# 17B1WHS731 QUALITY MANAGEMENT

**Course Goal**

Quality management is a system that serves to control Quality in the critical activities of an organization by bringing together resources, equipment, people and procedures. It uses techniques and principles such as quality function deployment, Taguchi method, service quality management, quality audits and Six Sigma to control quality in every sphere of activity in an organization.

**Course Objective**

1. Evaluate the principles of quality management and to explain how these principles can be applied within quality management systems.
2. Identify the key aspects of the quality improvement cycle and to select and use appropriate tools and techniques for controlling, improving and measuring quality.
3. Critically appraise the organisational, communication and teamwork requirements for effective quality management
4. Critically analyse the strategic issues in quality management, including current issues and developments, and to devise and evaluate quality implementation plans
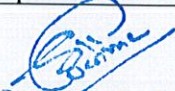
## Detailed Syllabi

### Lecture-wise Breakup

| Subject Code | 17B11WHS731 | Semester | 8 | |
|---|---|---|---|---|
| Subject Name | Quality Management | | | |
| Credits | 3 | Contact Hours | 3 | |
| Faculty (Names) | Coordinator(s) | 1.Dr. Tanu Sharma | | |
| | Teacher(s) (Alphabetically) | | | |
| Module No. | Subtitle of the Module | Topics | | No. of Lectures |

| Unit | Contents | Topic | Hrs |
|------|----------|-------|-----|
| 1 | **The Engineer and QM link** | Introduction<br>The engineer as a specialist<br>The failure of engineering:<br>educational systems: The UK<br>experience<br>The new breed of engineers<br>Engineers' competences and the role of QM<br>The evolution of engineers for Total Quality Management<br>The engineer in a QM environment | 2 |
| 2 | **Pioneers of QM** | How old is the quality concept?<br>Why are the Japanese leading the field of quality? How the West has woken up to the importance of quality<br>WE Deming, Joseph M Juran, Philip B Crosby, Armand V Feingenbaum, Bill Conway, Kaoru Ishikawa, Genichi Taguchi, Shigeo Shingo, W G Ouchi | 3 |
| 3 | **Total Preventative Maintenance for QM** | Introduction<br>What is quality?<br>Some quality characteristics<br>The quality processes<br>What is meant by Quality Control?<br>What is meant by Statistical Quality Control? What is meant by Total Quality Control? What is meant by Quality Assurance? What is meant by Quality Management? Some examples of QM models,<br>QM - a boardroom place<br>OM and productivity<br>QM and Advanced Manufacturing Technology | 3 |
| 4 | **QM** | The meaning of quality systems.<br>Why are Quality Assurance systems needed? The role of quality standards. The different stages of a quality assurance system. The implementation of quality systems.<br>The ISO 9000 quality system<br>British Standard BS 5750/ISO 9000.<br>Registration and accreditation in quality systems | 4 |
| 5 | **QM: Tools and Techniques** | Introduction. Why use tools and techniques in QM? How do we define processes? Process variation and its | 4 |

| | | | causes . What are the tools and techniques for QM?  Process capability.  The implementation of Statistical Process Control | |
|---|---|---|---|---|
| 6 | **Total Preventive QM techniques** | | Introduction  . What is TPM? Failure patterns  . Costs and benefits of TPM Some examples of TPM implementation Towards Zero Defect: Zero Breakdown Implementing TPM: Some guidelines | 3 |
| 7 | **Continuous Process Improvement- #TQM, Besterfield** | | Juran Triology, Improvement Strategies , Types of Problems, The PDCA cycle, Problem solving Methods, Kaizen, Reengineering | 4 |
| 8 | **Leadership And Strategic Planning #TQM, Besterfield** | | Leadership theory and practices, Creating the leadership system, Strategic Planning, leadership, strategy and  organization structure, leadership for Quality ; The Seven Management And Planning tools, | 4 |
| 9 | **Essentials of QM** | | Introduction     Internal customer-supplier chains     External customer-supplier chains     From customer satisfaction to customer commitment from a win-lose to a win-win situation Towards single sourcing-supplier chains The power of communications in customer-supplier chains. | 3 |
| 10 | **Principles of Six Sigma** **#The Management and Control of Quality, Evans Lindsay** | | The statistical basis of Six Sigma ; Six Sigma Problem Solving ( The DMAIC Methodology ; Tools and Techniques; Design for Six Sigma Six sigma in services and small organizations Six Sigma and Lean Production Lean Six sigma and Services | 3 |
| 11 | **Benchmarking** | | Define benchmarking, Reasons to benchmark Process, Deciding what to Benchmark, Pitfalls and criticism of Benchmarking | 5 |
| | **Total Hours** | | | 42 |

## Methodology

The course will be taught with the aid of lectures and case studies. Lectures are combined with hands-on practice and discussion in class. . The students will be provided with research papers which they will analyze and study to further strengthen their understanding of the topics. Students need to read in advance case studies in order to be able to answer the questions. Groupwork outside the classroom is also needed for the students to formulate a strategy for an assigned company.

## Evaluation Scheme

| Exam | Marks |
|---|---|
| Test 1 | 15 |
| Test 2 | 25 |
| Test 3 | 35 |
| Case study\presentation | 20 |
| Assignment | 5 |

| Recommended Reading (Books/Journals/Reports/Websites etc | |
|---|---|
| 1. | Dale H. Besterfield, Pearson, *Total quality Management*, Pearson Education |
| 2. | Evans's. James, Lindsay M. William , *The Management and Control of Quality,* Cengage Learning |
| 3. | H.Lal, Lt. Gen ,Wiley Eastern Limited, 1990 , *Total Quality Management* |
| 4. | Bounds Greg , McGraw , *Beyond Total Quality Management* |
| 5. | Kanishka Bedi, Oxford Higher Education, *Quality Management* |
| 6. | http://www.evans.swlearning.com |
| 7. | www.cengage.com/international |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

### 6. Advanced Algorithms (10M11CI211)
II Sem (CSE), IV Sem Elective (ECE) Credits-4(3-1)

Review of Algorithms. Algorithm correctness and efficiency. Growth of functions. Algorithm analysis methods, recurrences, divide and conquer, backtracking, dynamic programming. Sorting. Search pruning. Heuristic methods. NP – completeness. Matrix operations. String matching. Computational geometry. Approximation algorithm. Linear programming.

### 7. Advanced OS (10M11CI212)
II Sem (CSE), II Sem Elective (ECE) Credits-4(3-1)

Review of OS principles. Synchronization mechanisms. Process deadlocks. Resource models. Theoretical foundations. Inherent limitations of distributed operating systems. Event ordering. Timestamps. Distributed mutual exclusion. Token and non-token based algorithms. Comparative performance analysis. Concurrency control. Agreement protocols for handling processor failures. Coordination of processes and related algorithms. Failure handling and recovery mechanisms. Multiprocessor operating systems and related thread handlings.

### 8. Advance Software Engineering (10M11CI213)
II Sem (CSE) Credits-4(3-1)

Review of software Engineering. PSP.TSP. Usability. Agile Methods. Agile Development. Iterative Scrum. Extreme Programming. Unified Process. Evolution. Requirements engineering.Meta Modeling.Software Architecture and Design Patterns Software Metrics and Software Reliability. Testing Strategies. Planning and Automated Testing. Aspect Oriented Programming (AOP).

### 9. Multimedia Systems(10M11CI214)
II Sem (CSE/ECE) Credits-4(3-1)

Introduction. Multimedia Data Encoding (Audio, Image, Video, and Animation). Quality of Service. Multimedia Operating Systems: Process Management. Inter-process Communication
and Synchronization. Memory Management. Device Management. Media Server Architecture and Storage Management. Networks Services, Protocols, Layers, and Synchronization.

### M.Tech. Courses(Theory- Elective Courses)

### 1.    System and Network Security Techniques(09M11CI421)
I Sem CSE Credits-3(3-0)
Introduction to System security, network security,security system model, ITU TX-800, mathematical foundations for security, classical cipher techniques, Block ciphers: DES,

# Advanced Bioinformatics

**COURSE CODE** BM118T12

**COURSE CREDITS: 3**

CORE/ELECTIVE: CORE

L-T-P: 3-0-0

Pre-requisite: Molecular Biology, Introduction to Bioinformatics

## Course Objectives

1. The objective of the course is to develop an understanding of important concepts of bioinformatics with a focus on next generation sequencing and its applications in the contemporary world.

## Course Outcomes

| Sr. No. | Course outcomes | Level Attainment |
|---|---|---|
| CO I | Able to apply bioinformatics to modern day biology with special focus on next generation sequencing | Familiarity |
| CO II | Able to perform computational analysis of metagenomics | Familiarity |
| CO III | Able to perform computational analysis of RNA-seq | Assessment |
| CO IV | Able to understand and perform Chip-seq analysis | Assessment |
| CO V | To develop a strong foundation variant analysis | Usage |
| CO VI | Able to understand the contemporary research in biology through NGS techniques | Usage |

## Topics Covered

| S. No. | Contents | Lecture required. |
|---|---|---|
| 1 | Bioinformatics and its applications in translational medicine (p4 medicine, Homology modelling, drug design etc) | 1 |
| 2 | Metagenomics and its computational analysis, alpha and beta diversity | 4 |
| 3 | Next generation sequencing (NGS), its applications and its computational analysis, Galaxy package | 4 |
| 4 | R language for bioinformatics | 10 |
| 5 | Relational databases: Design and implementation of relational databases and software programs, ER diagrams | 6 |
| 6 | Gene expression databases and gene expression analysis (microarrays, RNA-seq) | 5 |
| 7 | Chip-Seq and Variant analysis, BAM/SAM file, VCF file | 5 |
| 8 | Protein structure, function and stability prediction, sequence and domain analyses | 2 |
| 9 | Research seminars on contemporary bioinformatics (related to metagenomics, transcriptomics etc.) | 5 |
| | | 42 |

## TEXT BOOKS

1. Biological Sequence analysis by R Durbin, Sean Eddy et al.
2. Metagenomics: perspectives, methods and applications by Muniyandi Nagarajan

Approved in Academic Council Meeting held on 28 July, 2021

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

IQAC

3. Microarray Gene Expression Data Analysis: A Beginner's Guide by Helen Causton

**Evaluation Scheme:**

| Assessment | Max. marks | Duration | Course Covered |
|---|---|---|---|
| T1 Test | 15 | 1 hr. | Syllabus covered upto T-1 |
| T2 Test | 25 | 1.5 hrs. | Syllabus covered upto T-2 |
| End Term Test | 35 | 2 hrs. | Entire Syllabus |
| Teacher Assessment | 25 | Entire Sem | Based on Assignments, quizzes etc. |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

Approved in Academic Council Meeting held on 28 July, 2021

queries, range trees, interval trees, segment trees, ray shooting and partition trees, External memory/cache-oblivious models, B-trees, ordered-file maintenance, list labeling, order queries, priority queues, Distributed data structures, distributed hash table, distributed trees, distributed stack and distributed lists, Streamming data structures, synopsis, sketches, histogram, fingerprint, wavelets and sliding windows.

### 2. Advanced Computer Networks (10M11CI112)
I Sem(CSE) Credits-4(3-1)

Review of computer Networks. IPv6. Security issues in IPv6. TCP/IP details. Voice over IP. Real time communication protocols. High speed local and wide area networks. Virtual networks. Network security. Broadband networks. Introduction to intelligent networking. Performance analysis of networks.

### 3. Advanced Database Systems(10M11CI113)
I Sem (CSE) Credits-4(3-1)

Review of Database systems. Web-enabled database systems. Storage and file structures. Indexing and Hashing. Query Processing. Query Optimization. Object oriented DBMS. Extended relational model. Distributed Databases. Active Databases. Temporal Databases, Spatial Databases. Multimedia databases. Deductive Databases. Emerging databases technologies.

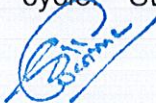### 4. High Performance Computer Architecture (10M11CI114)
I Sem(CSE), III Sem Elective (ECE) Credits-4(3-1)

Performance analysis and scalability. Modeling performance. Pipelined Systems. Interconnection networks. Processor array. Multicomputers. Multiprocessors. Systolic Array. Vector processor. Structured memory design for parallel systems – symmetric shared, distributed shared and synchronization. Parallel Programming Concepts and Design Patterns Theoretical Analysis of Parallel Algorithms , Amdahl's law, Memory Hierarchy Models, Communication Models, CUDA Hardware, CUDA Programming, CUDA Threading Model, CUDA Communication and Memory Model, CUDA Performance Monitoring and Optimizations.

### 5. Fundamentals of Algorithms and Statistical Analysis(11M12CS111)
I Sem (CB) Credits-4(3-1)

Review of Data Structure. Analyzing algorithm, designing algorithm. Growth of functions. Recurrences, divide and conquer algorithms, substitution method for solving recurrences, dynamic programming, greedy algorithm, backtracking. Decision tree, game tree. Index trees – IBST, TBST, AVL, and B Trees. Heaps. Graph algorithms - minimum spanning tree, shortest path, Hamiltonian cycle. String and sequence matching. Basic computational geometry.

queries, range trees, interval trees, segment trees, ray shooting and partition trees, External memory/cache-oblivious models, B-trees, ordered-file maintenance, list labeling, order queries, priority queues, Distributed data structures, distributed hash table, distributed trees, distributed stack and distributed lists, Streamming data structures, synopsis, sketches, histogram, fingerprint, wavelets and sliding windows.

## 2. Advanced Computer Networks (10M11CI112)
I Sem(CSE) Credits-4(3-1)

Review of computer Networks. IPv6. Security issues in IPv6. TCP/IP details. Voice over IP. Real time communication protocols. High speed local and wide area networks. Virtual networks. Network security. Broadband networks. Introduction to intelligent networking. Performance analysis of networks.

## 3. Advanced Database Systems(10M11CI113)
I Sem (CSE) Credits-4(3-1)

Review of Database systems. Web-enabled database systems. Storage and file structures. Indexing and Hashing. Query Processing. Query Optimization. Object oriented DBMS. Extended relational model. Distributed Databases. Active Databases. Temporal Databases, Spatial Databases. Multimedia databases. Deductive Databases. Emerging databases technologies.

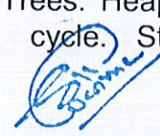## 4. High Performance Computer Architecture (10M11CI114)
I Sem(CSE), III Sem Elective (ECE) Credits-4(3-1)

Performance analysis and scalability. Modeling performance. Pipelined Systems. Interconnection networks. Processor array. Multicomputers. Multiprocessors. Systolic Array. Vector processor. Structured memory design for parallel systems – symmetric shared, distributed shared and synchronization. Parallel Programming Concepts and Design Patterns Theoretical Analysis of Parallel Algorithms , Amdahl's law, Memory Hierarchy Models, Communication Models, CUDA Hardware, CUDA Programming, CUDA Threading Model, CUDA Communication and Memory Model, CUDA Performance Monitoring and Optimizations.

## 5. Fundamentals of Algorithms and Statistical Analysis(11M12CS111)
I Sem (CB) Credits-4(3-1)

Review of Data Structure. Analyzing algorithm, designing algorithm. Growth of functions. Recurrences, divide and conquer algorithms, substitution method for solving recurrences, dynamic programming, greedy algorithm, backtracking. Decision tree, game tree. Index trees – IBST, TBST, AVL, and B Trees. Heaps. Graph algorithms - minimum spanning tree, shortest path, Hamiltonian cycle. String and sequence matching. Basic computational geometry.

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

IQAC

## 6. Advanced Algorithms (10M11CI211)

II Sem (CSE), IV Sem Elective (ECE) Credits-4(3-1)

Review of Algorithms. Algorithm correctness and efficiency. Growth of functions. Algorithm analysis methods, recurrences, divide and conquer, backtracking, dynamic programming. Sorting. Search pruning. Heuristic methods. NP – completeness. Matrix operations. String matching. Computational geometry. Approximation algorithm. Linear programming.

## 7. Advanced OS (10M11CI212)

II Sem (CSE), II Sem Elective (ECE) Credits-4(3-1)

Review of OS principles. Synchronization mechanisms. Process deadlocks. Resource models. Theoretical foundations. Inherent limitations of distributed operating systems. Event ordering. Timestamps. Distributed mutual exclusion. Token and non-token based algorithms. Comparative performance analysis. Concurrency control. Agreement protocols for handling processor failures. Coordination of processes and related algorithms. Failure handling and recovery mechanisms. Multiprocessor operating systems and related thread handlings.

## 8. Advance Software Engineering (10M11CI213)

II Sem (CSE) Credits-4(3-1)

Review of software Engineering. PSP.TSP. Usability. Agile Methods. Agile Development. Iterative Scrum. Extreme Programming. Unified Process. Evolution. Requirements engineering.Meta Modeling.Software Architecture and Design Patterns Software Metrics and Software Reliability. Testing Strategies. Planning and Automated Testing. Aspect Oriented Programming (AOP).

## 9. Multimedia Systems(10M11CI214)

II Sem (CSE/ECE) Credits-4(3-1)

Introduction. Multimedia Data Encoding (Audio, Image, Video, and Animation). Quality of Service. Multimedia Operating Systems: Process Management. Inter-process Communication
and Synchronization. Memory Management. Device Management. Media Server Architecture and Storage Management. Networks Services, Protocols, Layers, and Synchronization.

## M.Tech. Courses(Theory- Elective Courses)

## 1.      System and Network Security Techniques(09M11CI421)

I Sem CSE Credits-3(3-0)

Introduction to System security, network security,security system model, ITU TX-800, mathematical foundations for security, classical cipher techniques, Block ciphers. DES

Assistant (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

## 6. Advanced Algorithms (10M11CI211)
II Sem (CSE), IV Sem Elective (ECE) Credits-4(3-1)

Review of Algorithms. Algorithm correctness and efficiency. Growth of functions. Algorithm analysis methods, recurrences, divide and conquer, backtracking, dynamic programming. Sorting. Search pruning. Heuristic methods. NP – completeness. Matrix operations. String matching. Computational geometry. Approximation algorithm. Linear programming.

## 7. Advanced OS (10M11CI212)
II Sem (CSE), II Sem Elective (ECE) Credits-4(3-1)

Review of OS principles. Synchronization mechanisms. Process deadlocks. Resource models. Theoretical foundations. Inherent limitations of distributed operating systems. Event ordering. Timestamps. Distributed mutual exclusion. Token and non-token based algorithms. Comparative performance analysis. Concurrency control. Agreement protocols for handling processor failures. Coordination of processes and related algorithms. Failure handling and recovery mechanisms. Multiprocessor operating systems and related thread handlings.

## 8. Advance Software Engineering (10M11CI213)
II Sem (CSE) Credits-4(3-1)

Review of software Engineering. PSP.TSP. Usability. Agile Methods. Agile Development. Iterative Scrum. Extreme Programming. Unified Process. Evolution. Requirements engineering. Meta Modeling.Software Architecture and Design Patterns. Software Metrics and Software Reliability. Testing Strategies. Planning and Automated Testing. Aspect Oriented Programming (AOP).

## 9. Multimedia Systems(10M11CI214)
II Sem (CSE/ECE) Credits-4(3-1)

Introduction. Multimedia Data Encoding (Audio, Image, Video, and Animation). Quality of Service. Multimedia Operating Systems: Process Management. Inter-process Communication
and Synchronization. Memory Management. Device Management. Media Server Architecture and Storage Management. Networks Services, Protocols, Layers, and Synchronization.

### M.Tech. Courses(Theory- Elective Courses)

## 1.     System and Network Security Techniques(09M11CI421)
I Sem CSE Credits-3(3-0)
Introduction to System security, network security,security system model, ITU TX-800, mathematical foundations for security, classical cipher techniques, Block ciphers: DES,

IQAC

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

## 10B11CE614 TRANSPORTATION ENGINEERING

RAILWAYS: History of railways in India, alignment and project reports, permanent way and track materials, geometric design, railway points and crossings and junction, track laying, track drainage, station yards, maintenance of track.

AIR PORTS: Development of air transport in India, airport planning, air port design standards, terminal lay out & classification, Design of air port pavements, drainage, marking &lighting, heliports, air traffic control, air cargo, accidents in the air, maintenance of air ports.

DOCKS, HARBOURS AND INLAND WATER WAYS: Historical development in India, tides, winds & waves, docks, harbours, break waters, jetties, landing stages & wharves, dry docks, transit sheds, cargo handling, , inland water transport. Maintenance.

MINOR MODES OF TRANSPORTATION: Pipelines, elevators, belt conveyors, aerial rope ways, & under sea transportation.

## 10B11CE615 ADVANCED STRUCTURAL ANALYSIS

Kani's method to analyze simple portal frames

Basic Principles of matrix method - Flexibility and Stiffness matrices and their generation.

Analysis of Fixed arches

Rolling loads and Influence lines for beams and arches.

Plastic Analysis of beams and frames.

Approximate Methods to analyze Portal frames: Portal method, cantilever method

Matrix Methods of Analysis for Discrete Structures

Flexibility and Stiffness matrices and their generation, Concept of stiffness method, types of skeletal structures, degree of freedom, Stiffness matrix for: Truss elements, Beams in 1-D, 2-D and 3-D,

Formation of the Global Analysis Equations, The General Assembly Procedure, Applying Boundary conditions and Calculating Support Reactions, Analysis of simple plane trusses and plane frames with stiffness matrix method

## 10B17CE671 CIVIL ENGINEERING SOFTWARE LAB

1. AutoCAD: Plan, Elevation, Foundation, Column.
2. Spreadsheets: Problem based on civil related topics like structures, fluid mechanics.
3. STAADPro: Introduction, Modeling and Analysis of structures.
4. Ansys: Introduction, Analysis of 2-D structures, Plane frames.
5. MATLAB: Programming of Analysis of building.
6. Primvera: Introduction

## 10B17CE672 FOUNDATION ENGINEERING LAB

### List of Experiments
1. Consolidation test
2. Triaxial compression test (Undrained condition)
3. Direct shear box test
4. Vane shear test

# Advances in Molecular Cell Biology

**COURSE CODE** 13M11BT111

**COURSE CREDITS: 3**

CORE

L-T-P: 3-0-0

---

Pre-requisite: Molecular Biology, Biochemistry

## Course Objectives
1. This is an advance course with objective expose students to the advanced topics of Molecular Cell Biology

## Course Outcomes

| Sr. No. | Course outcomes | Level Attainment |
|---|---|---|
| CO I | Students will acquire knowledge about the Topological properties of DNA and importance of topoisomarases for cell survival | Familiarity |
| CO II | Students will have understanding about the unique aspect of ekaryotic replication and DNA damage, repair and recombination | Familiarity |
| CO III | Students will acquire advance knowledge Eukaryotic RNA and Protein synthesis | Assessment |
| CO IV | Students will acquire advance knowledge on gene regulation and regulation of cell cycle and cell communication | Usage |
| CO V | Students will be able to comprehend the recent development in the area of genome editing tools and their application | Usage |

## Topic Covered

| S. No. | Contents | Lecture required. |
|---|---|---|
| 1 | Concept: Closed circular DNA, Negative and Positive supercoiling, Linking Number twist writhe. Topoisomerases and their mode of action, Antibiotics based on topoisomerases | 4 |
| 2 | Unique aspects of eukaryotic replication, fidelity of replication, DNA damage, repair mechanisms, homologous and site-specific recombination, | 5 |
| 3 | Eukaryotic RNA polymerases, RNA synthesis and RNA processing in eukaryotes. RNA editing, splicing, and polyadenylation | 4 |
| 4 | Aminoacylation of tRNA, tRNA-identity, aminoacyl tRNA synthetase, and translational proof-reading, translational inhibitors, Post- translational modification of proteins. | 4 |
| 5 | Inducible, Repressible Positive and Negative Control of Gene Expression, Lac operon mutants, Tryptophan Repression and Attenuation, Repression of Lambda Lytic Pathway Genes, Translational Control of Gene Expression, Post-Translational gene regulation. Major gene regulation mechanisms in eukaryotes with examples | 10 |
| 6 | Cell Cycle Checkpoints, **cyclins and cyclin-dependent kinases (CDKs),** Regulation of Cell Cycle Apoptosis, pathways, Regulation and role in cancer | 5 |
| 7 | General principles of cell communication cell surface receptor, signaling through G-protein coupled receptors, signal transduction pathways, second messengers, regulation of signalling pathways, interaction of cancer cells with normal cells | 6 |
| 8 | Genome editing, Zinc finger nuclease, ALLEN, CRISPR/Cas, CRISPER/Cas vectors and their delivery, Advancement in genome editing tools, Application of | 4 |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

| | | |
|---|---|---|
| | genome editing | |
| | Total Contact Hours | 42 |

**TEXT BOOKS**
1. Molecular Cell Biology by Lodish
2. Molecular Biology, PS Verma VK Agarwal
3. Principles of genetics / D. Peter Snustad, Michael J. Simmons Snustad, D. Peter

**REFERENCE BOOKS**

1. **Research and Review Articles:**
2. Lewin's GENES IX, X XII

**Evaluation Scheme:**

| Assessment | Max. marks | Duration | Course Covered |
|---|---|---|---|
| T1 Test | 15 | 1 hr. | Syllabus covered upto T-1 |
| T2 Test | 25 | 1.5 hrs. | Syllabus covered upto T-2 |
| End Term Test | 35 | 2 hrs. | Entire Syllabus |
| Teacher Assessment | 25 | Entire Sem | Based on Assignments, quizzes etc. |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

Approved in Academic Council Meeting held on 28 July, 2021

# Artificial Intelligence

COURSE CODE: 18B1WCI732

COURSE CREDITS: 2

CORE/ELECTIVE: ELECTIVE

L-T-P: 2-0-0

**Pre-requisites:** Data Structure, Discrete Structure

## Course Objectives:

1. Describe introductory techniques in Artificial Intelligence
2. Heuristic search and adversarial search, Logic for knowledge representation and reasoning
3. Reasoning under uncertainty
4. Machine Learning
5. Apply introductory techniques in Artificial Intelligence to solve realistic problems.

