsibility of both the internal and external examiners.

Internal Continuous Assessment (Maximum Marks-150)

Marks by Committee: 50%  
Marks by Guide: 50%

25% - Presentation/viva, clarity in presentation, awareness to the work/topic etc.
50% - Current relevance of the work, implementation/experimentation of the work, involvement in the work etc.
25% - Evaluation of the report

University Examination Pattern:

Viva-Voce

Maximum Total Marks: 100

Marks should be awarded as follows:

40% - General topics covered in the curriculum and other related and advanced topics.
40% - Project work.
20% - Seminar topic

Course Outcome:

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

- Apply knowledge of mathematics, science and engineering principles to solve complex real world problems bringing out economically and socially feasible solutions upholding ethical values.
- Participate in peer group discussions and integrate ideas.
- Apply the knowledge base about advanced topics pertaining to area of study to design and implement solutions to challenging problems.
- Test and analyze the developed system for further improvement.
- Identify new research problems from issues raised during implementation.
- Communicate problems and solutions to society through reports.
- Manage time and resources effectively.