## Course Outcomes:

| S. No. | Course Outcomes | Level of Attainment |
|--------|-----------------|---------------------|
| CO-1 | Determine the characteristics of a given problem that an intelligent system must solve. | Familiarity |
| CO-2 | Apply Bayes rule to determine the probability of a hypothesis given evidence. | Assessment |
| CO-3 | Identify examples of knowledge representations for reasoning under uncertainty. | Assessment |
| CO-4 | List the differences among the three main styles of learning: supervised, reinforcement, and unsupervised. | Assessment |
| CO-5 | Identify examples of classification tasks, including the available input features and output to be predicted. | Assessment |

## Course Contents:

| Unit | Contents | Lectures Required |
|---|---|---|
| 1 | **Introduction:** Intelligence, Definitions of Intelligent Agents<br><br>**Single-Agent Search:** Breadth-first, Depth-first and Iterative Deepening Search, Heuristic Search (A* search), Stochastic Local Search (Simulated Annealing, Genetic algorithms) | 7 |
| 2 | **Adversarial Search:** Minimax Search, Alpha-beta pruning, Stochastic Games and Expectiminimax<br><br>**Knowledge Representation and Logic:**<br>Propositional Logic, Propositional Inference , First-Order Logic, Propositional Inference (Forward chaining, Backward chaining) | 7 |
| 3 | **Reasoning Under Uncertainty:** Probability Bayes Rule , Bayesian Networks, Bayesian Inference | 7 |
| 4 | **Machine Learning:** Definition and examples of broad variety of machine learning tasks, including classification, Inductive learning, Simple statistical-based learning, such as Naive Bayesian Classifier, decision trees, The over-fitting problem, Measuring classifier accuracy | 11 |
| **Total lectures** | | 32 |

## Suggested Text Book(s):

1. Artificial Intelligence a Modern Approach, 3rd Edition. Prentice Hal
2. Artificial Intelligence Hardcover by Elaine Rich and Kevin Knight
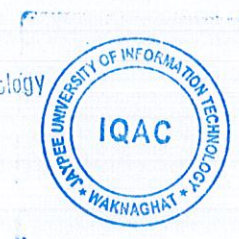
## Suggested Reference Book(s):

1. Paradigms of Artificial Intelligence Programming: Case Studies in Common Lisp by Peter Norvig
2. Machine Learning by Tom M. Mitchell
3. Prediction Machines: The Simple Economics of Artificial Intelligence by Ajay Agrawal , Joshua Gans , Avi Goldfarb

## Other useful resource(s):

1. Link to NPTEL course contents:
    i. https://nptel.ac.in/courses/106105077/
    ii. https://nptel.ac.in/courses/106105079/
2. Link to topics related to course:

i.  https://www.ibm.com/developerworks/library/cc-beginner-guide-machine-learning-ai-cognitive/index.html
ii.  https://ai.google/education/

## Evaluation Scheme:

| S. No | Exam | Marks | Duration | Coverage / Scope of Examination |
|-------|------|-------|----------|--------------------------------|
| 1 | T-1 | 15 | 1 Hour. | Syllabus covered upto T-1 |
| 2 | T-2 | 25 | 1.5 Hours | Syllabus covered upto T-2 |
| 3. | T-3 | 35 | 2 Hours | Entire Syllabus |
| 4. | Teaching Assessment | | Entire Semester | Assignment (2) - 10<br><br>Quizzes (2)      - 10<br><br>Attendance - 5 |

## Course Outcomes (COs) contribution to the Programme Outcomes(POs)

| Course outcomes ( Artificial Intelligence ) | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 | PO-8 | PO-9 | PO-10 | PO-11 | PO-12 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-1 | 3 | 3 | 3 | 1 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 1.9 |
| CO-2 | 3 | 3 | 3 | 1 | 3 | 2 | 1 | 2 | 1 | 2 | 3 | 2 | 2.2 |
| CO-3 | 3 | 3 | 3 | 3 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 2 | 2.3 |
| CO-4 | 3 | 3 | 3 | 3 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 2 | 2.3 |
| CO-5 | 3 | 3 | 3 | 3 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2.3 |
| Weightage | 3 | 3 | 3 | 2.2 | 2 | 1.4 | 1.6 | 2 | 1.6 | 2 | 2.6 | 2 | |

# BASIC ELECTRONICS DEVICES AND CIRCUITS

## (Core Subject)

| Course Code: | 10B11EC211 | Semester: | 2nd Semester, B. Tech (ECE, CSE & IT) |
|---|---|---|---|
| Credits: | 4 | Contact Hours: | L-3, T-1, P-0 |

## Course Objectives

The objectives are to study

1. To understand and acquire knowledge about various semiconductor devices.
2. To prepare the students to design simple electronic circuits to meet a practical requirement.
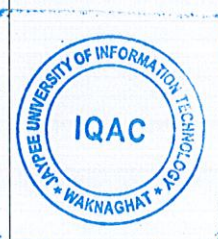
## Course Outcomes

Upon successful completion of this course the students would have:

1. Acquire knowledge about the different semiconductor materials and their behavior.
2. Able to understand the construction, working and characteristic of diode, BJT and FET.
3. Develop an ability to design different biasing arrangements of BJT and FET for stabilizing the operating point.
4. Able to understand the working of basic electronic circuits.
5. Able to design complex electronic circuits using basic semiconductor devices.

## Course Content

| Unit | Topics | References (chapter number, page no. etc) | Lectures |
|---|---|---|---|
| 1 | **Semiconductors** Intrinsic semiconductors, Charge carriers (electrons and holes), Energy-band diagrams, Extrinsic semiconductors (N-type and P-type and their representation), Effect of temperature on conductivity | **Chap- 1** **R L Boylestad** | 5 |
| 2 | **Semiconductor Diodes** Unidirectional property, Formation of depletion layer, Drift current, Diffusion current, $PN$-junction with no bias, with forward bias and with reverse bias, Transition and diffusion capacitances, $V\text{-}I$ characteristics, Comparison of Si and Ge diodes, Temperature effects, Diode resistance (static and dynamic), Diode equation, Ideal diode, Circuit model of a diode. | **Chap-1** **R L Boylestad** | 8 |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

IQAC

| 3 | **Diode Applications**<br>Block diagram of dc power supply, Half-wave and full-wave (centre tap and bridge) rectifiers, PIV rating of diode, Performance of half-wave and full-wave rectifiers, Shunt capacitor filter and its ripple factor, Clippers: Series and Parallel, Limiters; Clampers, SMPS.<br>Breakdown Diodes : Zener and avalanche breakdown mechanism, Zener diode, Analysis of Zener voltage regulator | **Chap-2**<br><br>**R L Boylestad** | 8 |
|---|---|---|---|
| 4 | **Bipolar Junction Transistors (BJTs)**<br>BJT Structure, Working of a transistor, Transistor current equation, Collector reverse saturation current, three configurations, CB and CE input and output characteristics, Comparison between three configurations, Basic CE amplifier, DC load line, Biasing of a transistor. | **Chap-3,4**<br><br>**R L Boylestad** | 8 |
| 5 | **Transistor Amplifiers**<br>Amplification, A practical CE amplifier, Need of DC analysis, AC analysis, Role of capacitors. | **Chap-3,5**<br><br>**R L Boylestad** | 5 |
| 6 | **Field-Effect Transistors (FETs)**<br>Junction Field-Effect Transistor (JFET): Basic construction, Pinch-off voltage, Drain saturation current, Output and transfer characteristics, Voltage controlled resistor, JFET parameters, JFET small-signal amplifier, Its AC analysis.<br>Metal Oxide Semiconductor Field Effect Transistors (MOSFETs): *Depletion MOSFET* : Structure, Working principle, Output characteristics; *Enhancement MOSFET* : Structure, Formation of channel, Output characteristics; *CMOS.* | **Chap-6,7**<br><br>**R L Boylestad** | 8 |

## Evaluation Scheme

1. Test 1 : 15 marks
2. Test 2 : 25 marks
3. Test 3 : 35 marks
4. **Internal Assessment** : 25 marks
   - 10 Marks : Class performance, Tutorials & Assignments
   - 10 Marks : Quizzes
   - 5 marks : Attendance

## Text Books

1. R L Boylestad and Nachelsky: Electronic Devices & circuit Theory, 10th Ed.Pearson.

2. Thomas L Floyd: Electronic Devices, Pearson Education (US), 1995.

## Reference Books

1. B.G. Streetman: Solid State Electronic Devices, 5th Ed., Prentice Hall, 2000

2. Adel S. Sedra, Kenneth C. Smith    : Microelectronics Circuits, 5th Ed., Oxford University Press, 2004

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

# Basic Electronics LAB

## (Core Subject)

| Course Code: | 15B11EC471 | Semester: | 4th Semester, B. Tech (BI& BT) |
|---|---|---|---|
| Credits: | 1 | Contact Hours: | L-0, T-0,P-2 |

## Course Objectives

1. To have understanding of Ohm's law, Kirchhoff's current and voltage laws.

2. Introduce the working, the characteristics and the applications of electronic devices.

3. To have basic understanding of digital electronics.

5. To analyze digital circuits with logic gates.

## Course Outcomes

1) After studying this course the students would gain enough knowledge analyze and design various electrical circuits

2) To implement various electronic circuits using discrete components and to understand their applications.

3) To implement Boolean expressions using logic gates and understand their application in logic design.

## List of Experiments

1. Introduction to power supply, Multimeter, CRO & Function Generator.

2. To determine the equivalent resistance of a circuit using colour code and to verify it using a multimeter.

3. To verify Kirchoff's Voltage Law(KVL).

4. To verify Kirchoff's Current Law(KCL).

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

5. To plot the characteristics of a diode in forward and reverse biased conditions.

6. To plot input and output characteristics of a transistor in common-base configuration

7. To plot the drain and transfer characteristics of a JFET in common - source configuration

8. To implement Logic gates using TTL ICs.

9. Implementation of combinational circuits using MSI Logic.

10. To verify NAND and NOR gates as a universal gates.

## Evaluation Scheme

1. Mid Sem Evaluation      20 Marks
2. End Sem Evaluation      20 Marks
3. Attendance      15 Marks
4. Class response      30 Marks
5. File      15 Marks

**Total Marks**      **100 Marks**

## Text Books

1. Basic Electrical Engineering D C Kulshreshtha tata Mc Graw Hill
2. Electronic Devices and circuit theory : Boylestad and Nashelsky PHI
3. Digital Fundamentals Floyd

# Bioentrepreneurship and Management

**COURSE CODE** 14M11BT214

**COURSE CREDITS: 3**

CORE/ELECTIVE: CORE

L-T-P: 3-0-0
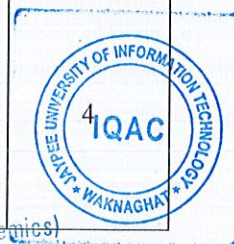
Pre-requisite: B. Tech

## Course Objectives

1. The objective of the course is to provide an insight to the students on different aspects of entrepreneurship in different streams of Biotechnology and related ones, so that their technological expertise would be utilize to generate new business avenues.

## Course Outcomes

| Sr. No. | Course outcomes | Level Attainment |
|---------|-----------------|------------------|
| CO I | Able to understand the nature and functions of the bio-based industries | Familiarity |
| CO II | Able to explore different biotech business models and to acquire the fundamentals of biotech business management | Familiarity |
| CO III | Able to understand the fundamentals of business setup including organizational structure, market strategy, financial planning etc. | Assessment |
| CO IV | To understand the requirements of a biotech business plan in particular from the perspective of prospective funders | Usage |
| CO V | Able to launch a new business with a holistic understanding of the firm functions and their role and have presentation skills to market a new venture | Usage |

## Topic Covered

| S. No. | Topics Covered | Teaching required |
|--------|----------------|-------------------|
| 1 | Importance of entrepreneurship and its essential features, Entrepreneurs: Types, characteristics, qualities and skills, and their functions, Entrepreneurial Attributes and Characteristics, Factors affecting entrepreneurship in action | 3 |
| 2 | **Introduction to bioentrepreneurship**: Biotechnology in a global scale; Scope in bioentrepreneurship; Types of bio-industries: Biopharma, Bioagri, Bioservices & Bioindustrial; Opportunities: Entreprenuership development programs of public and private agencies (MSME, DBT, BIRAC, Startup & Make in India); Patent landscape, IP protection & commercialization strategies. | 5 |
| 3 | **Business plan and its preparation**: Definition, its importance, its various components, writing of a business plan. **Business feasibility:** Business idea generation and feasibility analysis by SWOT, socio-economic costs benefit analysis. **Market validation:** Opportunity recognition as entrepreuner, marketability analysis, identifies key information such as market size and opportunities (are there other uses/markets besides what the researcher has identified?; trends in the industry, presence of competitors), | 4 |

| | | |
|---|---|---|
| 4 | **Financing options:** Funds/support from Government agencies like MSME/banks and private agencies like venture capitalists:/angel investors for bioentrepreneurship; Business plan proposal for "virtual startup company"; statutory and legal requirements for starting a company/venture; **Basics in accounting practices:** Concepts of balance sheet, profit and loss statement, double entry, bookkeeping; collaborations & partnerships; information technology for business administration and expansion. | 3 |
| 5 | **Creating the Organization:** Development of organizational vision and mission and its culture issues Organization design, Statutory and legal requirements for starting a venture **Launching the venture:** Establishing the organizational goals and strategies, marketing functions, designing the venture's information systems, financial and accounting systems | 3 |
| 6 | Assessment of market demand for potential product(s) of interest; Market conditions, segments; Identifying needs of customers including gaps in the market, packaging the product; Market linkages, branding issues; Developing distribution channels; Pricing/Policies/Competition; Promotion/Advertising. Managing growth and downturns, Succession or contingency planning, Founder's dilemma | 4 |
| 7 | Knowledge Centre and R&D Knowledge centres e.g., in universities, innovation centres, research institutions (public & private) and business incubators; R&D for technology development and upgradation; assessment of technology development; managing technology transfer; industry visits to successful bio-enterprises, regulations for transfer of foreign technologies; quality control; technology transfer agencies; Understanding of regulatory compliances and procedures (CDSCO, NBA, GLP, GCP, GMP) | 6 |
| | No. of Lectures | 42 |

**Case Studies**

1. Prepare a proposal for funding from any one of the Government funding agency.

2. Students should be made to start a 'mock company' based on their ideas, systematically following all the procedures. The market analysis developed by them will be used to choose the product or service. The students need to defend their idea of making a product or service through mock company.

**TEXT BOOKS**
1. Entrepreneurship and small firms. D. Deakins, M. Freel. The McGrawHill Education, 5th Edition.
2. Enterprise for life scientists: Developing innovation and entrepreneurship in the biosciences. Adams, D. J., & Sparrow, J. C. (2008). Bloxham: Scion
3. Biotechnology entrepreneurship: Starting, managing, and leading biotech companies. Shimasaki, C. D. (2014). Amsterdam: Elsevier. Academic Press is an imprint of Elsevier.. Innovation, Commercialization, and Start-Ups in Life Sciences. Jordan, J. F. (2014). London: CRC Press.

**REFERENCE BOOKS**
1. The Dynamics of Entrepreneurial Development and Management. Desai, V. (2009). New Delhi: Himalaya Pub. House.
2. Business modeling for life science and biotech companies: Creating value and competitive advantage with the milestone bridge. Onetti, A., & Zucchella, A. (n.d.). Routledge. Entrepreneurship. R. D. Hisrich, M. P. Peters. The McGrawHill Education, 5th Edition
3. Entrepreneurship: New Venture Creation, D. H. Holt. Prentice-Hall India (2004).

**Evaluation Scheme:**

| Assessment | Max. marks | Duration | Course Covered |
|---|---|---|---|
| T1 Test | 15 | 1 hr. | Syllabus covered upto T-1 |

Approved in Academic Council Meeting held on 28 July, 2021
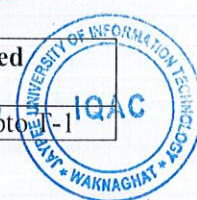
# Business Analytics

COURSE CODE:18B1WHS632

COURSE CREDITS: 3

CORE/ELECTIVE: ELECTIVE

L-T-P: 3-0-0

**Pre-requisite:** None

## Course Objectives:

1. To understand facets of business analytics within an organization.
2. To gain an understanding of how managers use business analytics to formulate and solve business problems and to support managerial decision making.
3. To become familiar with the processes needed to develop, report, and analyze business data.
4. To analyze real world business problems, not only with the context of the company but also with the context of the society, with the help of modern concepts and tools and techniques of the concerned area.
5. To provide an optimal solution which benefits both the company and the society as a whole.
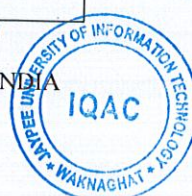
## Course Outcomes:

| S.No. | Course Outcomes | Level of Attainment |
|-------|-----------------|---------------------|
| CO-1 | Understanding the concepts and dimensions of business analytics | Familiarity |
| CO-2 | Formulations of business analytics problems | Assessment |
| CO-3 | Developing and reporting of the problems after proper assessment | Assessment |
| CO-4 | Analyzing problems using different tools and techniques of business analytics | Usage |
| CO-5 | Designing an optimal strategy to help the company | Usage |

## Course Contents:

| Unit | Contents | Lectures required |
|------|----------|-------------------|
| 1 | **Introduction:**Introduction and importance to Business Analytics, Categorization of Analytical Methods and Models, Business Analytics in Practice – Marketing, HR, Finance etc. | 3 |
| 2 | **Business Analytics Models:** Overview and Deployment of Business Analytics Models | 2 |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt., Solan (H.P.)

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY WAKNAGHAT, SOLAN (H.P.) INDIA

| | | | |
|---|---|---|---|
| 3 | **Exploring Data:** Describing the distribution of single variable – Types of data, categorical variables etc,; Relationships among variables – categorical variables, categorical and numerical variables and numerical variables | 6 |
| 4 | **Probability and Decision Making:** Probability and distributions – single random variables; Distributions – normal, binomial, poisson and exponential; Decision making under uncertainty – elements of decision analysis, precision tree, Bayes' rule, multistage decision problems; Applications in Business Management | 7 |
| 5 | **Statistical Inference:**Sampling and sampling distributions; Confidence Interval Estimations; Hypothesis testing; Applications in Business Management | 7 |
| 6 | **Regression Analysis:**Regression Analysis – Estimation; Regression Analysis – Inference; Applications in Business Management | 8 |
| 7 | **Simulation Modeling:** Introduction to Simulation Modeling; Simulation Models – Operations, Financials, Marketing Applications in Business Management | 9 |
| **Total Number of Lectures** | | 42 |

**Suggested Text Book(s):**

1. S. Christian Albright and Wayne L. Winston: Business Analytics: Data Analysis and Decision Making, Cengage Learning, 5e

**Suggested Reference Book(s):**

1. Jeffrey D Camm et al.: Essentials of Business Analytics, Cengage Learning
2. Halady P: Business Analytics: An Application Focus, PHI
3. Seema Acharya and R. N. Prasad: Fundamentals of Business Analytics, Wiley
4. Some real life data from different government/non-government sources will also be discussed and analysed.

**EvaluationScheme:**

| S. No | Exam | Marks | Duration | Coverage / Scope of Examination |
|---|---|---|---|---|
| 1 | T-1 | 15 | 1 Hour. | Syllabus covered upto T-1-> Unit 1, 2 and 3 |
| 2 | T-2 | 25 | 1.5 Hours | Syllabus covered upto T-2->Upto T1 Unit 4and 5 (partially) |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

Department of Humanities and Social Sciences

IQAC
JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY · WAKNAGHAT ·

| 3. | T-3 | 35 | 2 Hours | Entire Syllabus |
|---|---|---|---|---|
| 4. | Teaching Assessment | 25 | Entire Semester | Attendance – 5<br>Class Performance - 10<br>Quizzes –10 |

## 10B11CE614 TRANSPORTATION ENGINEERING

RAILWAYS: History of railways in India, alignment and project reports, permanent way and track materials, geometric design, railway points and crossings and junction, track laying, track drainage, station yards, maintenance of track.

AIR PORTS: Development of air transport in India ,airport planning, air port design standards, terminal lay out & classification, Design of air port pavements, drainage, marking &lighting, heliports, air traffic control, air cargo, accidents in the air, maintenance of air ports .

DOCKS, HARBOURS AND INLAND WATER WAYS: Historical development in India , tides, winds & waves, docks, harbours, break waters, jetties, landing stages & wharves, dry docks, transit sheds, cargo handling, , inland water transport. Maintenance.

MINOR MODES OF TRANSPORTATION: Pipelines, elevators, belt conveyors, aerial rope ways, & under sea transportation.

## 10B11CE615 ADVANCED STRUCTURAL ANALYSIS

Kani's method to analyze simple portal frames

Basic Principles of matrix method - Flexibility and Stiffness matrices and their generation.

Analysis of Fixed arches

Rolling loads and Influence lines for beams and arches.

Plastic Analysis of beams and frames.

Approximate Methods to analyze Portal frames: Portal method, cantilever method

Matrix Methods of Analysis for Discrete Structures

Flexibility and Stiffness matrices and their generation, Concept of stiffness method, types of skeletal structures, degree of freedom, Stiffness matrix for: Truss elements, Beams in 1-D, 2-D and 3-D,

Formation of the Global Analysis Equations, The General Assembly Procedure, Applying Boundary conditions and Calculating Support Reactions, Analysis of simple plane trusses and plane frames with stiffness matrix method

## 10B17CE671  CIVIL ENGINEERING SOFTWARE LAB

1. AutoCAD: Plan, Elevation, Foundation, Column.
2. Spreadsheets: Problem based on civil related topics like structures, fluid mechanics.
3. STAADPro: Introduction, Modeling and Analysis of structures.
4. Ansys: Introduction, Analysis of 2-D structures, Plane frames.
5. MATLAB: Programming of Analysis of building.
6. Primvera: Introduction

## 10B17CE672 FOUNDATION ENGINEERING LAB

### List of Experiments
1. Consolidation test
2. Triaxial compression test (Undrained condition)
3. Direct shear box test
4. Vane shear test

# COMMUNICATION SYSTEMS
**(Core Subject)**

| Course Code: | 07B51EC241 | Semester: | 5th Semester, B. Tech (CSE/IT) |
|---|---|---|---|
| Credits: | 4 | Contact Hours: | L-3, T-1, P-0 |

## Course Objectives
1. To introduce the concept of communication system.
2. To make the students to know the constituents of the communication systems such as transmitter, receiver and channel with their features.
3. To enhance the understanding of communication system and device.

## Course Outcomes
This course provides the knowledge of analog and digital communication system analysis and design. After study through lectures and assignments, students will be able to
1. Formulate and interpret the presentation and processing of signals in communication systems.
2. Assess and evaluate different analog and digital modulation and demodulation techniques.
3. Develop an ability to compare and contrast the strengths and weaknesses of various communication systems.
4. Evaluate the influence of noise on communications signals.
5. Understand the state-of-art of the communication systems.

## Course Contents

| Unit | Topics | References (chapter number, page no. etc) | Lectures |
|---|---|---|---|
| 1. | Introduction: Review of Signals and Systems, Review of Fourier Analysis, Elements of a communication system, Introduction to Modulation, Need of Modulation in Communication Systems, band-limited signals and systems, bandwidth, time-limited and frequency-limited signals. | B.P. Lathi: Chapter 1 W. Tomasi: Chapter 1 | 3 |

| 2. | Amplitude Modulation: DSBSC, AM, SSBSC, VSB modulation, Generation and detection of AM signals: Coherent detection, Envelope detection, Generation and detection of DSBSC, SSBSC signals. | B.P. Lathi: Chapter 4 W. Tomasi: Chapter 4-5 | 12 |
|---|---|---|---|
| 3 | Angle Modulation: Concepts of FM and PM, Narrowband and Wideband FM, Carson's rule, Generation and detection of FM signals. | B.P. Lathi: Chapter 5 W. Tomasi: Chapter 7 | 10 |
| 4 | Analog Communication Systems: Homo/Hetro/ Super-hetrodyne Receivers, Multiplexing, TDM, FDM, QCM, PLL. | W. Tomasi: Chapter 8 | 3 |
| 5 | Noise: Performance of modulation systems in presence of noise, Study of channel noise performance for various modulation schemes. | B.P. Lathi: Chapter 9 &12 | 3 |
| 6 | Sampling and Pulse Modulation Techniques: Sampling theorem, time and frequency domain analysis of sampling , aliasing effect, under sampling and oversampling, practical sampling, Reconstruction of signals, PAM, PPM, PWM generation & demodulation methods, Overview of Digital Communication Systems (DCS) - Merits and Demerits. | B.P. Lathi: Chapter 6 W. Tomasi: Chapter 10 | 6 |
| 7 | Analog to Digital Conversion: Quantization, Quantization Noise, Pulse code Modulation– PCM generation and reconstruction- Differential PCM, DM and ADM. | B.P. Lathi: Chapter 6 | 4 |
| 8 | Digital Modulation Techniques: ASK, FSK,PSK, QPSK Modulation, Demodulation, Constellation diagrams, Comparison of digital modulation systems. | B.P. Lathi: Chapter 7 W. Tomasi: Chapter 9 | 4 |
| | | **Total Number of Lectures** | **45** |

## Evaluation Scheme

1. Test 1 : 15 marks
2. Test 2 : 25 marks
3. Test 3 : 35 marks
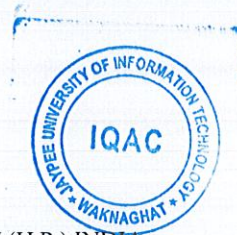
JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY WAKNAGHAT, SOLAN (H.P.) INDIA

4. **Internal Assessment** : 25 marks
   - 10 Marks : Class performance, Tutorials & Assignments
   - 10 Marks : Quizzes
   - 5 marks : Attendance

## Text Books

1. B.P. Lathi, Zhi Ding, "Modern Digital and Analog Communication", 4th Ed., Oxford University Press.
2. W. Tomasi , "Electronic Communications Systems : Fundamentals Through Advanced", 5th Ed., Pearson.

## Reference Books

1. Simon S. Haykin, Michael Moher, "Communication Systems", 4th Ed., John Wiley.
2. Bruce Carlson, "Communication Systems", McGrawHill.

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

# COMMUNICATION SYSTEMS LAB

## (Core Subject)

| Course Code: | 08B51EC801 | Semester: | 5th Semester, B. Tech (CSE & IT) |
|---|---|---|---|
| Credits: | 1 | Contact Hours: | L-0, T-0,P-2 |

## Course Objectives

The objectives are to enhance the understanding of students of communication systems and devices.

## Course Outcomes

After studying this course the students would gain enough knowledge to

➢ Design different analog and digital modulation and demodulation techniques.
➢ Design various pulse modulation schemes.

## List of Experiments

1. To study Amplitude modulation and demodulation

2. To study Frequency modulation and demodulation.

3. To study Pulse Amplitude modulation and demodulation.

4. To study Pulse Width modulation.

5. To study Pulse Position modulation.

6. To study Delta Modulation.

7. To study Amplitude Shift Keying.

8. To study Frequency Shift Keying.

9. To study Phase Shift Keying.

10. To study various Line Coding techniques.

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY WAKNAGHAT, SOLAN (H.P.) INDIA

# COURSE DESCRIPTION

| | |
|---|---|
| **Course Code:** | 10B11CI612 |
| **Course Title:** | Compiler Design |
| **Course Credits:** | 4 (3-1-0) |
| **Semester:** | VI$^{th}$ Semester [CSE] |

## Purpose

This course covers modern compiler techniques and their application to both general purpose and domain specific languages. The practical aspects focus on current technologies, primarily Java and interactive web services.

## C Prerequisites

Introduction to Computer and Programming: This is a programming-intensive course. The primary languages used are C and Java and familiarity with them is assumed.

## Course Objectives

The learning objectives of this course are

- Develop a greater understanding of the issues involved in programming language design and implementation
- . Develop an in-depth understanding of functional, logic, and object-oriented programming paradigms
- Implement several programs in languages other than the one emphasized in the core curriculum (Java/C++)
- Understand design/implementation issues involved with variable allocation and binding, control flow, types, subroutines, parameter passing
- Develop an understanding of the compilation process.

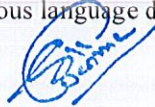## Course Outcome (CO)

| S.NO | Course outcomes ( Compiler Design) (10B11CI612) | Level of Attainment |
|------|------------------------------------------------|---------------------|
| CO-1 | Fluency in describing the theory and practice of compilation, in particular, the lexical analyzer, syntax and semantic analysis, code generation and optimization phases of compilation | Familiarity |
| CO-2 | Ability to create lexical rules and grammars for a programming language | Familiarity |
| CO-3 | Ability to use flex or similar tools to create a lexical analyzer and Yacc/Biscon tools to create a parser | Computational skills |
| CO-4 | Ability to implement a various parser such as a bottom-up SLR parser without using any compiler-generation tools | Technical skills |
| CO-5 | Ability to implement a various intermediate code generation techniques without using any compiler generation tools | Technical skills |
| CO-6 | Ability to implement various code optimizing techniques without using any compiler-generation tools | Technical skills |
| CO-7 | Ability to implement semantic rules into a parser that performs attribution while parsing | Assessment |
| CO-8 | Ability to design a compiler for a concise programming language | Assessment |

## Detailed Syllabus

This course studies the principles of programming languages with an emphasis on programming language implementation and compiler design. This includes various techniques for describing and defining a language, as well as techniques for implementing compilers. The course is centered on a large programming project-the construction of a complete compiler for a small programming language-which will be completed in this subject. Topics to be covered in this subject include: lexical analysis, syntactic analysis, recursive descent parsing, LR parsing, syntax-directed translation, type checking, run-time environments, code generation, code optimization, and various language design issues.

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)
175

## Course Contents/Lecture Plan

| S.No. | Topics | Hrs. |
|---|---|---|
| 1 | Introduction | 1 |
| 2 | Phases of a Compiler | 2 |
| 3 | Cousins of Compiler | 1 |
| 4 | Analysis synthesis model and grouping | 2 |
| 5 | Grammar and language | 2 |
| 6 | Lexical Analysis | 2 |
| 7 | Specification of Tokens | 2 |
| 8 | Recognition of Token | 2 |
| 9 | Finite Automata | 2 |
| 10 | Optimization of DFA based Pattern Matching | 2 |
| 11 | Language for specifying Laxical Analyzer | 2 |
| 12 | Design of Laxical Analizer Generator | 2 |
| 13 | Syntax Analysis | 2 |
| 4 | Top Down Parsing and SR Parsing | 2 |
| 15 | Operator Precedence | 2 |
| 16 | LR Parser | 2 |
| 17 | Intermediate Code Generator | 2 |
| 18 | Declaration | 2 |
| 19 | Assignments | 2 |
| 20 | Boolean Expression | 2 |
| 21 | Code Optimization | 2 |
| 22 | Code Generation | 2 |
|  | Total | 42 |

## Schedule

Lectures: 3 hours/week. Tues, Thurs, Fri, and one Tutorial

## Evaluation Scheme

| S.No | Exam | Marks | Duration | Coverage / Scope of Examination |
|------|------|-------|----------|----------------------------------|
| 1 | T-1 | 15 | 1 Hour. | Syllabus covered upto T-1 |
| 2 | T-2 | 25 | 1.5 Hours | Syllabus covered upto T-2 |
| 3. | T-3 | 35 | 2 Hours | Entire Syllabus |
| 4. | Tutorials / Assignments, Quizzes, Attendance | 25 | Entire Semester | Assignment (5) - 9<br>Quizzes (5) - 12<br>Attendance - 4 |
| | | | | |
| 4. | Lab Exercises(LE) | 100 | Entire Semester | Continuous Assessment-30<br>Mid Sem Test - 20<br>End Sem Exam - 20<br>Lab Record – 15<br>Attendance - 15 |

## Text Books

The readings consist of chapters from the following two textbooks:

- Compiler Construction, Kenneth C. Louden, 582 pages
- Modern Compiler Implementation in C, Andrew W. Appel, 544 pages

## Reference Resources

- http://ecomputernotes.com/compiler-design
- http://www.diku.dk/~torbenm/Basics/basics_lulu2.pdf

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

# COURSE DESCRIPTION

| | |
|---|---|
| **Course Code:** | 10B17CI672 |
| **Course Title:** | Compiler Design Lab |
| **Course Credits:** | 01 |
| **Semester:** | VI<sup>th</sup> Semester |

## Pre-requisites

An understanding in Theory of computation, Introduction to any programming language (Preferably, C)
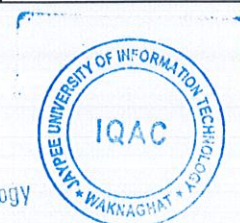
## Course Objective

The lab course provides the complete description about inner working of a compiler. The main focus is on the design of compilers and optimization techniques. The course also aims to convey the language specifications, use of regular expressions and context free grammars behind the design of compiler. It builds an understand ability of various parsing techniques like predictive parsing, LR parsing, LALR parsing. It also focuses on the design of Compiler writing tools.

## Course Outcome (CO)

| S.NO | Course outcomes ( Compiler Design Lab) (10B11CI612) | Level of Attainment |
|---|---|---|
| CO-1 | Gain an in-depth understanding of the principles underlying the design | Familiarity |
| CO-2 | Construction of compilers | Familiarity |
| CO-3 | Functioning of Compiler writing tools | Computational skills |
| CO-4 | Building various parsing techniques | Technical skills |

## Detailed Syllabus

This course studies the principles of programming languages with an emphasis on programming language implementation and compiler design. This includes various techniques for describing and defining a language, as well as techniques for implementing compilers. The course is centered on a large programming project-the construction of a complete compiler for a small programming language-which will be completed in this subject. Topics to be covered in this subject include: lexical analysis, syntactic analysis, recursive descent parsing, LR parsing, syntax-directed translation, type checking, run-time environments, code generation, code optimization, and various language design issues.

## List of Practical

| S. No | Topic | No of Labs |
|-------|-------|------------|
| 1 | a. Write a program to read and translate integers into numbers. <br><br> e.g.    1=ONE <br><br> 12 = ONE TWO <br><br> 856 = EIGHT FIVE SIX <br><br> Generate an error if the number of digits is more than 3 <br><br> b. Write a program to convert infix notation to postfix notation. | 1 |
| 2 | 1. Implement a DFA which simulates the regular expression a + (aa)*b. <br><br> 2. The following rules define the translation of an English word into pig Latin: <br><br> a) If the word begins with a nonempty string of consonants, move the initial consonant string to the back of the word and add the suffix AY; e.g., pig comes igpay. <br><br> b) If the word begins with a vowel, add the suffix YAY; e.g., owl becomes owlyay. <br><br> c) U following a Q is a consonant. <br><br> d) Y at the beginning of a word is a vowel if it is not followed by a vowel. <br><br> e) One-letter words are not changed. <br><br> Write a C program to generate pigLatin from an English word. | 2 |

| 3 | Implementation of Lexical analysis | 1 |
|---|---|---|
| 4 | Program for computation of FIRST AND FOLLOW of non-terminals. | 1 |
| 5 | Write a program to check whether a grammar is left recursive or not, if it is remove left recursion. | 1 |
| 6. | Implementation of Predictive Parsing Table Construction | 2 |
| 7. | Implementation of Shift Reduce Parsing | 1 |
| 8. | Implementation of Operator Precedence Parsing | 1 |
| 9. | Implementation of LR Parsing | 1 |
| 10 | Intermediate Code Generation | 1 |
| 11 | Implementation of Code Generation | 1 |
| | Total lab hrs | 13 |

## Evaluation Scheme

| S.No. | Exam | Coverage/Scope of Examination | Marks |
|---|---|---|---|
| 1 | Mid Term Test | Viva and Written Exam | 20 |
| 2 | End Term Test | Viva and Written Exam | 20 |
| 3 | Lab Records | | 15 |
| 4 | Teacher Assessment | (Quality and quantity of experiment performed, learning laboratory skills) | 30 |
| 5 | Attendance and discipline in lab | | 15 |
| 6 | Total | | 100 |

## BOOKS

- Compilers : Principles, techniques and tools, Aho, Sethi and Ullman
- Compiler design in C, Holub
- Advanced compiler design and implementation, Muchnick, Morgan and Kauffman
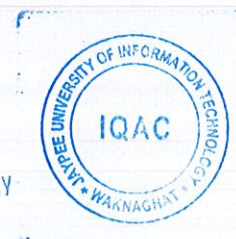
# COMPUTER NETWORKS

COURSE CODE: 10B11CI611

COURSE CREDITS: 4

CORE/ELECTIVE: CORE

L-T-P: 3-1-0

---

**Pre-requisites:** None

**Course Objectives:**
This course introduces the concepts and fundamental design principles of modern computer networking, focusing on the Internet's architecture and protocols. The lecture begins at concepts of data and computer communications, computer network introduction and its applications in our real life. Topics include the reference models such as OSI and TCP/IP and its way toward the physical layer concepts, data link layer and its protocols, multiple access protocols, Network layer and its different routing protocols, the concepts/design of IP addressing, Transport layer and its protocols such as TCP, UDP and SCTP to application layer and its protocol such as HTTP, FTP, SMTP and DNS.

The course will be supplemented by a separate Lab course in which the students learn to implement important computer networking protocols in a high – level programming language. In addition, to become acquainted with socket programming. Students participating in the exercise apply this knowledge in individual projects that cover all aspects from the lecture/lab with the design and development of network applications/protocols. Students are strongly encouraged to participate actively in class discussions.

**Course Outcomes:**

| S.NO | Course outcomes ( Computer Networks) (10B11CI611) | Level of Attainment |
|------|---------------------------------------------------|---------------------|
| CO-1 | To learn the basic concepts and terminology in computer networks | Familiarity |
| CO-2 | To learn about the layered models in computer networks and different types of network topologies and protocols | Assessment |
| CO-3 | To learn about the data link layer and MAC layer protocols and related issues | Assessment |
| CO-4 | To learn concepts associated with subnetting and routing mechanisms. Understand network industry standards such as: Routing Protocols, Address Resolution and Reverse Address | Assessment |

| | | | |
|---|---|---|---|
| | Resolution Protocols, IP Addresses and Subnetting, MAC Addressing. | | |
| CO-5 | To learn about the transport layer protocols and related issues | Assessment | |
| CO-6 | You will learn about the session, presentation and application layers protocols. | Usage | |
| CO-7 | Further, to learn about the some advanced topics in networks such as Cryptographic algorithms, Network security and management, and concepts of wireless networks | Familiarity | |

**Course Contents:**

| Unit No. | Content | Hrs | Book No. |
|---|---|---|---|
| 1 | **Introduction to Computer Networks**: Network Software Architecture: layers and protocols, OSI vs. TCP, Network Model, Connection Oriented and Connectionless services, Network Topology, Delay. | 4 | 1,2 |
| 2 | **Physical Layer:** Transmission Terminology, Analog and Digital Signal, Transmission Impairments, Transmission Media, Modulation, Switching Techniques, Multiplexing Techniques | 8 | 1,2 |
| 3 | **Data Link Layer:** Introduction and services to Data Link layer, Error detection and Correction techniques, Bit and Byte stuffing, Bit/Byte oriented protocol, Flow Control Mechanism, Multiple access protocol, Ethernet, Hubs and switches, Router and Gateways. | 8 | 1,3 |
| 4 | **Network Layer:** Network service model, Virtual circuit and Datagram networks, Logical Addressing and Sub-netting, Internet protocol: IPv4 and IPv6, ARP vs RARP, DHCP, Routing algorithms and standards, Internetworking, The network layer in the internet, Broadcast and multicast routing, Congestion Control Algorithms, | 8 | 1,3 |
| 5 | **Transport Layer:** Transport layer services and principles, End-to-end protocols: Issues and services, Multiplexing and De-multiplexing, Connectionless transport: UDP, Principles of reliable data transfer, Connection-oriented Transport: TCP, SCTP, Principles of congestion control, TCP Congestion Control, Quality of services. | 8 | 1,2 |
| 6 | **Application Layer:** Principle of application layer protocols, WWW and HTTP, FTP, Telnet, SMTP, DNS etc. | 3 | 1,3 |
| 7 | **Some Advanced Topics:** Symmetric-key algorithms, Public key algorithms, RSA, Digital Signatures, Communication security, authentication protocols, Web security, Wireless LAN, Mobile IP, | 3 | 1,2 |

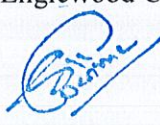| | Introduction to Multimedia networking, Network management. | | | |
|---|---|---|---|---|
| | | | | |
| | **Total Hours** | | 42 | |

**Evaluation Scheme:**

| S.No | Exam | Marks | Duration | Coverage/Scope of Examination |
|---|---|---|---|---|
| 1 | Test 1 (T1) | 15 | 1 hr. | Syllabus covered up to T1 Test |
| 2 | Test 2 (T2) | 25 | 1.30 hr. | Mainly syllabus covered after T1 Test, plus some questions from portions covered up to T1 Test. |
| 3 | Test3 (T3) | 35 | 2 hr. | Mainly syllabus covered after T1 and T2 Test, plus some questions from portions covered up to T1 & T2 Test. |
| | Assignments/ Quizzes/Home work/Regularity in Attendance | 25 | Entire Semester | 5 + 10 + 5 + 5 = 25 M arks. |
| | **Total =** | **100** | | |

**Text Books:**

1. Andrew S. Tanenbaum, "Computer Networks, Fourth Edition, Prentice Hall India.
2. B. A. Fourozan, "Data Communications and Networking", 4th Edition, Singapore, McGrawHill, 2004.

**Reference Books:**

3. William Stallings, "Data and Computer Communications", Seventh Edition, Prentice Hall of India Publication.
4. James F. Kurose, Keith W. Ross, "Computer Networking: A Top-Down Approach Featuring the Internet" 3rd Edition Pearson Education.

5. B. A. Fourozan, "TCP/IP Protocol Suite", 3rd Edition, Singapore, McGrawHill, 2004.
6. Bertsekas D. and Gallager R., Data Networks. Englewood Cliffs, NJ: Prentice-Hall, 1992.

**Course Outcomes (COs) contribution to the Programme Outcomes (POs)**

| Course outcomes (Computer Networks) | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 | PO-8 | PO-9 | PO-10 | PO-11 | PO-12 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-1 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 3 | 1 | 3 | 2.4 |
| CO-2 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 2 | 2 | 3 | 1 | 3 | 2.5 |
| CO-3 | 3 | 3 | 3 | 2 | 2 | 3 | 1 | 2 | 3 | 3 | 1 | 3 | 2.4 |
| CO-4 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 1 | 3 | 2.6 |
| CO-5 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 1 | 3 | 2.6 |
| CO-6 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 3 | 1 | 3 | 2.5 |
| CO-7 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 1 | 3 | 2.5 |
| Average | 3 | 3 | 3 | 2 | 2.6 | 2.9 | 2.1 | 2 | 2.4 | 3 | 1 | 3 | |

# Computer Networks Lab

COURSE CODE: 10B17CI671

COURSE CREDITS: 1

CORE/ELECTIVE: CORE

L-T-P: 0-0-2

**Pre-requisite:** None

**Course Objective:**
To implement important computer networking protocols in a high – level programming language. Also, to become acquainted with socket programming and some of the important GUI based computer networking tools (NS 2 tool).

**Course Outcomes:**

| S.No. | Course Outcomes | Level of Attainment |
|-------|-----------------|---------------------|
| CO-1 | To understand the working concepts of Networking and inter – networking Devices. | Familiarity |
| CO-2 | To understand the concepts of different shortest path algorithms. | Assessment |
| CO-3 | To understand different error detection and correction techniques/algorithms. | Assessment |
| CO-4 | To understand Flow control techniques/algorithms. | Assessment |
| CO-5 | To understand the concepts of client – server interaction using connection oriented and connectionless protocols. | Assessment |
| CO-6 | To understand the proficiency in Traffic Shaping Algorithms. | Usage |
| CO-7 | You shall be exposed to working of encryption and decryption algorithms. | Familiarity |
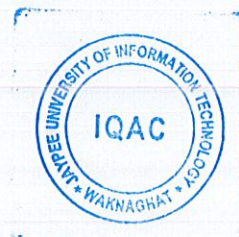
**List of Experiments:**

| Sr. No. | Name of Experiment | Hours |
|---|---|---|
| 1. | Representation of a computer network using matrix representation of a graph | 2 |
| 2. | Finding shortest path between any two nodes in a computer network using Dikjestra's shortest path algorithm | 2 |
| 3. | Finding shortest path between any two nodes in a computer network using Prim's shortest path algorithm | 2 |
| 4. | Study of network troubleshooting using Ping and Traceroute commands | 2 |
| 5. | Study of various networking and inter – networking devices | 2 |
| 6. | Implementation of CRC generator and checker algorithm in C / C++ / Java | 2 |
| 7. | Implementation of Hamming code algorithm in C / C++ / Java | 2 |
| 8. | Study of client – server programming using sockets in a UNIX / Linux and Windows environment | 2 |
| 9. | Implementing client – server program using TCP / UDP sockets | 2 |
| 10. | Implementation of Stop – and – Wait protocol in C / C++ / Java in a client – server environment using sockets | 2 |
| 11. | Implementation of Sliding Window protocol in C / C++ / Java in a client – server environment using sockets | 2 |
| 12. | Implementation of encryption algorithm converting plain text to cipher text using C / C++ / Java | 2 |
| 13. | Design and implement Traffic Shaping Algorithms:<br>o   Leaky Bucket<br>o   Token Bucket | 2 |
| 14. | Implementation of chat system | 2 |
|  | Allocation of Mini projects |  |
|  | **Total** | **28** |

**Evaluation Scheme:**

| | | |
|---|---|---|
| 1 | Mid Sem. Evaluation | 20 Marks |
| 2 | End Sem.  Evaluation | 20 Marks |
| 3 | Attendance | 15 Marks |
| 4 | Lab Assessment | 45 Marks |
| | Total | 100 marks |

**Text Books:**

1. James F. Kurose, Keith W. Ross, "Computer Networking: A Top-Down Approach Featuring the Internet" 3rd Edition Pearson Education.
2. Andrew S. Tanenbaum, "Computer Networks" 4th Edition PHI
3. UNIX Network Programming, Volume 1, Second Edition: Networking APIs: Sockets and XTI, Prentice Hall, 1998, ISBN 0-13-490012-X.
4. Arnold Robbins, "UNIX in a Nutshell", O'Reilly 4th Edition
5. David I. Schawartz, "Introduction to UNIX", Prentice Hall, Second Edition
6. BEHROUZ a. Forouzan and Richard F. Gilberg, "UNIX and Shell Programming: A Textbook"
7. NS Simulator for Beginner's, Lecture notes Univ. de Los Andes, France.

**Course Outcomes  (COs) contribution to the Programme Outcomes(POs)**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-1 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 3 | 3 | 3 | 1 | 3 | 2.5 |
| CO-2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | | 1 | 2 | 1.6 |
| CO-3 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 3 | 1 | 1 | 3 | 2.2 |
| CO-4 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | | 2 | 2 | 1.8 |
| CO-5 | 2 | 2 | 2 | 2 | 2 | 3 | 1 | 1 | 2 | 2 | 2 | 2 | 1.9 |
| CO-6 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 1.9 |
| CO-7 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 1.9 |
| Average | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 1.7 | 1 | 1.6 | 2.3 | 2 | 1.6 | 2.3 | |

# COMPUTER ORGANIZATION & ARCHITECTURE

COURSE CODE: 10B11CI613
COURSE CREDIT: 4
CORE/ELECTIVE: CORE
L-T-P: 3-1-0

**Pre-requisites:** Basic Understanding of Computer System

## Course Objective
The objective of this course is to present understanding and appreciation of a computer system's functional components, their characteristics, their performance, and their interactions. Students need to understand computer architecture in order to structure a program so that it runs more efficiently on a real machine. The course provides an overview of computer architecture and teaches students the operation of a typical computing machine. It covers the basic principles, while acknowledging the complexity of existing commercial systems. The format of the course will be lecture-discussions, assignments. Students are strongly encouraged to participate actively in class discussions.

## Course Outcomes:

| S.NO | Course Outcomes ( Computer Organization & Architecture ) (10B11CI613) | Level of Attainment |
|------|------------------------------------------------------------------------|---------------------|
| CO-1 | To learn the basic concepts and terminology in computer organization and architecture | Familiarity |
| CO-2 | To learn about the evolution in computer systems and their performance | Familiarity |
| CO-3 | To learn about the memory systems of computers and their comparison | Assessment |
| CO-4 | To learn concepts associated with input/output, control unit, processor structure and functions of computer systems | Assessment |
| CO-5 | To learn about instruction level parallelism and superscalar processors | Assessment |
| CO-6 | To learn about parallel processing and multi-core systems | Usage |
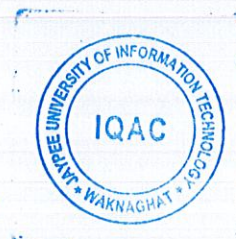
## Course Contents:

| Unit No. | Content | Hrs | Book No. |
|---|---|---|---|
| 1 | Introduction- Organization & Architecture, Structure & Function | 1 | 1 |
| 2 | Computer Evolution & Performance | 3 | 1,2 |
| 3 | A Top Level View of Computer Function and Interconnection | 3 | 1,3 |
| 4 | Cache Memory | 5 | 1,4 |
| 5 | Internal Memory Technology | 3 | 1 |
| 6 | External Memory | 3 | 1,2 |
| 7 | Input/Output | 3 | 1,3 |
| 8 | Computer Arithmetic | 4 | 1,4 |
| 9 | Processor Structure and Function | 4 | 1 |
| 10 | Instruction Level Parallelism and Superscalar Processors | 4 | 1,2 |
| 11 | Control Unit Operation & Micro programmed Control | 5 | 1,3 |
| 12 | Parallel Processing & Multi Core Computers | 4 | 1,4 |
| | **Total** | **42** | |

## Evaluation Scheme:

| S.No | Exam | Marks | Duration | Coverage/Scope of Examination |
|---|---|---|---|---|
| 1 | Test 1 (T1) | 15 | 1 hr. | Syllabus covered up to T1 Test |
| 2 | Test 2 (T2) | 25 | 1.30 hr. | Mainly syllabus covered after T1 Test, plus some questions from portions covered up to T1 Test. |
| 3 | Test3 (T3) | 35 | 2 hr. | Mainly syllabus covered after T1 and T2 Test, plus some questions from portions covered up to T1 & T2 Test. |

| | Assignments/ Quizzes/Home work/Regularity in Attendance | 25 | Entire Semester | 5 + 10 + 5 + 5 = 25 M arks. |
|---|---|---|---|---|
| | **Total = 100** | | | |

**Text Books:**

1. William Stallings, Computer Organization & Architecture - Designing for Performance Eighth Edition, Pearson, 2010. ISBN 978-81-317-3245-8

**References Books:**

2. John L. Hennessy and David A. Patterson ,Computer Architecture: A Quantitative Approach, Fourth Edition, Morgan Kaufmann Publishers
3. M. Morris Mano , Computer System Architecture, Third Edition, Pearson Education Inc
4. Luiz Andre Barroso and Urs Holzle;The Datacenter as a Computer – An Introduction to the Design of Warehouse Scale Machines Morgan and Claypool Publishers

**Course Outcomes (COs) contribution to the Programme Outcomes (POs):**

| Course Outcomes (Computer Organization and Architecture) | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 | PO-8 | PO-9 | PO-10 | PO-11 | PO-12 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-1 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 1.8 |
| CO-2 | 3 | 3 | 3 | 3 | 1 | 3 | 1 | 2 | 2 | 2 | 2 | 2 | 2.3 |
| CO-3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.3 |
| CO-4 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2.4 |
| CO-5 | 3 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 2.4 |
| CO-6 | 3 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 3 | 1 | 2 | 2 | 2.2 |
| Average | 3 | 2.3 | 2.5 | 2.5 | 2 | 2.5 | 2 | 1.8 | 2.5 | 1.7 | 1.8 | 2 | |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

IQAC

# COMPUTER PROGRAMMING LAB

COURSE CODE: 10B17CI171

COURSE CREDITS: 2

CORE/ELECTIVE: CORE

L-T-P: 0-0-2

## Objective:

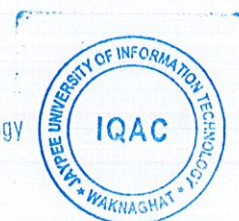Students will develop their ability to design, develop, test and document structured programs in C language.

## Learning Outcomes:

| S.No. | Course Outcomes | Level of Attainment |
|-------|-----------------|---------------------|
| CO-1 | Understand the Typical C Program Development Environment, compiling, debugging, Linking and executing. | Familiarity |
| CO-2 | Introduction to C Programming using Control Statements and Repetition Statement | Usage |
| CO-3 | Apply and practice logical formulations to solve some simple problems leading to specific applications. | Assessment and Usage |
| CO-4 | Design effectively the required programming components that efficiently solve computing problems in real world. | Assessment & Usage |

## List of Experiments

| S.No | Description | Hours |
|------|-------------|-------|
| 1 | Getting acquainted with the C program Structure and basic I/O.<br>Getting acquainted with the various data types and arithmetic operator used in C. | 2 |
| 2 | Write a program to obtain the reversed number and to determine whether the original and reversed numbers are equal or not.<br>Write a program to check whether a triangle is valid or not, when the three angles of triangle are entered through the keyboard. A triangle is valid if the sum of all three angles is equal to 180 degrees.<br>Check a given I/P is character, number or special symbol. | 2 |
| 3 | WAP to check a given number is Armstrong or not.<br>Calculate factorial of a number | 2 |

| | | | |
|---|---|---|---|
| | Given number is prime or not. | |
| 4 | Write a program to add first seven terms of the following series using any loop: 1/1! + 2/2! + 3/3! +….. <br> Any five pattern program. | 2 |
| 5 | WAP to swap two numbers with function using $3^{rd}$ variable or without using (call by value & reference). <br> Write a function to find out the roots of quadratic equation. | 2 |
| 6 | Factorial using recursion <br> Fibonacci series using recursion. | 2 |
| 7 | WAP to sort N elements of an array using bubble sort. <br> WAP for Binary search & linear search. | 2 |
| 8 | Find Max, Min, $2^{nd}$ Max, Standard Deviation. <br> Reverse elements of an array. | 2 |
| 9 | Matrix addition, Multiplication and Transpose. | 2 |
| 10 | WAP to handle pointer variables and access the elements of an array using pointers. <br> WAP to insert a string and perform operations: string length, copy, concatenation, compare, lower to upper, etc. | 2 |
| 11 | Write a program to find whether the string is palindrome or not using pointers <br> Write a program to delete all vowels from sentence, assume that sentence is not more than 80 character long using pointers. | 2 |
| 12 | Enter the detail of 5 students using structure and print the details of all students including pointers and also sort the detail of students using DOB. | 2 |
| 13 | Dynamic allocation function and random function with string and integer array. | 2 |
| 14 | Perform operation on files: open, read, write, close etc. | 2 |
| **Total Lab hours** | | 28 |

**References**

1. Yale N. Patt and Sanjay J. Patel, Introduction to Computing Systems, from bits & gates to C & beyond, $2^{nd}$ Edition, 2004.
2. Deitel and Deitel, C How to Program, $7^{th}$ Edition, 2013.
3. Venugopal Prasad, Mastering C, Tata McGraw Hill.
4. Complete Reference with C, Tata McGraw Hill.
5. Drmey, How to solve it by Computer, PHI.
6. Kerninghan and Ritchie, The C Programming Language.

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

**Evaluation Scheme:**

| 1 | Mid Sem. Evaluation | 20 Marks |
|---|---|---|
| 2 | End Sem. Evaluation | 20 Marks |
| 3 | Attendance | 15 Marks |
| 4 | Lab Assessment | 45 Marks |
|   | Total | 100 marks |

**Course Outcomes (COs) contribution to the Programme Outcomes(POs)**

| CO/PO | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO1 0 | PO1 1 | PO1 2 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 1.7 |
| CO2 | 3 | 3 | 2 | 1 | 3 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 1.8 |
| CO3 | 3 | 3 | 2 | 2 | 2 | 3 | 2 | 1 | 1 | 2 | 2 | 2 | 2.1 |
| CO4 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 2 | 1 | 3 | 2.2 |
| Average | 3 | 3 | 2 | 1.8 | 2.5 | 2 | 1.3 | 1 | 1 | 2 | 1.3 | 2.3 | |

Pumps and pumping stations: Types of pumps and their choice; pumping stations; economical diameter of rising main; hand pumps; pump testing; Water hammer and its control measures.
Planning and preparing water supply projects.

## 10B11CE515 CONSTRUCTION TECHNOLOGY AND MANAGEMENT

Introduction to various operations in construction, execution and management.
Standard and special construction equipments, heavy earthmoving equipments, shovels and cranes, crushing plant, batching plant, bitumen plant
Techniques and equipments for concreting, tunneling, road pavement, dewatering, drilling, blasting and grouting
Selection of construction equipment, cost of owning and operating, capacity and utilization, breakdown analysis, economic life, replacement of equipment and sinking fund
Form works, their design, fabrication and uses
Uses and design of scaffoldings
Steel constructions; fabrication and erection techniques

PERT and CPM Analysis

## 10B17CE571 HIGHWAY ENGINEERING LAB
### List of experiments:
1. Aggregate crushing strength test.
2. Los angeles abrasion test.
3. Aggregate impact test.
4. Flakiness index & elongation index test.
5. Penetration test.
6. Ductility test.
7. Viscosity test.
8. Softening point test.
9. Flash &fire point test.
10. Determination of bitumen content by centrifuge    extractor.
11. Determination of marshal stability value.
12. Determination of rebound deflection of pavement by Benkelman beam.


## 10B17CE572  CONCRETE LAB

### List of Experiments:
1. To determine the quantity of water for cement paste for normal consistency
2. To determine initial and final setting time of cement
3. To determine the fineness, specific gravity and unit weight of cement
4. Determination of tensile and compressive strength of cement
5. To determine fineness modulus of fine and coarse aggregate
6. To determine compressive strength of nominal mix concrete of a given grade

# COURSE DESCRIPTION

| | |
|---|---|
| **Course Name:** | DATA ANALYSIS AND SIMULATION TECHNIQUES |
| **Course Code:** | 10B11CI616 |
| **Course Credits:** | 4 (3-1-0) |
| **Branch and Semester:** | 6th Semester |
| **Faculty Coordinators:** | **Dr. Rajinder Sandhu** |

**Pre-requisite Course:** Programming experience in C/C++, working knowledge of UNIX operating system, basic probability and statistics.

## Description & Rationale:

This course introduce some of the core tools used to analyze the data and simulation techniques including model design and development, comparison to analytical models, input data preparation, random number generation, output statistical analysis, and model validation. Using these techniques, students will: model real-world systems, implement the model as a computer program, and evaluate the performance of real-world systems by analyzing the output of the model under various conditions.

## Objectives:

- Understand basic concepts, applications and terminology of computer simulation.
- Develop ability to design and model simulations.
- Introduce students to data analysis techniques and methods.
- Develop ability to evaluate different simulation software.
- Apply simulation techniques to various examples and real life applications

## Course Outcomes:

| S. No. | Course outcomes ( Data Analysis and Simulation Techniques) (16B28CI681) | Level of Attainment |
|---|---|---|
| CO-1 | To learn the basic concepts, applications and terminology of computer simulation. | Familiarity |
| CO-2 | To select the appropriate technique for data analysis for simulation | Usage |
| CO-3 | To learn statistical hypothesis generation & testing and the Chi Square test. | Assessment |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

190

IQAC

| CO-4 | To learn the stages in simulation model development. | Assessment |
| CO-5 | To study abstract representation techniques and random number generation in simulations. | Usage |
| CO-6 | To learn about different simulation software's and their ethical issues. | Assessment |

**Course Contents / Lecture Plan:**

| S.No. | Topics | Hrs. |
|-------|--------|------|
| 1 | **Introduction:** Simulation Language Tutorial, Purpose of Simulation, Overview of Basic Approaches: Monte Carlo Simulation, Queuing Network Simulation, Quasi-continuous Simulation, Discrete-event Simulation, Applications. | 5 |
| 2 | **Data Analysis:** Introduction, Relation with Simulation, Data Understanding: Data Quality, Data Visualization, Outliner detection. **Data Preparation:** Selection of data, Cleaning of Data, Construction of Data, Integration of Data. | 6 |
| 3 | **Statistical Hypothesis Generation and Testing:** Null and Alternate Hypotheses, Statistical Significance, Rejecting the Null Hypothesis, Problems with Statistical Significance, Types of Statistical Error, Guarding Against Statistical Error. | 5 |
| 4 | **Chi Square Test:** Chi-Square Test, Chi-Square Test for Goodness of Fit, Performing a Goodness of Fit Test in Excel, Cross Tabulations and the Chi-Square Test for Independence, Performing a Test for Independence with Crosstabs in Excel. Correlation. | 6 |
| 5 | **Simulation Basics:** Basic Concepts: System, Attribute, State, Event, Process, Activity, Time, Parallelism, Model, Basic Mechanisms: Time Advance, Scheduling, Alternative Models: Activity, Process, Others | 3 |
| 6 | **Stages of Simulation Model Development:** Problem, System Analysis, Data Collection, Fitting Distributions to Data: Parameter Estimation, Goodness-of-Fit, Iterative Prototyping, Statistical Instrumentation, Verification, Validation, Inference. | 5 |
| 7 | **Abstract Representation Techniques:** Activity-cycle Diagrams, State-Transition Diagrams, Petri Nets. | 3 |

| 8 | **Random Number Distributions:** Sources of Randomness, Random Number Generation, Random Variates: From Distribution Functions, From Empirical Data | 5 |
|---|---|---|
| 9 | **Evaluation of Simulation Modeling**: Ethical Issues in Simulation, Benefits of Simulation, Limitations of Simulation. | 2 |
| 10 | **Simulation Software's:-** Classification of Simulation Software, Desirable software feature. Introduction to some popular simulator and simulation projects. | 2 |
| | | 42 |

**Maintenance of Records:**

Students are expected to keep records of labwork and homework assignments (to be posted on students resource from time to time) neatly in suitable hard bound notebooks separately (one for each). The same will be submitted to the TA in the Lab on or before the scheduled time.

**Teaching and Learning Strategies:**

Delivery consists of a series of lectures that introduce and develop the core principles. These are further explored and expanded through a series of laboratory-based sessions. A project problem is to be taken up and implemented as a continuous assessment in the semester to give a hands-on exposure on integrating various concepts taught and integrating them into a problem solving exercise.

The students are expected to spend time on unsupervised self-study and laboratory work. The course is structured so that each unit builds upon previous knowledge. Programming and implementation on different topics will be available that will be implemented in the semester.

**Tools and Technologies:**

C / C++ Compiler (Dev C++ / Borland C++ or any other suitable compiler for windows)

**Evaluation Scheme**:

| S.No | Exam | Marks | Duration | Coverage / Scope of Examination |
|---|---|---|---|---|
| 1 | T-1 | 15 | 1 Hour. | Syllabus covered upto T-1 |
| 2 | T-2 | 25 | 1.5 Hours | Syllabus covered upto T-2 |
| 3. | T-3 | 35 | 2 Hours | Entire Syllabus |
| 4. | Tutorials / Assignments, Quizzes, Attendance | 25 | Entire Semester. | Assignment (2) - 10 Quizzes (2) - 10 |

192

| | | | | Attendance  - 5 |
|---|---|---|---|---|

**Text Book:**

T1: Computer Simulation Techniques – The Definitive Introduction:   Harry Perros,    North Carolina State University.

T2: Bertholt, Borgelt, Hoeppner, Klawonn: Guide to Intelligent Data Analysis, Springer.

T3: Statistics: Murray R Spigel and Larry J Stephens, Schaum's Outline Series.

**References:**

R1: Simulation Modeling & Analysis" by A. Law and D. Kelton, McGraw Hill Publishing.

R2: Simulation Model Design and Execution: Building Digital Worlds" by P. Fishwick, Prentice-Hall.

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Dis't. Solan (H.P.)

### 21. Data Mining (10B22CI622)
VI Sem(IT/ICT) Credits-4(3-1)

Introduction. Data Warehouse Software Engineering: Requirement Analysis, Data modeling, Design, Project Management, Building, and Testing. Hypothesis testing. Online analytical Process models. Query Access Architectures. Extraction Transformation Loading. OLAP. Data warehouse security. Metadata. Data mining Models. Statistical Data mining. Classification Techniques. Clustering Techniques. Association Rules.

### 22. Compiler Design (10B11CI612)
VI Sem(CSE) Credits-4(3-1)

Introduction. Lexical Analysis. Syntax Analysis. Top down and Bottom-up Parsers. Semantic Analysis. Symbol Table Management. Storage Management. Error Handling. Code Optimization. Code Generation.

### 23. Computer Organisation and Architecture (10B11CI613)
VI Sem(CSE), III Sem(ICT) Credits-4(3-1)

System level design, Register level design, Processor level design. Advanced data representation. Instruction set architecture level. Data-path Design. Hardwired control unit, micro-programmed control unit, pipeline control unit. Structured Memory Design. Bus System. System control. I/O Control. Performance analysis. Processor array. Multi-computer and Multi-processor.

### 24. Object Oriented Systems and Programming (10B11CI614)
VI Sem (ECE) Credits-4(3-1)

Interactive database driven software. Database Environment. Relational Model. SQL. PL/SQL. ER & EER Modeling. Normalization. Database Connectivity. Transactions Processing. 3-tier Architecture. O-O paradigm. Objects, Classes, Methods, Constructors and Destructors. File Handling. Friend Functions and Static members functions. Inheritance. Polymorphism and Virtual Functions. Interfaces in JAVA. Exception Handling in C++ and JAVA. Basic principals of Software engineering. System analysis, design, testing and debugging.

### 25. Computer Graphics (11B1WC1611)
VI Sem(CSE), V Sem(ICT) Credits-4(3-1)

Computer representation of image, Graphics programming , User – computer interface, Components of Graphics Systems, Output primitives, Area filling, Windowing and clipping, 3D object representation, 3D Transformation & viewing, Hidden surface and Hidden line, Illumination models and shading

# DATA STRUCTURES

**Course Name:**      DATA STRUCTURES

**Course Code:**      10B11CI211

**Course Credits:**     4 (3-1-0)

**Pre-requisite Course:**  Introduction to Programming

## Course Objectives:

1. To impart the basic concepts of data structures and algorithms.
2. To understand concepts about searching and sorting techniques
3. To understand basic concepts about stacks, queues, lists, trees and graphs.
4. To enable them to write algorithms for solving problems with the help of fundamental data structures
5. Introduce students to data abstraction and fundamental data structures.

## Course Outcomes:

| S.No. | Course Outcomes | Level of Attainment |
|-------|-----------------|---------------------|
| CO-1 | To gain knowledge on the notions of data structure, Abstract Data Type. | Familiarity |
| CO-2 | For a given algorithm student will able to analyze the algorithms to determine the time and computation complexity and justify the correctness. | Assessment |
| CO-3 | For a given Search problem (Linear Search and Binary Search) student will able to implement it. | Assessment |
| CO-4 | For a given problem of Stacks, Queues and linked list student will able to implement it and analyze the same to determine the time and computation complexity. | Assessment |
| CO-5 | Student will able to implement Graph search and traversal algorithms and determine the time and computation complexity. | Assessment |
| CO-6 | Student will able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity. | Usage |
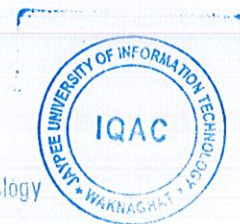
**Course Contents:**

| S.No. | Topics | Hrs. |
|---|---|---|
| 1 | Introduction to Data Structures, Abstract Data Type (ADT), Arrays and Strings, Structures, Recursion, Pointers, Dynamic memory allocation | 5 |
| 2 | Algorithm Design, Scalability, Introduction to Complexity Analysis, Big O Notation, Relationship between time complexity and hardware performance, | 3 |
| 3 | Linked Lists:- ADT type, Linear List, Linear Linked list, doubly linked list, circular linked list, header Linked list, various implementations and applications of Linked Lists | 5 |
| 4 | Stack: - ADT type, specifications, array based and linked list based, recursion and its removal with stack, stack as buffer, searching, matching, integration and other applications, managing multiple stacks, various implementations and applications of Stacks | 3 |
| 5 | Queues:- ADT type, array based and linked list based,, queue as buffer, searching, Circular queues, Deque, Managing multiple queues, , various implementations and applications of Queues | 4 |
| 6 | Binary Trees:- Introduction to non-linear data structures, ADT type, array based and linked list based, binary tree, binary search tree, AVL tree, tree traversal, various implementations and applications of Trees | 6 |
| 7 | Sorting Algorithms: Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort, Shell Sort, Radix Sort, various implementations and applications of Sorting | 8 |
| 8 | Searching:- Linear and Binary Search Hashing:- Hash table Various implementations and applications of Searching and Hashing | 3 |
| 9 | Graphs: - ADT type, array based and linked list based, graph traversal algorithms i.e. Breadth First & Depth First, various implementations and applications of graphs | 5 |
| | Total | 42 |

**Text Book(s):**

T1: Langsam, Augestein, Tenenbaum : Data Structures using C and C++, 2nd Edn, 2000,

**Reference Book(s):**

R1:  Horowitz and Sahani:  Fundamental of Data Structures in C, 2nd Edn, 2008
R2:  Kruse, Tonso, Leung: Data Structures and Program Design in C, 2000
R3:  Richard F. Gilberg & Behrouz Forouzan: Data Structures, A Pseudocode Approach with C, 2001.
R4:  Weiss: Data Structures and Algorithm Analysis in C/C++, 3rd Edn, 2006
R5:  Carrano and Prichard: Data Abstraction and Problem solving with C++, 5th Edn, 2007

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

IQAC

R6:  Sedgewick : Algorithms in C/C++
R7:  Sahani : Data Structures, Algorithms and applications in C++, 1997.
R8:  Corman et al: Introduction to Algorithms, 3$^{rd}$ Edn., 2009.
R9:  Heileman :  Data Structures, Algorithms and Object Oriented Programming, 2002.
R10: Sorenson and Tremblay:  An Introduction to Data Structures with Applications, 2$^{nd}$ Edn,
      2008.
R11: Knuth:   The Art of Computer programming Vol I, Vol III
R12: Hubbard, John R.: Schaum's Outline of Data Structures with C++, 2000.

**Additional Resources :**

**A.  Web Resources:**

   http://www.nptel.iitm.ac.in/video.php?subjectId=106102064, last accessed Mar 13, 2014.
   http://www.cs.auckland.ac.nz/~jmor159/PLDS210/ds_ToC.html, last accessed Mar 13, 2014.
   http://courses.cs.vt.edu/csonline/DataStructures/Lessons/index.html, last accessed Mar 13, 2014.

**B.  Course Material:**

Lecture presentations, assignments and practicals, will be posted on the student resource from time to time. In addition following additional online/downloadable  resources will be useful.

**Evaluation Scheme:**

| S. No | Exam | Marks | Duration | Coverage / Scope of Examination |
|-------|------|-------|----------|---------------------------------|
| 1 | T-1 | 15 | 1 Hour. | Syllabus covered upto  T-1 |
| 2 | T-2 | 25 | 1.5 Hours | Syllabus covered upto  T-2 |
| 3. | T-3 | 35 | 2 Hours | Entire Syllabus |
| 4. | Teaching Assessment | 25 | Entire Semester | Assignment (2)  - 10   Quizzes (2)    - 10   Attendance  - 5 |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

## Course Outcomes (COs) contribution to the Programme Outcomes(POs)

| Course Outcomes (Data Structure and Algorithms) | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 | PO-8 | PO-9 | PO-10 | PO-11 | PO-12 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-1 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 3 | 1 | 3 | 2.4 |
| CO-2 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 2 | 2 | 3 | 1 | 3 | 2.5 |
| CO-3 | 3 | 3 | 3 | 2 | 2 | 3 | 1 | 2 | 3 | 3 | 1 | 3 | 2.4 |
| CO-4 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 1 | 3 | 2.6 |
| CO-5 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 1 | 3 | 2.6 |
| CO-6 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 3 | 1 | 3 | 2.5 |
| Average | 3 | 3 | 3 | 2 | 2.7 | 2.8 | 2 | 2 | 2.5 | 3 | 1 | 3 | |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

# DATA STRUCTURES AND COMPUTER PROGRAMMING LAB

COURSE CODE: 10B17CI271

COURSE CREDITS: 2

CORE/ELECTIVE: CORE

L-T-P: 0-0-4

**Pre-requisites:** None

**Course Objectives:**

1. Develop problem solving ability using Programming
2. Develop ability to design and analyze algorithms
3. Introduce students to data abstraction and fundamental data structures
4. Develop ability to design and evaluate Abstract Data Types and data structures
5. Apply data structure concepts to various examples and real life applications

**Course outcomes:**

| S.No. | Course Outcomes | Level of Attainment |
|-------|-----------------|---------------------|
| CO-1 | To gain knowledge on the notions of data structure, Abstract Data Type | Familiarity |
| CO-2 | To have hands on skills to evaluate different kinds of linked lists and their applications in day to day problem solving. | Usage |
| CO-3 | To have hands on skills to evaluate different kinds stacks and their applications and implementations in day to day problem solving | Assessment |
| CO-4 | To have hands on skills to evaluate different kinds queues and their applications and implementations in simulations. | Assessment |
| CO-5 | To acquire knowledge of various sorting algorithms | Usage |
| CO-6 | To learn Searching; Balanced tree, red-black tree, lower bounds for searching | Usage |
| CO-7 | To learn to code for operations on Tree or BST (Creation; Traversing like pre-order, post-order and in-order; Searching element; finding height etc.) | Usage |

| CO-8 | Introduction to Heaps | Usage |
|------|-----------------------|-------|
| CO-9 | To learn to code for operations on Graphs (Creation; entering info, printing output and deleting; traversal of BFS and DFS algorithm ) | Assessment |

## Course Contents:

| S.No. | Topics | Hours |
|-------|--------|-------|
| 1 | Getting acquainted with Arrays and Strings, Structures, Recursion, Pointers and Dynamic memory allocation | 6 |
| 2 | Operations on Linear Linked List, Doubly and Circular Linked List ( Creation, insertion, deletion, sorting, traversing, reversing etc) | 6 |
| 3 | Operations on Stacks ( Creation; pushing; popping; testing underflow, overflow; prefix and postfix) | 6 |
| 4 | Operations on Queues ( Creation; enqueue; dequeue; testing underflow, overflow) | 6 |
| 5 | Operations on Tree or BST (Creation; Traversing like preorder, post-order and in-order; Searching element; finding height etc.) | 6 |
| 6 | Implementation of Insertion Sort and Selection Sort Algorithm with arrays using dynamic memory allocation. | 4 |
| 7 | Implementation of Bubble Sort and Merge Sort Algorithm with arrays using dynamic memory allocation. | 4 |
| 8 | Implementation of Radix Sort and Quick Sort Algorithm with arrays using dynamic memory allocation. | 4 |
| 9 | Operation on Heaps and Heap Sort | 4 |
| 10. | Implementation of Linear Search Algorithm and Binary Search Algorithm using dynamic memory allocation. | 4 |
| 11. | Operations on Graphs (Creation; entering info; printing Output and deleting; traversal of BFS and DFS algorithm etc.) | 6 |
| | **Total** | 56 |
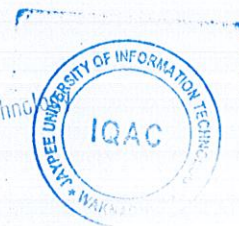
# References

1. Langsam, Augestein, Tenenbaum : Data Structures using C and C++, 2nd Edn, 2000,

2. Horowitz and Sahani : Fundamental of Data Structures in C, $2^{nd}$ Edn, 2008

3. Weiss : Data Structures and Algorithm Analysis in C/C++, 3rd Edn, 2006

4. Sahani : Data Structures, Algorithms and applications in C++, 1997.

5. Corman et al : Introduction to Algorithms, 3rd Edn., 2009

**Additional Resources :**

    **A. Web Resources:**

       http://www.nptel.iitm.ac.in/video.php?subjectId=106102064, last accessed Mar 13, 2014.

       http://www.cs.auckland.ac.nz/~jmor159/PLDS210/ds_ToC.html, last accessed Mar 13, 2014.

       http://courses.cs.vt.edu/csonline/DataStructures/Lessons/index.html, last accessed Mar 13, 2014.

    **B. Course Material:**

       Lecture presentations, assignments and practicals, will be posted on the student resource from time to time.

**Evaluation Scheme:**

| 1 | Mid Sem. Evaluation | 20 Marks |
|---|---|---|
| 2 | End Sem. Evaluation | 20 Marks |
| 3 | Attendance | 15 Marks |
| 4 | Lab Assessment | 45 Marks |
| | Total | 100 marks |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

# DATABASE SYSTEMS

COURSE CODE: 10B11CI312

COURSE CREDITS: 4

CORE/ELECTIVE: CORE

L-T-P: 3-1-0

---

**Pre-requisite:** Introduction to Computer Programming, Discrete Mathematics, Data Structures

## Course Objectives

- Develop the ability to design, implement and manipulate databases.
- Introduce students to build database management systems.
- Apply DBMS concepts to various examples and real life applications.

## Course Outcomes:

| S.NO | Course outcomes ( Database Systems) (10B11CI312) | Level of Attainment |
|------|--------------------------------------------------|---------------------|
| CO-1 | Explain the characteristics, architecture of database approach, describe the components, major functions of a database system and give examples of their use. | Familiarity |
| CO-2 | Compare and contrast appropriate data models, including concepts in modeling notation and how they would be used. | Usage |
| CO-3 | Demonstrate use of the relational algebra operations from mathematical set theory (union, intersection, difference, and Cartesian product) and the relational algebra operations developed specifically for relational databases (select (restrict), project, join, and division). | Usage |
| CO-4 | Create a relational database schema in SQL, use SQL to create a non-procedural query, write a stored procedure that deals with parameters and has some control flow, to provide a given functionality. | Usage |
| CO-5 | Using SQL to implement roles, privileges, access control and authorization policies | Usage |

| CO-6 | Determine the functional dependency between two or more attributes, compute the closure of a set of attributes, evaluate a proposed decomposition, and describe the properties of BCNF, PJNF, and 5NF. | Technical skills |
|------|------|------|
| CO-7 | Explain the use of integrating OO properties with relational modeling | Assessment |

**Course Contents / Lecture Plan:**

| S.No. | Topics | Hrs. |
|-------|--------|------|
| 1 | Introduction to Databases, Introduction to Conceptual Modeling, ER Modeling | 5 |
| 2 | Database Design: Entity Relationship Approach, Relational Database Design, Application Design, Functional Dependencies, Normalization and building normalized databases | 7 |
| 3 | Relational Databases, Relational Model: Concepts, Constraints, Languages, Design, Programming and Relational Calculus | 6 |
| 4 | SQL: Data Manipulation, Data Definition, SQL, Advanced SQL, Other Relational Languages | 5 |
| 5 | Data Storage and Querying: Storage and File Structure, Indexing and Hashing, Query Processing, Query Optimization. | 6 |
| 6 | System Architecture: Database System Architecture, Parallel databases and Distributed databases | 5 |
| 7 | Transaction Management: Transaction Concepts, Concurrency Control, Database Recovery Techniques | 6 |
| 8 | Database connectivity: ODBC, JDBC, SQLJ. | 2 |
| | Total | 42 |

**Evaluation Scheme:**

| S.No | Exam | Marks | Duration | Coverage/Scope of Examination |
|------|------|-------|----------|-------------------------------|
| 1 | Test -1 | 15 | 1 hr. | Syllabus covered upto T- 1 |
| 2 | Test -2 | 25 | 1 hr 30 min. | Syllabus covered upto T- 2 |
| 3 | Test - 3 | 35 | 2 hours | Full Syllabus |
| 4 | Regularity, Assignments, Quizzes. | 25 | Entire Semester | Regularity- 4<br><br>Assignments - 9<br><br>Quizzes    - 12 |

**Text Book:**

"Database system concepts"  Henry F Korth, Abraham Silberschatz, S. Sudurshan, McGraw-Hill

**Reference Book(s):**

1. "Database Systems: A Practical Approach to design, Implementation and Management". Thomas Connolly, Carolyn Begg; Third Edition, Pearson Education.
2. "Fundamentals of Database Systems"    Elmasri, Navathe, Pearson Education.
3. Bipin C Desai, ?An Introduction to Database Systems?, Galgotia. Publications Pvt Limited, 2001
4. "An Introduction to Database Systems", C.J.Date, Pearson Education.
5. "A first course in Database Systems", Jeffrey D. Ullman, Jennifer Windon, Pearson,    Education.
6. "Data Management: databases and organization", Richard T. Watson, Wiley.
7. " Data Modeling Essentials", Graeme C. Simxion, Dreamtech.
8. Introduction to Data Base Management, Naveen Prakash, Tata McGraw Hill.
9. "Oracle 8i manuals".

## Course Outcomes (COs) contribution to the Programme Outcomes(POs)

| Course outcomes (Database Management Systems) | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 | PO-8 | PO-9 | PO-10 | PO-11 | PO-12 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-1 | 3 | 3 | 2 | 1 | 2 | 2 | 2 | 1 | 2 | 3 | 3 | 2 | 2.2 |
| CO-2 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 2 | 2 | 1 | 2 | 2 | 2.3 |
| CO-3 | 3 | 3 | 2 | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 2.3 |
| CO-4 | 3 | 2 | 3 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 1.9 |
| CO-5 | 3 | 2 | 2 | 1 | 2 | 3 | 3 | 2 | 1 | 3 | 2 | 1 | 2.1 |
| CO-6 | 3 | 2 | 3 | 1 | 1 | 3 | 2 | 1 | 1 | 3 | 2 | 1 | 1.9 |
| CO-7 | 3 | 3 | 2 | 1 | 1 | 3 | 3 | 1 | 3 | 3 | 3 | 1 | 2.3 |
| Average | 3 | 2.6 | 2.4 | 1.1 | 1.6 | 2.6 | 2.6 | 1.7 | 1.9 | 2.6 | 2 | 1.4 | |

# DATABASE SYSTEMS LAB

COURSE CODE: 10B17CI372

COURSE CREDITS: 1

CORE/ELECTIVE: CORE

L-T-P: 0-0-2

**Pre-requisite:** None

**Course Objective**
- Develop the ability to design, implement and manipulate databases.
- Introduce students to build database management systems.
- Apply DBMS concepts to various examples and real life applications.

## Course Outcome (CO)

| S.NO | Course outcomes (Database Systems Lab) (10B17CI372) | Level of Attainment |
|---|---|---|
| CO-1 | Design and implement a database schema | Usage |
| CO-2 | Design different views of tables for different users and to apply embedded and nested queries | Usage |
| CO-3 | Understand the use of structured query language and its syntax , transactions , database recovery and techniques for query optimization | Familiarity |
| CO-4 | Understand , analyze and apply common SQL statements including DDL , DML , DCL statements to perform different operations | Assessment & Usage |
| CO-5 | Develop application programs using PL/SQL | Usage |
| CO-6 | Design and implement a project using embedded SQL and GUI | Usage |

## List of Experiments:

| S.No | Topic | No of Labs |
|---|---|---|
| 1 | Getting acquainted with Data Definition (DDL), Table Creation, Constraints etc. | 1 |

| 2 | Getting acquainted with Data Manipulation Language Commands (DML), Insert, Select Commands, Update and Delete Commands. | 1 |
|---|---|---|
| 3 | Getting acquainted with Data Control Language, Transfer Control Language Commands (DCL). | 1 |
| 4 | Getting acquainted with in Built Functions like sum, avg. etc. | 1 |
| 5 | Getting acquainted with Nested Queries And Join Queries | 2 |
| 6 | Getting acquainted with Set operators like union, intersection, minus etc. | 2 |
| 7 | Getting acquainted with Views. | 2 |
| 8 | Getting acquainted with High level programming language extensions (Control structures, Procedures and Functions). | 2 |
| 9 | Getting acquainted with Procedures and Functions | 2 |
| 10 | Getting acquainted with Triggers | 2 |

**References :**

1. "Database Systems: A Practical Approach to design, Implementation and Management". Thomas Connolly, Carolyn Begg; Third Edition, Pearson Education.
2. "Fundamentals of Database Systems" Elmasri, Navathe, Pearson Education.
3. Bipin C Desai, ?An Introduction to Database Systems?, Galgotia. Publications Pvt Limited, 2001
4. "An Introduction to Database Systems", C.J.Date, Pearson Education.
5. "A first course in Database Systems", Jeffrey D. Ullman, Jennifer Windon, Pearson, Education.
6. "Data Management: databases and organization", Richard T. Watson, Wiley.
7. " Data Modeling Essentials", Graeme C. Simxion, Dreamtech.
8. Introduction to Data Base Management, Naveen Prakash, Tata McGraw Hill
9. "Oracle 8i manuals".

**Evaluation Scheme:**

| 1 | Mid Sem. Evaluation | 20 Marks |
|---|---|---|
| 2 | End Sem. Evaluation | 20 Marks |
| 3 | Attendance | 15 Marks |
| 4 | Lab Assessment | 45 Marks |
| | Total | 100 marks |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

IQAC

## Attainment of POs through COs

| | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | | 0 | | 3 | | | 3 | 3 | | 3 | | |
| CO2 | | 3 | 2 | 2 | | | | 3 | 3 | 1 | | |
| CO3 | 3 | 2 | | 2 | 1 | | | 1 | 2 | 2 | 1 | 3 |
| CO4 | 2 | 1 | | 2 | 1 | 1 | | 2 | | 1 | 1 | 1 |
| CO5 | 2 | 1 | 1 | 0 | 0 | 0 | | 0 | 0 | 1 | 0 | 0 |
| CO6 | 0 | 0 | | 0 | 0 | | 0 | 1 | 0 | 1 | | 2 |
| Average Score | 1.16 | 1.16 | 0.5 | 1.5 | 0.3 | 0.16 | 0.5 | 1.6 | 0.83 | 1.5 | 0.33 | 1 |

# DEVICES AND CIRCUIT SIMULATION LAB

## (Core Subject)

| Course Code: | 10B17EC471 | Semester: | 4th Semester, B. Tech (ECE) |
|---|---|---|---|
| Credits: | 1 | Contact Hours: | L-0, T-0,P-2 |

## Course Objectives

The objectives are to make the student familiar with the basics of PSPICE and CAPTURE and to know the steps involved in the analysis and synthesis of analogue circuits.

## Course Outcomes

After studying this course the students would gain enough knowledge After the successful completion of the course, student should be able to:

1. Draw various analogue circuits in PSPICE Capture and write the code for the same and verify them.
2. To synthesize different analogue circuits and observe different types of outputs depending on the analysis type.
3. To use the knowledge acquired in this lab in the project related works in future.
4. To use the knowledge acquired through this lab to design blocks that are used in communications systems and integrated circuits.

## List of Experiments

1. Introduction to PSPICE and Capture. To verify the KCL and the KVL on a given circuit.
2. To perform the Nodal and Mesh analysis on a circuit containing independent and dependent sources.
3. To obtain the Thevenin's and Norton's equivalent circuits for a given circuit.
4. To perform transient analysis on RC, RL and RLC circuits. To design the series resonant and shunt resonator circuits.
5. To design a half-wave and a full wave rectifier circuits.
6. To design and obtain the voltage transfer characteristics of a positive, negative and double sided clippers and observe the time domain signals.
7. To design different transistor biasing circuits.
8. To obtain series and shunt feedback amplifiers-Frequency response, Input and output impedances.
9. To measure the common mode rejection ratio of a differential amplifier.

Assistant (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

10. To design inverting, non-inverting amplifiers using an op-amp. To obtain the transfer characteristic of an op-amp in open loop and design a voltage reference circuit. To design active LPF and HPF using op-amp.

11. To design a Schmitt trigger circuit and to design Wien bridge, oscillators using op-amp.

12. To design astable and mono stable multi vibrator circuits using IC555 timer.

13. To design LC filters and compare their magnitude and phase responses.

14. To design bi-stable and mono-stable and astable multi-vibrators using transistors.

## Evaluation Scheme

| | | |
|---|---|---|
| 1. | Mid Sem Evaluation | 20 Marks |
| 2. | End Sem Evaluation | 20 Marks |
| 3. | Attendance | 15 Marks |
| 4. | Class response | 30 Marks |
| 5. | File | 15 Marks |

**Total Marks**                                **100 Marks**

## Text Books

1. Rashid, Muhamad H. "Introduction to PSpice Using OrCAD." *Prentice Hall of India* (2010).

2. Tobin, Paul. "PSpice for circuit theory and electronic devices." *Synthesis Lectures On Digital Circuits and Systems* 2.1 (2007): 1-159.

# Digital Electronics
## (Core Subject)

| Course Code: | 10B11EC401 | Semester: | 3rd Semester B.Tech. (CSE and IT) 4th Semester, B. Tech. (ECE) |
|---|---|---|---|
| Credits: | 4 | Contact Hours: | L-3, T-1, P-0 |

## Course Objectives
The objectives are to study

1. To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits.
2. To prepare students to perform the analysis and design of various digital electronic circuits.

## Course Outcomes
After studying this course the students would gain enough knowledge

1. Have a thorough understanding of the fundamental concepts and techniques used in digital electronics.
2. To understand and examine the structure of various number systems and its application in digital design.
3. The ability to understand, analyze and design various combinational and sequential circuits.
4. Ability to identify basic requirements for a design application and propose a cost effective solution.
5. The ability to identify and prevent various hazards and timing problems in a digital design.
6. To develop skill to build, and troubleshoot digital circuits.

## Course Contents

| Unit | Topics | References (chapter number, page no. | Lectures |
|---|---|---|---|
| 1. | **Number System, Binary Codes and Boolean Algebra** : Conversion of bases, Representation of negative numbers, 1's complement, 2's complement, arithmetic using 2's complement Hexadecimal code, weighted codes - BCD, Excess-3 code, Gray Code. Logic gates and Boolean Algebra. | 1,2 | 6 |
| 2. | **Boolean function representation and minimization techniques**: Standard and canonical representation and minimization of Boolean expressions using Karnaugh map. | 3,4 | 7 |

| 3 | **Combinational Logic Circuits :** Half Adder, Full Adder, Half Subtractor, Full Subtractor, Full adder using half adder, BDC Adder. Carry Look ahead, Multipliers. Multiplexer/de- multiplexers, Encoders and Decoders. | 5,6 | 8 |
|---|---|---|---|
| 4 | **Waveform and wave shaping generator using IC-555 based:** 555 Timer, Astable and monostable multivibrator and bistable multivibrator. | 8 | 2 |
| 5 | **Sequential Logic Circuits:** Latches, Edge Triggered Flip Flops: SR, D, JK, Master slave JK,. Excitation tables, conversion of Flip Flops. State Diagrams | 8 | 4 |
| 6 | **Counters:** Synchronous and Asynchronous counters, Up/Down Counters, Design of Synchronous counters, Cascaded Counters, Counter Decoding, Counter applications | 9 | 8 |
| 7 | **Shift registers:** Shift register functions, Serial in/serial out shift registers, serial in parallel out/shift registers, Parallel In/ Parallel out shift registers, bidirectional Shift registers, Shift register counters, Shift register Applications. | 10 | 5 |
| 8 | **Analog to Digital & Digital to Analog Converters:** Design of various A to D and D to A Converters. | 14 | 2 |
| 9 | **Digital Logic Families:** Parameters of Logic Families. Introduction to logic Families: DTL, RTL, TTL, CMOS. | 15 | 2 |
| **Total Number of Lectures** | | | **44** |
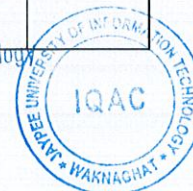
## Evaluation Scheme

1. Test 1 : 15 marks
2. Test 2 : 25 marks
3. Test 3 : 35 marks
4. **Internal Assessment** : 25 marks
   - 10 Marks : Class performance, Tutorials & Assignments
   - 10 Marks : Quizzes
   - 5 marks : Attendance

## Text Books

1. T h o m a s L F l o y d " D i g i t a l F u n d a m e n t a l s "

## Reference Books
1. M. Morris Mano. "Digital Logic and Computer Design",
2. M . Morris Mano, "Digital Design", Pearson Education Asia,.

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

# DIGITAL ELECTRONICS LAB

## (Core Subject)

| Course Code: | 10B17EC407 | Semester: | 3rd Semester B.Tech. (CSE and IT) 4th Semester, B. Tech. (ECE) |
|---|---|---|---|
| Credits: | 1 | Contact Hours: | L-0, T-0, P-2 |

## Course Objectives

The objectives are to study

1. To provide students basic experimental experiences in constructing digital circuits, measuring the experimental data and analysis of the results.
2. To develop skills to design various combinational and sequential circuits using electronics devices.

## Course Outcomes

After studying this course the students would gain enough knowledge.

1. To acquire knowledge about electronic components and hardware devices required for designing digital electronics circuits.
2. Foster ability to identify, analyze and design combinational circuits.
3. Foster ability to design various synchronous and asynchronous sequential circuits.
4. To acquire knowledge about internal circuitry and logic behind any digital system.
5. To develop skill to build, and troubleshoot digital circuits.

## List of Experiments

Introduction (About Bread Board)

1. To implement Logic gates using TTL ICs (7400, 7402, 7404, 7408, 7410, 7411, 7420, 7427, 7432, 7486).
2. Implementation of Combinational Circuits.
3. To verify NAND and NOR gates are universal gates.
4. Implementation of Combinational Logic Design using 74** ICs.
5. Simplification of Boolean expression using Karnaugh Map Method.
6. To design a 4 bit Binary to Gray code Converter, bit Gray to Binary code Converter, 3 bit Binary to Excess-3 code Converter.
7. To implement Adder and Subtractor circuits:- (Half and Full using simple gates and universal gates).
8. Implement multiplexer using gates and TTL IC's.
9. To verify the truth table of Binary (2 bit) to decimal decoder and octal to decimal decoder.

Assistant Registrar (Academics)
University of Information Technology
Waknaghat, Distt. Solan (HP)
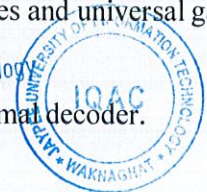
10. To verify the truth table of one bit and two bit Comparators using logic Gates.

11. To verify the truth tables for each (a) DDL OR gate (b) DDL AND gate (c) TTL OR gate (d) TTL

    AND gate (e) TTL NAND gate (f) TTL NOR gate.

12. Functional table verification of Latches:-

(i)      SR-Latch with NOR Gates

(ii)     SR-Latch with NAND Gates

(iii)    SR-Latch with control input using NAND Gates

(iv)     D Latch

(v)      T Latch

## Evaluation Scheme

|   |                      |          |
|---|----------------------|----------|
| 1. | Mid Sem Evaluation  | 20 Marks |
| 2. | End Sem  Evaluation | 20 Marks |
| 3. | Attendance          | 15 Marks |
| 4. | Class response      | 30 Marks |
| 5. | File                | 15 Marks |

**Total Marks**              **100 Marks**

## Text Books

1. Thomas L Floyd "Digital Fundamentals"

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

# DISCRETE MATHEMATICS (10B11MA211)

**Core course**                                                                 **Credits 4**

**Lectures 3 Tutorials 1 Practical 0**

**Course Objectives:** The objectives are to study:

- Various discrete structures (e.g., sets, relations, graphs, trees, etc.) that provide the mathematical formalizations for computational problems.
- Mathematical arguments and proof techniques.

**Course Assessment:**

| Test 1 | 15 Marks | 1 Hour |
|---|---|---|
| Test 2 | 25 Marks | 1.5 Hours |
| Test 3 (End Semester Exam) | 35 Marks | 2 Hours |
| Course work + Attendance | 20+5=25 Marks | Continuous evaluation |
| **Total** | **100 Marks** | |

**Syllabi Coverage**:

1. Test 1 Syllabi covered up-to T-1.
2. Test 2: (Mid Term) Syllabi covered up to T-2 (including T1 syllabus).
3. End Semester Exam: Entire Syllabus.

**Course Outcomes (CO):**

Students that successfully complete this course will be able to:

CO1: Understand set operations, Principle of Mathematical Induction, various types of relations & their representations.

CO2: Solve problems related to Pigeon-hole principle, recurrence relations, Propositions and quantifiers.

CO3: Understand various types of graphs, paths, Graph colorings, Trees, Rooted trees & MST algorithms.

CO4: Understand Ordered Sets, Lattices.

CO5: Recognize Algebraic structures; Groups, Subgroups, Rings, Fields etc.

CO6: Comprehend Languages, grammars, finite state automata & finite state machines.

## Detailed Syllabi

**Sets and their algebra:** Sets and their algebra, duality, power sets and partitions. Principle of Strong Mathematical Induction, Product sets, relations and their composition. Pictorial, matrix representation, Equivalence relations, types of functions, Composition of functions, Characteristic function of a set, Recursive functions. [CO1] [8L]

The Principle of Inclusion-Exclusion, The Addition and Multiplication Rules, The Pigeon-Hole Principle, Solving Recurrence Relations, Simple and compound statement. logical operators. Implication and double implication, Tautologies and contradictions. Valid arguments and fallacy. Propositional functions and quantifiers. [CO2] [8L].

**Graphs:** Graphs and related definitions, Various types of graphs, Subgraphs, isomorphism, paths and connectivity. Eulerian graph and Konigsberg problem. Hamiltonian graph, Covering; Matching. Independent sets; Planar Graphs, Homeomorphism, Kuratowski's theorem, Graph colorings. Four color problem, Digraphs and related definitions, connectivity in diagraphs, Trees, Rooted trees. Minimum Spanning Trees, Algebraic expressions and Polish notation. Sequential representation. Sequential representation. Adjacency matrix. Path matrix. Shortest path. [CO3] [14L].

**Ordered Sets and Lattices:** Ordered Sets and Lattices: Partial order relations and Hasse diagram, Supremum and infimum, total ordering, lattices – bounded, distributive, complemented, modular, Product of lattices. [CO4] [4L].

**Algebraic structures:** Binary operations, Algebraic structures – semigroup, monoid, groups, subgroups and their homomorphism. Rings, Integral domain and fields, Polynomials over a field. [CO5] [4L].

**Introduction to Languages:** Introduction to Languages, finite state automata grammars, finite state machines. [CO6] [4L].

| Recommended Reading: | |
|---|---|
| 1. | Kenneth H. Rosen: Discrete Mathematics and Its Applications with combinatorics and Graph Theory), Seventh Edition, Tata McGraw Hill 2011. |
| 2. | Kolman B., Busby R., Ross S.: Discrete Mathematical Structures, Sixth Edition, Pearson Education 2009. |
| 3. | Deo, N. : Graph Theory, Prentice Hall, 2004. |
| 4. | Liu, C. L.: Elements of Discrete Mathematics, Third Edition, Tata McGraw-Hill 2008. |

# ELECTRICAL CIRCUIT ANALYSIS
## (Core Subject)

| Course Code: | 10B11EC111 | Semester: | 1st Semester, B. Tech (ECE/CSE/IT/CE) |
|---|---|---|---|
| Credits: | 4 | Contact Hours: | L-3, T-1, P-0 |

## Course Objectives

The objective of this course is to provide insight into the circuits and the study of different techniques in different domains to use them in the analysis of circuits. Become familiar with electrical quantities such as current, voltage, resistance, power, and frequency in simple DC and AC resistive circuits. Become familiar with multiport network.

## Course Outcomes

After studying this course the students would gain enough knowledge:

1. To have a crystal clear understanding of fundamentals of Ohm's law, Kirchhoff's current and voltage laws
2. To develop mathematical equations for a given circuit (using matrices and simultaneous equations, integration and differentiation) for analysis
3. To analyze a given circuit depending on types of elements, DC analysis, Transient analysis and Frequency analysis.
4. To design circuits (at least proto type models) for a given set of specifications whether in time domain or in frequency domain.
5. Perform analysis using the fundamental electrical theorems and model simple electrical systems.
6. Derive the natural, forced and complete response of simple networks

## Course Contents

| Unit | Topics | References (chapter number, page no. etc) | Lectures |
|---|---|---|---|
| 1 | Introduction: Charge, Current, voltage and power, Voltage and Current sources, Ohm's law. | Hayt: Chapter 2 | 2 |
| 2 | Circuit Concepts: Electromotive Force (EMF), Terminal Voltage; Open-circuit and Short-circuit; Circuit Elements – Active and Passive; Voltage Divider, Current Divider; Star-Delta Transformation. | Hayt: Chapter 3, 7 | 4 |

| 3 | Network Analysis : Voltage Source and Current Source, Source Transformation, Combination of Sources; Kichhoff's Circuit Laws; Loop-Current Analysis, Supermesh; Mesh Analysis; Node-Voltage Analysis, Supernode; Choices of Method of Analysis. | Hayt: Chapter 4 | 8 |
|---|---|---|---|
| 4 | Network Theorems (DC Circuits) : Superposition Theorem; Thevenin's Theorem; Norton's Theorem; Maximum Power Transfer Theorem | Hayt: Chapter 5 | 8 |
| 5 | DC Transients : Simple RL Circuit, Time Constant, Decay and Growth of Current; Simple RC Circuit, Discharging of a Capacitor, Charging of a Capacitor; Initial and Final Value. | Hayt: Chapter 8, 9 | 4 |
| 6 | Alternating Voltage and Current : Physical Model for a Sinusoid, Phase and Phase Difference; Average Value, Effective Value, Form Factor and Peak Factor; Nonsinusoidal Waveforms; Power and Power Factor | Hayt: Chapter 11 | 2 |
| 7 | AC Circuits : Concept of Phasors, Addition of Phasors Using Complex Numbers; Behaviour of R, L and C in AC Circuits. Series RL Circuit, Complex Impedance; Series RC Circuit, Complex Power; Parallel RL Circuit; Parallel RC Circuit; Series RLC Circuit and its Phasor Diagram; Parallel RLC Circuit and its Phasor Diagram, Network Theorems (AC Circuits) | Hayt: Chapter 10 | 8 |
| 8 | Resonance in AC Circuits : Series Resonance Circuit, Effect of Variation of Frequency, Quality Factor, Voltage Magnification; Resonance Curve, Selectivity, Relationship between f1, f2, f0 and BW; Parallel Resonant Circuit; Ideal Parallel Resonant Circuit, Current at Resonance; Quality Factor. | Hayt: Chapter 16 | 4 |
| 9 | Two-Port Networks : Impedance, Admittance, Hybrid, Transmission Parameters; Equivalent Networks, Determination of Different Parameters. | Hayt: Chapter 17 | 2 |
| **Total Number of Lectures** | | | 42 |

## Evaluation Scheme

1. Test 1: 15 marks
2. Test 2 : 25 marks
3. Test 3 : 35 marks
4. Internal Assessment : 25 marks
   - 10 Marks : Class performance, Tutorials & Assignments
   - 10 Marks : Quizzes
   - 5 marks : Attendance


## Text Books

1. W.H. Hayt, J. E. Kemerlay & S.M. Durbin, "Engineering Circuit Analysis (Sixth Edition)", McGraw Hill, 2006


## Reference Books

1. D.C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill Education, 2011

2. Abhijit Chakrabarti, Sudipta Nath, Chandan Kumar Chanda, "Basic Electrical Engineering", Tata McGraw Hill Publishing Co, 2008.

3. Van Valkenburg, "Network Analysis", Prentice-Hall India Ltd., 2001.


## Web Resources

1. http://www.tina.com/course/course

2. http://nptel.ac.in/courses/108105053/

3. http://nptel.ac.in/syllabus/syllabus.php?subjectId=108102042

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

# ELECTRICAL CIRCUITS LAB

## (Core Subject)

| Course Code: | 10B17EC171 | Semester: | 1st Semester, B. Tech (ECE/CSE/IT/CE) |
|---|---|---|---|
| Credits: | 1 | Contact Hours: | L-0, T-0,P-2 |

## Course Objectives

The objectives are to study:

1. Fundamentals of Ohm's law, Kirchhoff's current and voltage laws and its practical implementation
2. Measurement of voltage, current, power and impedance of any circuit
3. Analysis of a given circuit depending on types of elements - DC analysis, Transient analysis and Frequency analysis
4. Measurement of frequency and amplitude of any signal using CRO
5. Designing of circuits (at least proto type models) for a given set of specifications weather in time domain or in frequency domain

## Course Outcomes

After studying this course the students would gain enough knowledge on:

1. Practical implications of the fundamentals of Ohm's law, Kirchhoff's current and voltage laws
2. Accurate measurement of voltage, current, power and impedance of any circuit
3. DC analysis, Transient analysis and Frequency analysis of a given circuit depending on types of elements
4. Using DSO to measure the frequency, and amplitude of any signal
5. Practical implementation of the fundamental electrical theorems and modeling of simple electrical systems
6. Teamwork skills for working effectively in groups and develop analytical skills to compare experimental results with theoretical concepts

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

## List of Experiments

1. Introduction to Power supply & Multimeter.
2. To determine the equivalent resistance of a circuit using color code and to verify it using a multimeter
3. To verify Voltage dividing rule and Kirchoff's Voltage Law (KVL)
4. To verify Current dividing rule and Kirchoff's Current Law (KCL)
5. To verify Superposition Theorem
6. To verify Thevenin's Theorem
7. To verify Norton's Theorem
8. To verify Maximum Power Transfer Theorem
9. To verify reciprocity theorem
10. Introduction to CRO & Function Generator
11. To study the transient response of series RC circuits using different values of R and C

## Evaluation Scheme

| | | |
|---|---|---|
| 1. | Mid Sem Evaluation | 20 Marks |
| 2. | End Sem Evaluation | 20 Marks |
| 3. | Attendance | 15 Marks |
| 4. | Class response | 30 Marks |
| 5. | File | 15 Marks |
| | **Total Marks** | **100 Marks** |

## Text Books

1. W.H. Hayt, J. E. Kemerlay & S.M. Durbin, "Engineering Circuit Analysis", Eighth Edition, McGraw Hill, 2012
2. Van Valkenburg, "Network Analysis", Prentice-Hall India, 2001.

# 10B1WPD731 Entrepreneurship Development

## Course Goal

The students develop and can systematically apply an entrepreneurial way of thinking that will allow them to identify and create business opportunities that may be commercialized successfully.

## Course Objectives
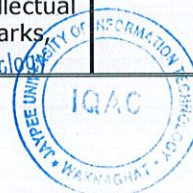
After the completion of the course, the students:
- Have the ability to discern distinct entrepreneurial traits
- Know the parameters to assess opportunities and constraints for new business ideas
- Understand the systematic process to select and screen a business idea
- discern the factors that can deem the idea successful and viable
- write a business plan

## Detailed Syllabi
## Lecture-wise Breakup

| Subject Code | 10B1WPD731 | Semester | 7 |
|---|---|---|---|
| Subject Name | Entrepreneurship Development | | |
| Credits | 3 | Contact Hours | 42 |

| Module No. | Subtitle of the Module | Topics | No. of Lectures |
|---|---|---|---|
| 1. | Introduction to Entrepreneurship | Role of the entrepreneur in India and around the globe; forces that are driving the growth of entrepreneurship; benefits and drawbacks of entrepreneurship; mistakes of entrepreneurship and how to avoid them; entrepreneurial failure. | 5 |
| 2. | Overview of business and its functioning | Business and industry; Components of macro and micro business environment | 4 |
| 3. | Business Idea and Feasibility | Creativity, innovation and entrepreneurship; mental locks" that limit individual creativity; steps in the creative process; techniques for improving the creative process; protection of intellectual property involving patents, trademarks and copyrights. | 4 |

| | | | |
|------|------|------|------|
| 4. | **Strategic Management and Entrepreneur** | Importance of strategic management to a (small) business; understanding competitive advantages; steps in the strategic planning process; basic strategies: low-cost, differentiation, and focus; balanced scorecard in the planning process. | 4 |
| 5. | **Forms of Business Ownership** | Advantages and the disadvantages of the three major forms of ownership: the sole proprietorship, the partnership, and the corporation. LLP and types of franchising: trade name, product distribution, and pure. Major trends shaping franchising. | 4 |
| 6. | **Building the business plan :marketing considerations** | Marketing concept and evolution; marketing process; guerilla marketing | 4 |
| 7. | **Foundations of New Venture Finance** | Understanding capital requirements; identifying the sources of finance; angel investing and venture finance; managing cash flow | 5 |
| 8. | **Creating the Organization : structure and design** | Forms of organization structure; factors contingent on organizational structure and design | 4 |
| 9. | **Technical entrepreneur and The E-entrepreneur** | Process of creating and growing high potential ventures; basic approaches to launch an e-commerce effort | 4 |
| 10. | **Crafting a winning business plan** | Need and importance of business plan; elements of a solid business plan. | 4 |
| | | **Total number of Lectures** | 42 |

| **Recommended Reading** | |
|------|------|
| 1. | **Entrepreneurship and New Venture Formation**: Thomas W. Zimmerer, and Norman M. Scarborough. PHI |
| 2. | **Entrepreneurship: Strategies and Resources**, 3/E -: Marc Dollinger; Prentice Hall |
| 3. | **Bringing New Technology to Market**- Kathleen R. Allen, Prentice Hall |

Assistant Registrar (Academic)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

JUIT, Waknaghat

| 4. | **Entrepreneurship in Action**, 2/E - Mary Coulter; Prentice Hall |
|----|----|

| **Methodology & Evaluation** | |
|---|---|
| The course essentially follows an interactive teaching- learning mode; classroom discussions on core concepts, open-forum discussions, use of multi-media cases and guest speakers. | |
| **Evaluation** | |
| **T1** | 15 marks |
| **T2** | 25 marks |
| **T3** | 35 marks |
| **TA** | 25 marks<br><br>1. Entrepreneurial solution to present day social problems<br>2. Video case<br>3. Spot exercise : Exercise based on segmentation and strategies<br>4. Group presentation -1<br>5. Group presentation -2 |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

JUIT, Waknaghat

# Environmental Studies

COURSE CODE: 07B41GE101

COURSE CREDITS: 3

CORE/ELECTIVE: Audit Course

L-T-P: 3-0-0

**Pre-requisite:** None

## Course Objectives:

1. Identify environmental problems arising due to engineering and technological activities and the science behind those problems.
2. Estimate the population- economic growth, energy requirement and demand.
3. Analyze material balance for different environmental systems
4. Realize the importance of ecosystem and biodiversity for maintaining ecological balance.
5. Identify the major pollutants and abatement devices for environmental management and sustainable development.
6. Recognizing the major concepts of environmental studies, developing problem solving ability, forecasting the global climate change

## Course Outcomes:

| S.No. | Course Outcomes | Level of Attainment |
|-------|-----------------|---------------------|
| CO-1 | Introducing basic concept of environmental studies, interdisciplinary nature and scope of the subject | Familiarity |
| CO-2 | Understanding ecosystem services and its functioning as well as equitable use of natural resources. | Assessment |
| CO-3 | Understanding Pollution, A threat to the environment and finding its solutions, Pollutant sampling and monitoring of samples. | Assessment |
| CO-4 | Correlating the concept of Biodiversity and its importance to human mankind | Usage |

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY WAKNAGHAT, SOLAN (H.P.) INDIA
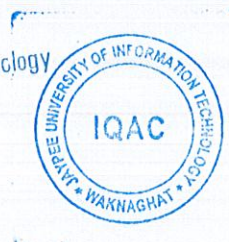
| | | | |
|---|---|---|---|
| CO-5 | Understanding social issues and their impact on environment. | | Usage |
| CO-6 | Role of Information Technology in environment and human health | | Usage |

**Course Contents:**

| Unit | Contents | Lectures required |
|---|---|---|
| 1 | **Unit 1: Multidisciplinary nature of environmental studies:** The Multidisciplinary nature of environmental studies: Definition, scope and importance, Need for public awareness, Types of Ecosystems, World Biomes, Ecosystem functioning, Biogeochemical cycles. | 3 |
| 2 | **Unit 2: Natural resources, their consumption & Protection:** Natural resources, their consumption & Protection: Water, Land Energy (Renewable, non-renewable, wind, solar, hydro, Biomass), Mineral, Forest, & Food resources, Role of an individual in conservation of natural resources, Equitable use of resources. | 4 |
| 3 | **Unit 3: Pollution- a threat to environment:** Pollution- a threat to environment: Air, Water & Land pollution, sources & causes, Space pollution, causes & effects, toxicity limits of pollutants. Critical issues concerning global Environment (Urbanization, population growth, global warming, climate change, acid rain, ozone depletion etc.) and the Roots in: Cultural, Social, Political, Commercial, industrial, territorial domains | 4 |
| 4 | **Unit 4: Environmental standards & Quality:** Environmental standards & Quality: Air, Water & Soil Quality, Pollutant sampling, pollution control systems. Green Chemistry and its applications | 3 |

Assistant Registrar (Academics)
Jaypee University of information Technology
Waknaghat, Distt. Solan (H.P.)

IQAC

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY WAKNAGHAT, SOLAN (H.P.) INDIA

| 5 | **Unit 5: Biodiversity and its conservation:** Biodiversity loss: Diversity of flora and fauna, species and wild life diversity, Biodiversity hotspots, threats to biodiversity | 4 |
|---|---|---|
| 6 | **Unit 6: Social Issues and the Environment:** Waste land reclamation, consumerism and waste products, eco-consumerism, dematerialization, green technologies, eco-tourism. Water conservation, rain water harvesting, watershed management. Environment protection act, Air (prevention and control of population) act; Water (prevention and control of pollution) act, Wildlife protection act, Forest conservation act, Issues involved in enforcement of environmental legislation National Environmental Policy; Function of pollution control boards (SPCB and CPCB), their roles and responsibilities. | 4 |
| 7 | **Unit 7: Human Population and the environment:** Population growth, variation among nations. Population explosion—Family Welfare Programme. Environment and human health. Human rights. Value education.HIV/AIDS. Women and Child Welfare. Role of Information Technology in environment and human health. Case Studies. | 4 |
| 8 | **Unit 8: Field work:** Field Work: Explore the surrounding flora & fauna (Study of common plants, insects, birds document environmental assets), documentation of industries in local region and their possible effects, measure of water, air and land quality, Visit to a local polluted site-Urban/Rural /Industrial / Agricultural, Study of simple ecosystems-pond, river, hill slopes etc | 4 |
| **Total lectures** | | **30** |

**Suggested Text Book(s):**

1. Environmental Studies By: M. P. Poonia and S.C. Sharma, Khanna Publishers
2. Textbook of Environmental Studies for UG Courses - Erach Bharucha, University Press
3. Joseph, B., 2005, Environmental Studies, Tata McGraw Hill, India.

## Suggested Reference Book(s):

1. Nebel, B.J. & Wright, R.T., 1993, Environmental Science, 8th Edition, Prentice Hall, USA.
2. Chiras D D.(Ed.). 2001. Environmental Science – Creating a sustainable future. 6th ed. Jones & Barlett Publishers.
3. David Laurance. 2003. Environment Impact assessment, Wiley publications.
4. Chhokar KB, Pandya M & Raghunathan M. 2004. Understanding Environment. Sage publications, NewDelhi .

## Other useful resource(s):

1. Issues of the journal: Down to Earth, published by Centre for Science and Environment.
2. Audio visuals from: Discovery, National Geographic etc.
3. https://nptel.ac.in/courses/120108002/
4. https://nptel.ac.in/courses/120108005

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

**(Course Code)   Finance and Accounting**

**Course Goal**

To understand the theoretical framework and issues of accounting and corporate finance and apply the concepts in practice so that one can make an optimal decision on sustainable basis, not only for the firm but also for the society in-large.

**Course Objectives**

1. Understand the issues and framework of accounting and corporate finance.
2. Prepare financial statements and analyze it.
3. Analyze the effect of corporate decisions on the value of a firm.
4. Analyze projects, its financial needs, financial performance and design a suitable strategy in case of conflicting recommendations.
5. Make optimal financial decisions on sustainable basis, not only for the firm but also for the society at large.

## Detailed Syllabi

## Lecture-wise Breakup

| Subject Code | 10B11PD411 | Semester | 4 | |
|---|---|---|---|---|
| Subject Name | Finance and Accounting | | | |
| Credits | 3 | Contact Hours | 3 | |
| Faculty (Names) | Coordinator(s) | | | |
| | Teacher(s) (Alphabetically) | | | |
| Module No. | Subtitle of the Module | Topics | | No. of Lectures |
| 1. | Introduction to Accounting | Basic concepts of accounting, Accounting standards and Policies, Accounting Concepts and Conventions, Accounting Equation, Preparation of Journal, Ledger and Trial Balance | | 6 |

| 2. | Preparations of Final Accounts | Understanding adjustments, Preparation of Final Accounts – Trading, Profit and Loss, Balance Sheet, Cash Flow Statements, Fund Flow Statements, Use of MS-Excel for financial statement analysis | 6 |
|---|---|---|---|
| 3. | Financial Management: An Overview | Nature and scope of financial management, Role of finance function, Finance decisions of the firm, Objective function in finance, Agency costs and corporate governance, Financial management and accounting, Financial objectives and organizational strategy | 2 |
| 4. | Comparative and Historical Analysis | Analyzing financial statement – Ratio Analysis – liquidity ratios, capital structure ratios, working capital ratios, profitability ratios, valuation ratios, Interlinking the ratios- Dupont analysis, Uses and limitations of ratio analysis | 5 |
| 5. | Sources of Finance | Role of financial markets, Financial Markets- segments, products and services, Long-term sources of finance - Equity, Debt, Debentures/Bonds | 2 |
| 6. | Time Value of Money | Basics of time value, Finding future value, Discounting and present value, Future value of annuity,, Present value of annuity, Periodicity of compounding and discounting, Equated monthly instalments | 3 |
| 7. | Cost of Capital | Opportunity cost of capital, Weighted average cost of capital (WACC), Cost of Debt, Cost of preference capital, Cost of equity, Assigning weights, WACC, Factors affecting cost of capital | 3 |
| 8. | Capital Structure – Theory | Common assumptions for analysis, Net income approach, Net operating income approach, Traditional approach, MM theory without and | 2 |

| | | with corporate taxes, Leverage and financial distress, Trade-off theory, Pecking order theory | |
|---|---|---|---|
| 9. | Designing Capital Structure | Operating leverage, Financial leverage, EBIT-EPS analysis, ROI-ROE analysis, Defining target/ optimal capital structure | 3 |
| 10. | Capital Budgeting | Features of capital budgeting decisions, Types of projects, Techniques of evaluation of capital budgeting decisions, Accounting rate of return, Payback period method, Net present value method, Internal rate of return, NPV and IRR – A comparison, Conflict between IRR and NPV, Advantages of NPV and IRR, Modified IRR, Projecting cash flows, Principles of cash flow projections, Cautions in capital budgeting and cash flow projection | 6 |
| 11. | Working Capital Management | Meaning of working capital, Scope of working capital management, Working capital needs of different types of businesses, Operating cycle and its relevance for WCM, Working capital financing policies, Working capital policy, Estimation of working capital requirements | 4 |
| | | **Total number of Lectures** | 42 |

| Evaluation Scheme | | |
|---|---|---|
| S.No. | Component | Weightage |
| 1. | Test – 1 (1 Hr) | 15 |
| 2. | Test – 2 (1 Hr 30 mins) | 25 |
| 3. | Test – 3 (2 Hrs) | 35 |

| 5. | Internal | |
|---|---|---|
| | • Assignment | 5 |
| | • Quiz | 5 |
| | • Class Participation | 10 |
| | • Attendance | 5 |

| Recommended Readings | |
|---|---|
| 1. | Financial Accounting: P. C. Tulsian, Pearson Education |
| 2. | Financial Accounting: V. Rajasekaran and R. Lalitha, Pearson Education |
| 3. | Financial Management: Rajiv Srivastava and Anil Misra, 2$^{nd}$ Ed, Oxford University Press. (**Text Book**) |
| 4. | Financial Management: I. M. Pandey, Vikas Publishing House, 9th Ed. |
| 5. | Fundamentals of Financial Management: Eugene F. Brigham, Thomson Learning. |
| 6. | Financial Management: Prasanna Chandra, Tata McGraw Hill. |
| 7. | Financial Management: Sheeba Kapil, Pearson Education. |

# 07B41PD104 Financial Management

## Course Goal

To understand the theoretical framework and issues of corporate finance and apply the concepts in practice so that one can make an optimal decision in corporate finance.

## Course Objectives

1. Understand the issues and framework of corporate finance.
2. Analyze the effect of corporate decision of the value of a firm.
3. Analyze a firm's performance to determine its strengths and weaknesses, and be able to use financial analysis to improve performance.
4. Design a firm's financial needs and interpret its effect on the value of the firm.
5. Analyze projects, how to apply them, and what to do if there are conflicting recommendations.
6. Make optimal financial decisions by integrating the concepts of leverage, working capital and dividend.

## Detailed Syllabi

## Lecture-wise Breakup

| Subject Code | 10B11PD411 | Semester | 4 | |
|---|---|---|---|---|
| Subject Name | Financial Management | | | |
| Credits | 3 | Contact Hours | 3 | |
| Faculty (Names) | Coordinator(s) | 1. Dr. Amit Srivastava | | |
| | Teacher(s) (Alphabetically) | 1. Ms. Triambica Gautam | | |
| Module No. | Subtitle of the Module | Topics | | No. of |

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY WAKNAGHAT, SOLAN (H.P.) INDIA

|  |  |  | **Lectures** |
|---|---|---|---|
| 1. | Introduction to Financial Accounting | Basic concepts of financial accounting, Accounting Equation, Preparation of Journal, Ledger, Trial Balance, Manufacturing and Trading Account, Income Statement and Balance Sheet | 5 |
| 2. | Financial Management: An Overview | Nature and scope of financial management, Role of finance function, Finance decisions of the firm, Objective function in finance, Agency costs and corporate governance, Financial management and accounting, Financial objectives and organizational strategy | 2 |
| 3. | Sources of Finance | Role of financial markets, Financial Markets- segments, products and services, Long-term sources of finance - Equity, Debt, Debentures/Bonds | 4 |
| 4. | Comparative and Historical Analysis | Balance sheet, Profit and loss account, Analysing financial statement – Ratio Analysis – liquidity ratios, capital structure ratios, working capital ratios, profitability ratios, valuation ratios, Interlinking the ratios- Dupont analysis, Uses and limitations of ratio analysis | 5 |
| 5. | Time Value of Money | Basics of time value, Finding future value, Discounting and present value, Future value of annuity,, Present value of annuity, Periodicity | 2 |

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY WAKNAGHAT, SOLAN (H.P.) INDIA

| | | of compounding and discounting, Equated monthly instalments | |
|---|---|---|---|
| 6. | Cost of Capital | Opportunity cost of capital, Weighted average cost of capital (WACC), Cost of Debt, Cost of preference capital, Cost of equity, Assigning weights, WACC as discount rate and risk, Pure play approach, Factors affecting cost of capital | 4 |
| 7. | Capital Structure – Theory | Common assumptions for analysis, Net income approach, Net operating income approach, Traditional approach, MM theory without and with corporate taxes, Capital structure with personal taxes, Leverage and financial distress, Trade-off theory, Pecking order theory, Asymmetric information theory | 4 |
| 8. | Designing Capital Structure | Operating leverage, Financial leverage, EBIT-EPS analysis, ROI-ROE analysis, Ratios and industry norms for capital structure, Defining target/optimal capital structure | 3 |
| 9. | Dividend Decisions | Relevance of dividend, Walter's model, Gordon's model, Irrelevance of dividend, MM theory of irrelevance, Home made dividend, Factors affecting dividend policy, Alternative form of dividend | 3 |
| 10. | Capital Budgeting | Features of capital budgeting decisions, Types of projects, | 6 |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY WAKNAGHAT, SOLAN (H.P.) INDIA

| | | Techniques of evaluation of capital budgeting decisions, Accounting rate of return, Payback period method, Net present value method, Internal rate of return, NPV and IRR – A comparison, Conflict between IRR and NPV, Advantages of NPV and IRR, Modified IRR, Projecting cash flows, Principles of cash flow projections, Cautions in capital budgeting and cash flow projection | |
|---|---|---|---|
| 11. | Working Capital Management | Meaning of working capital, Scope of working capital management, Working capital needs of different types of businesses, Operating cycle and its relevance for WCM, Working capital financing policies, Working capital policy, Estimation of working capital requirements | 4 |
| | | **Total number of Lectures** | 42 |

| **Evaluation Scheme** | | |
|---|---|---|
| S.No. | Component | Weightage |
| 1. | Test – 1 (1 Hr) | 15 |
| 2. | Test – 2 (1 Hr 30 mins) | 25 |
| 3. | Test – 3 (2 Hrs) | 35 |
| 5. | Internal<br>    • Assignment<br>    • Quiz | 5<br>10 |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY WAKNAGHAT, SOLAN (H.P.) INDIA

| | • Class Participation | 5 |
|---|---|---|
| | • Attendance | 5 |

| Recommended Readings | |
|---|---|
| 1. | Financial Management: Rajiv Srivastava and Anil Misra, 2<sup>nd</sup> Ed, Oxford University Press. (**Text Book**) |
| 2. | Financial Management:  I. M. Pandey, Vikas Publishing House, 9th Ed. |
| 3. | Fundamentals of Financial Management: Eugene F. Brigham, Thomson Learning. |
| 4. | Financial Management: Prasanna Chandra, Tata McGraw Hill. |
| 5. | Financial Management: Sheeba Kapil, Pearson Education. |
| **Web Resources** | |
| | • http://ocw.mit.edu/courses/sloan-school-of-management/15-401-finance-theory-i-fall-2008/<br>• http://ocw.mit.edu/courses/sloan-school-of-management/15-414-financial-management-summer-2003/ |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

# FINANCIAL PLANNING
## 10B1WPD737

**Course Goal**

This course is aimed at enabling the students understand the issues involved in planning finances and investments at a personal level. This course intends to give students a deeper understanding of concepts and issues relating to personal finance and their applications to real life situations so that they are capable of acting as a financial planner.
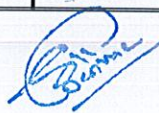
**Course Objectives**

1. Financial planning process.
2. Terms and concepts relating to personal financial planning.
3. Concepts and issues relating to management of money such as taxes, investments, loans, insurance policies etc. so that students are able to spend and invest their hard earned money wisely.

## Detailed Syllabi
### Lecture-wise Breakup

| Subject Code | 10B1WPD737 | Semester | 8 |
|---|---|---|---|
| Subject Name | FINANCIAL PLANNING | | |
| Credits | 3 | Contact Hours | 3 |

| Module No. | Subtitle of the Module | Topics | No. of Lectures |
|---|---|---|---|
| 1. | Financial Planning Process | • Meaning of financial planning<br>• Steps in financial planning process<br>• Determinants of personal income | 3 |
| 2. | Financial Statements and Plans | • Role of financial statement in financial planning<br>• Preparing a personal balance sheet<br>• Preparing the income and expense statement using personal financial statements<br>• Cash Budgets | 3 |
| 3. | Taxes | • Concepts of income tax<br>• Personal taxation<br>• Tax planning | 6 |
| 4. | Cash and Savings | • Role of cash management in personal financial planning<br>• Financial services market<br>• Cash management products<br>• Electronic baking services<br>• Channels of savings | 3 |

| 5. | Purchase of Automobiles and Houses | • Automobile purchase planning and Car loans<br>• The home buying process and Home loans | 6 |
|---|---|---|---|
| 6. | Credit and Credit Cards | • Credit<br>• Types of credit<br>• Different kinds of credit cards<br>• Disadvantages of the credit cards | 3 |
| 7. | Life Insurance | • Insurance planning<br>• Benefits of life insurance<br>• Calculating insurance needs<br>• Buying a life insurance<br>• Life insurance products in India | 4 |
| 8. | Health Insurance | • Health Insurance<br>• Types of health care plans<br>• Health Insurance in India. | 3 |
| 9. | Investments | • Meaning of investment<br>• Types of investment Vehicles<br>• Factors considered in the choice of investments<br>• Developing the investment strategy | 8 |

| | | • Investing in equities, mutual funds and fixed income securities | |
|---|---|---|---|
| 10. | Retirement Planning | • Sources of retirement income<br>• Pension funds. | 3 |
| | | **Total number of Lectures** | 42 |

| **Recommended Reading** (Books/Journals/Reports/Websites etc.: Author(s), Title, Edition, Publisher, Year of Publication etc. in IEEE format) | |
|---|---|
| 1. | Lawrence J Gitman and Michael D Joehnk. Personal Financial Planning. |
| 2. | Ernst and Young's Personal Financial Planning guide. |
| 3. | G Victor Hallman and Jerry S Rosenbloom,6$^{th}$ Edition, Mc GRaw Hill. Personal Financial Planning |

**Method of Evaluation**

The lecture will focus the basic concepts and tutorials will focus real problems and case-studies.

| Components | Weightage |
|---|---|
| T1 | 15 |
| T2 | 25 |
| T3 | 35 |
| **Internal assessment:**<br>• **Assignments**<br>• **Class assessment**<br>• **Attendance** | 25 |

| T2 Test | 25 | 1.5 hrs. | Syllabus covered upto T-2 |
|---|---|---|---|
| End Term Test | 35 | 2 hrs. | Entire Syllabus |
| Teacher Assessment | 25 | Entire Sem | Based on Assignments, quizzes etc. |

# Functional Genomics

**COURSE CODE** 14M1IBT213

**COURSE CREDITS: 3**

**CORE/ELECTIVE: CORE**

**L-T-P: 3-0-0**

Pre-requisite: Molecular Biology, Biochemistry

**Course Objectives**
1. The course will explore that how technological innovations fostered by the prokaryotic and eukaryotic genome Projects, will lead to significant advances in our understanding of diseases/ biological processes that have a genetic basis and, more importantly, how health care will be delivered from this point forward

**Course Outcomes**

| Sr. No. | Course outcomes | Level Attainment |
|---|---|---|
| CO I | Students will have understanding on the application genomic technologies such as whole genome mapping & sequencing, gene expression technologies, comparative genomics, introduction to pharmacogenomics,. | Familiarity |
| CO II | The students will learn the approach to decipher the insight into the functional aspects of the organism/ normal or disease condition. | Familiarity |
| CO III | Able to apply the knowledge of function genomics in public health | Assessment & usage |

**Topic Covered**

| S. No. | Contents | Teaching required. |
|---|---|---|
| 1 | Introduction<br><br>Genes and Genomes, Genome Organization, Exon-Introns, Alternate splicing, Model Genomes | 3 |
| 2 | Application of next generation sequencing<br><br>Next generation sequencing; Reverse termination sequencing, Single cell RNA sequencing or digital RNA sequencing and Applications | 8 |
| 3 | Comparative genomics<br><br>Genome Annotation i.e. Mining Genomic Sequence Data, gene prediction methods, Metagenomics, evolutionary relationship | 8 |
| 4 | Approaches to functional genomics<br><br>Serial Analysis of Gene Eexpression-SAGE, DNA-Microarray, cDNA-PCR, etc. | 8 |
| 5 | SNP | |

Approved in Academic Council Meeting held on 28 July, 2021

| | | |
|---|---|---|
| | SNP Technologies: Platforms & Analysis | |
| | Haplotyping: Concepts and Applications and relevance in cancer Biology | |
| 6 | Gene regulation<br>Gene Function Technologies (Gene Targeting, Gene Silencing (RNAi)) | 4 |
| 7 | Biomarkers<br><br>Pharmacogenomics: Concepts and Applications in Healthcare<br><br>Role of genotype in drug metabolism<br><br>Identification & Utilisation of cancer bio-marker | 4 |
| | **Total Number of Lectures** | **42** |

## REFERENCE RESEARCH ARTICLES & TEXT BOOKS

1. Discovering Genomics, proteomics & bioinformatics. Second edition by A Malcolm Campbell, Davidson College; Laurie J. Heyer Davidson College ; With Foreword by Francis S. Collins Molecular Biology of the Gene (1987) Watson J. D., Hopking N., Robast J. and Steiz, J.
2. BIOINFORMATICS: A Practical Guide to the Analysis of Genes and Proteins (Third edition) Andreas D. Baxevanis & B. F. Francis Ouellette
3. Ronaghi M. Pyrosequencing sheds light on DNA sequencing. Genome Res. 2001Jan;11(1):3-11. Review. PubMed PMID: 11156611.
4. Schulze A, Downward J. Navigating gene expression using microarrays—a technology review. Nat Cell Biol. 2001 Aug;3(8):E190-5. Review. PubMed PMID:
5. 11483980.
6. Kim JB, Porreca GJ, Song L, Greenway SC, Gorham JM, Church GM, Seidman CE, Seidman JG. Polony multiplex analysis of gene expression (PMAGE) in mouse hypertrophic cardiomyopathy. Science. 2007 Jun 8;316(5830):1481-4. PubMed PMID: 17556586
7. MacBeath G, Schreiber SL. Printing proteins as microarrays for high-throughput function determination. Science. 2000 Sep 8;289(5485):1760-3. PubMed PMID: 10976071. \
8. Shankar J, Wu TD, Clemons KV, Monteiro JP, Mirels LF, et al. (2011) Influence of 17b-Estradiol on Gene Expression of Paracoccidioides during Mycelia-to-Yeast Transition. PLoS ONE 6(12): e28402. doi:10.1371/journal.pone.0028402
9. Mary V. Relling, William E. Evans Nature. Author manuscript; available in PMC 2016 Jan 13.
10. Published in final edited form as: Nature. 2015 Oct 15; 526(7573): 343–350. doi: 10.1038/nature15817

**Evaluation Scheme:**

| Assessment | Max. marks | Duration | Course Covered |
|---|---|---|---|
| T1 Test | 15 | 1 hr. | Syllabus covered upto T-1 |
| T2 Test | 25 | 1.5 hrs. | Syllabus covered upto T-2 |
| End Term Test | 35 | 2 hrs. | Entire Syllabus |
| Teacher Assessment | 25 | Entire Sem | Based on Assignments, quizzes etc. |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

IQAC

Approved in Academic Council Meeting held on 28 July, 2021

# Fundamentals of Algorithms

COURSE CODE: 10B11CI411

COURSE CREDITS: 4

CORE/ELECTIVE: CORE

L-T-P: 3-1-0

**Pre-requisite:** Data structure and algorithms

## Course Objectives:

- Strengthen higher level cognitive skills of analysis, creation and evaluation.
- Strengthen ability of data abstraction and problem solving using computers.
- Strengthen ability to express solutions to problems clearly and precisely.
- Strengthen ability to design and evaluate ADTs, non-linear temporary and persistent data structures and also related algorithms.
- Introduce students to some domain specific data structures and related algorithms in various domains

## Course Outcomes:

| S.No. | Course Outcomes | Level of Attainment |
|-------|-----------------|---------------------|
| CO-1 | For a given algorithms analyze worst-case running times of algorithms based on asymptotic analysis and justify the correctness of algorithms. | Technical |
| CO-2 | Describe the greedy paradigm and explain when an algorithmic design situation calls for it. For a given problem develop the greedy algorithms. | Technical |
| CO-3 | Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Synthesize divide-and-conquer algorithms. Derive and solve recurrence relation. | Technical |
| CO-4 | Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. For a given problems of dynamic-programming and develop the dynamic programming algorithms, and analyze it to determine its computational complexity. | Technical |
| CO-5 | For a given model engineering problem model it using graph and write the corresponding algorithm to solve the problems. | Technical |
| CO-6 | Explain the ways to analyze randomized algorithms (expected running time, probability of error). | Technical |
| CO-7 | Explain what an approximation algorithm is. Compute the approximation factor of an approximation algorithm (PTAS and FPTAS). | Technical |

**Course Contents:**

| S.no. | Topics | Hours |
|-------|--------|-------|
| 1 | **Introduction:** Algorithmic thinking, Models of computation, Integer arithmetic, Square roots, Newton's method, Euclid's method | 6 |
| 2 | **Evaluation of algorithm:** Computational complexity, order notations, recurrences, Master's theorem | 6 |
| 3 | **Sorting:** Insertion sort, merge sort, Heaps and heap sort, Quick sort, Linear sort, priority queue, order statistics, lower bounds for sorting | 6 |
| 4 | **Searching:** Balanced tree, red-black tree, Skip list, Hashing, universal and perfect hashing, lower bounds for searching | 5 |
| 5 | **Graph:** representation and algorithms, Breadth-first search (BFS), Depth-first search (DFS), topological sorting, Shortest Paths, Single-source shortest paths problem, Dijkstra, Bellman-Ford | 6 |
| 6 | **Pattern matching & text search:** brute force, Rabin Krap, Automata based method, trie, compact trie, patricia, suffix tree. | 4 |
| 7 | **Dynamic Programming:** Concept, Longest common subsequence, shortest paths, Chain matrix multiplication, Coin denomination, edit distance, knapsack, TSP, etc.. | 6 |
| 8 | **P –NP:** classes of P and NP, NP-hard, NP-complete, reduction, Back tracking and 3-SAT, Branch and bound and TSP. | 3 |
| | **Total** | 42 |

**Suggested Text Book(s):**

1. Rntroduction to Algorithms, 4TH Edition, Thomas H Cormen, Charles E Lieserson, Ronald L Rivest and Clifford Stein, MIT Press/McGraw-Hill.
2. Fundamentals of Algorithms – E. Horowitz et al.

**Suggested Reference Book(s):**

1. Algorithm Design, 1ST Edition, Jon Kleinberg and ÉvaTardos, Pearson.
2. Algorithm Design: Foundations, Analysis, and Internet Examples, Second Edition,
3. Michael T Goodrich and Roberto Tamassia, Wiley.
4. Algorithms -- A Creative Approach, 3RD Edition, UdiManber, Addison-Wesley, Reading, MA.

**Other useful resource(s):**

1. Link to NPTEL course contents: https://onlinecourses.nptel.ac.in/noc18_cs20/preview
2. Link to topics related to course:
    i. https://nptel.ac.in/courses/106101060/

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

IQAC

**Evaluation Scheme:**

| S. No | Exam | Marks | Duration | Coverage / Scope of Examination |
|-------|------|-------|----------|--------------------------------|
| 1 | T-1 | 15 | 1 Hour. | Syllabus covered upto T-1 |
| 2 | T-2 | 25 | 1.5 Hours | Syllabus covered upto T-2 |
| 3. | T-3 | 35 | 2 Hours | Entire Syllabus |
| 4. | Teaching Assessment | 25 | Entire Semester | Assignment (2) - 10 Quizzes (2)   - 10 Attendance - 5 |

## Course Outcomes (COs) contribution to the Programme Outcomes (POs)

| Course outcomes (Fundamental of Algorithms) | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 | PO-8 | PO-9 | PO-10 | PO-11 | PO-12 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-1 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 3 | 3 | 3 | 1 | 3 | 2.5 |
| CO-2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 2 |  | 1 | 2 | 1.6 |
| CO-3 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 3 | 1 | 1 | 3 | 2.2 |
| CO-4 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 |  | 2 | 2 | 1.8 |
| CO-5 | 2 | 2 | 2 | 2 | 2 | 3 | 1 | 1 | 2 | 2 | 2 | 2 | 1.9 |
| CO-6 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 1.9 |
| CO-7 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 1.9 |
| Average | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 1.7 | 1 | 1.6 | 2.3 | 2 | 1.6 | 2.3 | |

queries, range trees, interval trees, segment trees, ray shooting and partition trees, External memory/cache-oblivious models, B-trees, ordered-file maintenance, list labeling, order queries, priority queues, Distributed data structures, distributed hash table, distributed trees, distributed stack and distributed lists, Streamming data structures, synopsis, sketches, histogram, fingerprint, wavelets and sliding windows.

## 2. Advanced Computer Networks (10M11CI112)
I Sem(CSE) Credits-4(3-1)

Review of computer Networks. IPv6. Security issues in IPv6. TCP/IP details. Voice over IP. Real time communication protocols. High speed local and wide area networks. Virtual networks. Network security. Broadband networks. Introduction to intelligent networking. Performance analysis of networks.

## 3. Advanced Database Systems(10M11CI113)
I Sem (CSE) Credits-4(3-1)

Review of Database systems. Web-enabled database systems. Storage and file structures. Indexing and Hashing. Query Processing. Query Optimization. Object oriented DBMS. Extended relational model. Distributed Databases. Active Databases. Temporal Databases, Spatial Databases. Multimedia databases. Deductive Databases. Emerging databases technologies.

## 4. High Performance Computer Architecture (10M11CI114)
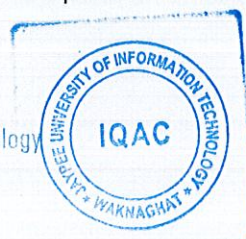I Sem(CSE), III Sem Elective (ECE) Credits-4(3-1)

Performance analysis and scalability. Modeling performance. Pipelined Systems. Interconnection networks. Processor array. Multicomputers. Multiprocessors. Systolic Array. Vector processor. Structured memory design for parallel systems – symmetric shared, distributed shared and synchronization. Parallel Programming Concepts and Design Patterns Theoretical Analysis of Parallel Algorithms , Amdahl's law, Memory Hierarchy Models, Communication Models, CUDA Hardware, CUDA Programming, CUDA Threading Model, CUDA Communication and Memory Model, CUDA Performance Monitoring and Optimizations.

## 5. Fundamentals of Algorithms and Statistical Analysis(11M12CS111)
I Sem (CB) Credits-4(3-1)

Review of Data Structure. Analyzing algorithm, designing algorithm. Growth of functions. Recurrences, divide and conquer algorithms, substitution method for solving recurrences, dynamic programming, greedy algorithm, backtracking. Decision tree, game tree. Index trees – IBST, TBST, AVL, and B Trees. Heaps. Graph algorithms - minimum spanning tree, shortest path, Hamiltonian cycle. String and sequence matching. Basic computational geometry.

# Algorithms Lab

COURSE CODE: 10B17CI471

COURSE CREDITS: 1

CORE/ELECTIVE: CORE

L-T-P: 0-0-2

**Pre-requisite:** None

## Course Objectives:

1. Student will understand the running time using time library functions. Learn to prepare table for input size vs. running time. Learn to measure best run and worst run of the experiments.
2. Students will learn to implement various types of design for an algorithms and compare the approaches.
3. Students will learn to implement network algorithms and their applications.
4. Students will learn to implement approximate algorithms for real world problems.
5. Students will learn to implement randomized solution for difficult real world problems.

## Course Outcomes:

| S.No. | Course Outcomes | Level of Attainment |
|-------|-----------------|---------------------|
| CO1 | Student will understand the running time using time library functions. Learn to prepare table for input size vs. running time. Learn to measure best run and worst run of the experiments. | Technical |
| CO2 | Students will learn to implement various types of design for algorithms and compare the approaches. | Technical |
| CO3 | Students will learn to implement network algorithms and their applications. | Technical |
| CO4 | Student will learn to implement classical NP problems | Technical |
| CO5 | Students will learn to implement approximate algorithms for real world problems. | Technical |
| CO6 | Students will learn to implement randomized solution for difficult real world problems. | Technical |

# List of Experiments

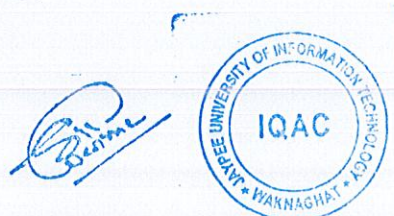| S.No | Topic | No of Labs |
|---|---|---|
| 1 | Write c programs for<br>    1) Prime number (check the given number is prime or not)<br>    2) GCD of k numbers<br>    3) Fibonacci sequence [ $f(n) = f(n-1) + f(n-2)$; $n > 2$, $f(1)=1$, $f(2)=1$ ]<br>• Compute running time using time library functions.<br>• Prepare table for input size vs. running time. For same input size note best run and worst run of your experiments. | 2 |
| 2 | Write c programs for<br>    1) Insertion Sort of n random number.<br>    2) Merge Sort of n random number<br>    3) Heap Sort of n random number<br>Where n is sufficiently large.<br>    4) Implement Priority Queue using Heap.<br>• Compute running time.<br>• Prepare table for number of elements vs. running time. | 2 |
| 3 | A) Implement the following variations of Quicksort using an array:<br><br>    1. First element is the partition element<br>    2. Last element is the partition element<br>    3. Randomized QuickSort ( Take the partition element at random)<br><br>B) Write a program to find $k^{th}$ order statistics. | 1 |
| 4 | Write c programs for<br>    1) Constructing a red-black tree of n random number and compute the average time of insertion, deletion and searching.<br>    2) Constructing a skip-list of n random numbers and compute the average time of insertion, deletion and searching.<br>Where n is sufficiently large.<br>Prepare table for number of elements vs. average time of insertion, deletion and searching. | 2 |
| 5 | 1) Implement BFS algorithm for connected graph.<br><br>2) Extend the above implementation for disconnected graph.<br><br>3) Implement DFS algorithm for connected graph. Find the back edges. | 1 |
| 6 | 1) Implement Prim's algorithm to find MST of a weighted graph.<br><br>2) Implement disjoint set data structures.<br><br>3) Implement Kruskal algorithm using above data structure.. | 2 |
| 7 | 1) Implement Dijkstra algorithm to find shortest path of a weighted graph. | 1 |

| | | | |
|---|---|---|---|
| | 2) Implement a FordFulkerson algorithm to find max flow of a flow network. | | |
| 8 | 1) Implement Rabin Krap algorithm for pattern matching<br><br>2) Implement a Patricia for text searching | 1 |
| 9 | Write c programs for the following problems using Dynamic programming methods.<br>    1) Longest common subsequence<br>    2) Matrix chain multiplication<br>    3) Coin denomination<br>    4) Shortest path<br>    5) Knapsack<br>    6) E.t.c...... | 2 |
| 10 | 1) Implement back tracking algorithm to find a solution of the 3-SAT problem.<br><br>2) Implement branch and bound algorithm to find a solution of TSP. | 2 |

## Suggested Books/Resources:

1. Data Structures and Algorithms with Python, Lee and Hubbard.
2. Algorithm Design, 1ST Edition, Jon Kleinberg and ÉvaTardos, Pearson
3. ink to topics related to course:
   a. Python
   b. SciPy
   c. NumPy

## Evaluation Scheme:

| 1 | Mid Sem. Evaluation | 20 Marks |
|---|---|---|
| 2 | End Sem. Evaluation | 20 Marks |
| 3 | Attendance | 15 Marks |
| 4 | Lab Assessment | 45 Marks |
| | Total | 100 marks |

**Course Outcomes (COs) contribution to the Programme Outcomes(POs)**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | Average |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|---------|
| CO1 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 3 | 3 | 3 | 1 | 3 | 2.5 |
| CO2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | | 1 | 2 | 1.6 |
| CO3 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 3 | 1 | 1 | 3 | 2.2 |
| CO4 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | | 2 | 2 | 1.8 |
| CO5 | 2 | 2 | 2 | 2 | 2 | 3 | 1 | 1 | 2 | 2 | 2 | 2 | 1.9 |
| CO6 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 1.9 |
| Average | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 1.7 | 1 | 1.5 | 2.3 | 2 | 1.5 | 2.3 | |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

# FUNDAMENTALS OF EMBEDDED SYSTEMS
### (Elective for B Tech)

| Course Code: | 14B1WEC735 | Semester: | 7th Semester, B. Tech (ECE) |
|---|---|---|---|
| Credits: | 3 | Contact Hours: | L-3, T-0, P-0 |

## Course Objectives
1. To have knowledge about the basic working of a microcontroller system and its programming in assembly language.
2. To provide experience to integrate hardware and software for microcontroller applications systems.
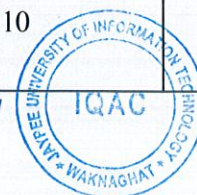
## Course Outcomes
To acquire knowledge about microcontrollers embedded processors and their applications.
1. Foster ability to understand the internal architecture and interfacing of different peripheral devices with Microcontrollers.
2. Foster ability to write the programs for microcontroller.
3. Foster ability to understand the role of embedded systems in industry.
4. Foster ability to understand the design concept of embedded systems.

## Course Contents

| Unit | Topics | References (chapter number, page no. etc) | Lectures |
|---|---|---|---|
| 1. | Introduction to embedded systems: Introduction to embedded systems, Difference between Embedded and General-Purpose Computing. Embedded microcontrollers and their architectures. Embedded system components. | Text Book #1 Chapter No. 1 Chapter No. 2 | 4 |
| 2. | 8051 Microcontroller: 8051 Architecture, Pin configuration, Reset and system clock, timers and interrupts, Special function registers, Program/ data memory, addressing modes. Introduction to 8051 assembly language programming, Arithmetic instructions, Logic and Compare instructions, Branch and conditional instructions, Single bit instruction programming. | Text Book # 2 Chapter No. 2 Chapter No. 3 -8 | 9 |
| 3 | 8051 Interrupts: Introduction to 8051 interrupts, programming of timer interrupts, programming external hardware interrupts, programming the serial communication interrupts, interrupt priority in the 8051. | Text Book # 2 Chapter No. 9 Chapter No. 11 | 4 |
| 4 | Serial Communication: Basics of serial communication, 8051 connection to RS 232, 8051 serial communications Programming. | Text Book #2 Chapter No. 10 | 3 |

| 5 | Real World Interfacing: Interfacing of A/D and D/A converter, interfacing stepper motor, interfacing of LCD, interfacing of sensors, interfacing keyboard. | Text Book # 2 Chapter No. 12 | 5 |
|---|---|---|---|
| 6 | PIC18F Family: The Architecture of PIC family of devices, PIC18F instructions and assembly language, PIC18F programming model, instruction set, instruction format. Data copy, arithmetic, branch, logical, bit manipulation and multiply divide operations. Stacks, subroutines and macros. | Text Book # 3 Chapter No. 3-7 | 8 |
| 7 | Interrupts and Timers of PIC: Concepts of Interrupts and Timers. Interrupts and their implementation in PIC18. The PIC18 timers. The CCP. Use of Interrupts in applications. | Text Book # 3 Chapter No. 10 Chapter No. 12 | 5 |
| 8 | I/O Port and Interfacing: Concepts of I/O interfacing and PIC18 I/O ports. Interfacing output and input peripherals. | Text Book # 3 Chapter No. 13 Chapter No. 14 | 4 |
| | **Total Number of Lectures** | | 42 |

## Evaluation Scheme

1. Test 1 : 15 marks
2. Test 2 : 25 marks
3. Test 3 : 35 marks
4. **Internal Assessment** : 25 marks
   - 10 Marks : Class performance, Tutorials & Assignments
   - 10 Marks : Quizzes
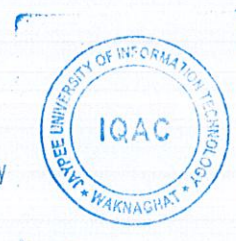   - 5 marks : Attendance

## Text Books

1. Embedded systems design by Steve Heath, Newnes.
2. The 8051 Microcontroller and embedded systems by Muhammad Ali Mazidi, PHI.
3. PIC microcontroller and embedded systems by Muhammad Ali Mazidi, PHI.

## Reference Books

1. The 8051 microcontroller by Kenneth J. Ayala, Cengage Learning.

# COURSE DESCRIPTION

**Course Name: Group & Cooperative Processes**

**Course Code: 10B11PD211**

**Course Credits: 3**

**Course Coordinator:  Tanu Sharma, Neena Jindal**

**Course objective**

 The main objective of the course is to make the students understand how to work with and through others to accomplish individual and group goals.**The student may thus be able to :**

1. List and define basic organizational behavior principles, and analyze how these influence behavior in the workplace.
2. Analyze individual human behavior in the workplace as influenced by personality, values, perceptions, and motivations.
3. Outline the elements of group behavior including group dynamics, communication, leadership, power & politics and conflict & negotiation.
4. Understand your own management style as it relates to influencing and managing behavior in the organization systems.
5. Enhance critical thinking and analysis skills through the use of management case studies, personal application papers and small group exercises.
6. Strengthen research, writing and presentation skills.

.

## Contents

| Module | Topic | Hrs.  All. |
|---|---|---|
| 1 | **Introduction to the course and course outline** | 2 |
| 2 | **Individual** <br><br> • Ability- Intellectual & Physical <br> • Personality: Concept, determinants, Big Five Personality model, Type A & Type B <br> • Perception: Definition, Importance, Factors <br> • Learning: Definition, <br> • Attitudes: Definition, components of Attitude, Cognitive Dissonance & its reduction. <br> • Job Attitudes: Job Satisfaction, Job Involvement, Organizational Commitment, Job Engagement and Performance. <br> • Values: Definition, Importance, Types <br> • Assertiveness <br>　　1.  Concept <br>　　2.  Communication styles <br>　　3.  Self expression | 12 |

| | | | |
|---|---|---|---|
| | | • Emotional Intelligence<br>  1. Concept of emotions & moods<br>  2. Concept of Emotional intelligence<br>  3. Components of EI<br>    a. Self-Awareness<br>    b. Self-Regulation<br>    c. Self-Motivation<br>    d. Empathy<br>    e. Social Skills<br>  4. How to be Emotionally Intelligent | |
| 3 | **Group** | • What is a group<br>• Characteristics of a group<br>• Group formation<br>• Group structure<br>• Group dynamics<br>• Group cohesion<br>• Group Performance<br>• Negotiation<br>• Managing conflict<br>• Group decision making | 11 |
| 4 | **Teams** | • What is a team<br>• Origin of work teams<br>• Types of teams<br>• Principles of team work<br>• Team structure<br>• Team process<br>• Decision making in teams | 6 |
| 5 | **Motivation** | • Concept of motivation<br>• Key elements<br>  1. Behaviour<br>  2. Performance<br>  3. Ability<br>  4. Situational constraints<br>  5. Motivation<br>• theories of motivation & their Implications<br>  1. Maslow's Hierarchy of Need Theory<br>  2. Theory X and Theory Y<br>  3. Two factor Theory<br>  4. Expectancy theory<br>  5. Goal setting theory<br>• Motivating by changing work<br>  1. Job characteristic model<br>  2. Employee empowerment | 6 |
| 6 | **Leadership** | | 5 |

| | <ul><li>Concept of leadership</li><li>Approaches of leadership<br>1. Trait approach<br>2. Behavioral approach<br>3. Situational approach<ul><li>Fiedler model</li><li>Leader-member Exchange Theory</li><li>Path-Goal Theory</li><li>Leader-Participation Theory</li></ul>4. Neocharismatic Theories<ul><li>Charismatic leadership</li><li>Transformational leadership</li></ul>5. Developing leadership</li></ul> | |

## Teaching Methodology

➢ The course will be taught with the help of Review and reinforcement, Power-point inputs, Textbook, Discussions and Presentations, Films, Case Studies, Games, Self-exploration Exercises, and Laboratory record.

## Evaluation Scheme

| Exam | Marks |
|---|---|
| T1 | 15 |
| T2 | 25 |
| T3 | 35 |
| Lab. Activities | 20 |
| Attendance | 5 |

## Text Book

➢ Stephen P. Robbins & Timothy A. Judge, *Organizational Behaviour*, 13th Edition, Prentice-Hall India.

## References

➢ Daniel Goleman, Emotional Intelligence;

➢ Randy J. Paterson, The Assertiveness Workbook

➢ Daniel Goleman, Working With Emotional Intelligence, Bantom Books

➢ Thomas Harris, I am O.K. You are O.K., Avon Publications

➢ Sue Bishop, Assertiveness Skills Training, Viva Books

➢ Adele B. Lynn 50 Activities for Developing Emotional Intelligence, Ane Books

➢ Jerald GreenBerg, Robert A. Baron, *Behaviour in Organizations*, 5th Edition, Prentice-Hall India.

➢ Sivasailam Thiagarajan, Glenn M. Parker; *Teamwork and Teamplay, Games and Activities for Building and Training Teams.*

➢ Parker & kropp, 50 Activities for Self Directed Teams, Ane Books

queries, range trees, interval trees, segment trees, ray shooting and partition trees, External memory/cache-oblivious models, B-trees, ordered-file maintenance, list labeling, order queries, priority queues, Distributed data structures, distributed hash table, distributed trees, distributed stack and distributed lists, Streamming data structures, synopsis, sketches, histogram, fingerprint, wavelets and sliding windows.

## 2. Advanced Computer Networks (10M11CI112)
I Sem(CSE) Credits-4(3-1)

Review of computer Networks. IPv6. Security issues in IPv6. TCP/IP details. Voice over IP. Real time communication protocols. High speed local and wide area networks. Virtual networks. Network security. Broadband networks. Introduction to intelligent networking. Performance analysis of networks.

## 3. Advanced Database Systems(10M11CI113)
I Sem (CSE) Credits-4(3-1)

Review of Database systems. Web-enabled database systems. Storage and file structures. Indexing and Hashing. Query Processing. Query Optimization. Object oriented DBMS. Extended relational model. Distributed Databases. Active Databases. Temporal Databases, Spatial Databases. Multimedia databases. Deductive Databases. Emerging databases technologies.

## 4. High Performance Computer Architecture (10M11CI114)
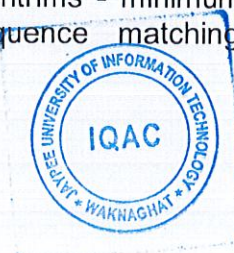I Sem(CSE), III Sem Elective (ECE) Credits-4(3-1)

Performance analysis and scalability. Modeling performance. Pipelined Systems. Interconnection networks. Processor array. Multicomputers. Multiprocessors. Systolic Array. Vector processor. Structured memory design for parallel systems – symmetric shared, distributed shared and synchronization. Parallel Programming Concepts and Design Patterns Theoretical Analysis of Parallel Algorithms , Amdahl's law, Memory Hierarchy Models, Communication Models, CUDA Hardware, CUDA Programming, CUDA Threading Model, CUDA Communication and Memory Model, CUDA Performance Monitoring and Optimizations.

## 5. Fundamentals of Algorithms and Statistical Analysis(11M12CS111)
I Sem (CB) Credits-4(3-1)

Review of Data Structure. Analyzing algorithm, designing algorithm. Growth of functions. Recurrences, divide and conquer algorithms, substitution method for solving recurrences, dynamic programming, greedy algorithm, backtracking. Decision tree, game tree. Index trees – IBST, TBST, AVL, and B Trees. Heaps. Graph algorithms - minimum spanning tree, shortest path, Hamiltonian cycle. String and sequence matching. Basic computational geometry.

# Human Rights for Technocrats

COURSE CODE: 18B1WHS641

COURSE CREDITS: 3

CORE/ELECTIVE: ELECTIVE

L-T-P: 3-0-0

**Pre-requisite:** None

**Course Objectives:**

1. Develop an understanding of what human rights are and to understand the origins of modern human rights
2. Appreciate the meaning and significance of the Universal Declaration of Human Rights and other human rights instruments
3. Appreciate the relationship between rights and responsibilities
4. Understand the forms human rights can take, legally and morally
5. Analyze the relationship of human rights to daily life and apply the concepts of human rights to their own lives.

**Course Outcomes:**

| S.No. | Course Outcomes | Level of Attainment |
|-------|-----------------|---------------------|
| CO-1 | Develop an understanding of what human rights are and to understand the origins of modern human rights | Familiarity |
| CO-2 | Appreciate the meaning and significance of the Universal Declaration of Human Rights and other human rights instruments | Usage |
| CO-3 | Appreciate the relationship between rights and responsibilities | Familiarity |
| CO-4 | Understand the forms human rights can take, legally and morally | Familiarity |
| CO-5 | Analyze the relationship of human rights to daily life and apply the concepts of human rights to their own lives. | Usage |

**Course Contents:**

| Unit | Contents | Lectures required |
|------|----------|-------------------|
| 1 | **Conceptual background of human rights and duties:** Definitions and classifications | 2 |
| 2 | **Meaning and Significance of Human Rights :** Scope of the Human Rights | 2 |

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY WAKNAGHAT, SOLAN (H.P.) INDIA

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

| | | | |
|---|---|---|---|
| 3 | **Relationship between Rights and Duties:** Constitutional provisions, Fundamental rights, Directive Principles of state policy, Duties of individuals and Fundamental duties | | 4 |
| 4 | **Universal Declaration of Human Rights: Technical background :** Creation and drafting, Adoption, Significance of the UDHR, And its legal effect | | 5 |
| 5 | **History of human rights civilization:** Brief history of human Rights, The Spread of Human Rights, Middle Ages, Modern human rights | | 5 |
| 6 | **Human rights movements :** Anti-colonialism, World War II and the United Nations, Global human rights struggles, Changes in the 1970s Since the 1990s | | 8 |
| 7 | **Enforcement and protection mechanism of human rights in India :** Judiciary, National Human Rights Commission and other Commissions and Committees , Non-governmental organizations, Information Media, Education | | 5 |
| 8 | **Development, international trade and human rights:** Right to development: Issues of international equity and justice, equitable access to benefits of science and technology, Freedom of international trade, most-favoured nation treatment (equality of treatment) versus special treatment of the developing countries, access to international markets, equitable pricing of raw material | | 5 |
| 9 | **Human rights, science and technology:** Overview,violation of human rights by technology | | 3 |
| 10 | **Human rights of the working class:** Labour welfare legislation in India, Problems of bonded labour, exploitation of child labour, female labour and unorganized labour | | 4 |
| **Total lectures** | | | 42 |

## Suggested Text Book(s):

1. Internet and human rights Griffin, J. (2008) On Human Rights. Oxford: Oxford University Press.
2. Miller, D. (2007) National Responsibility and Global Justice. Oxford: Oxford University Press

## Suggested Reference Book(s):

1. Internet and human rights Griffin, J. (2008) On Human Rights. Oxford: Oxford University Press.
2. Miller, D. (2007) National Responsibility and Global Justice. Oxford: Oxford University Press

Department of Humanities and Social sciences

## Other useful resource(s):

1. https://www.google.com/search?q=Meaning+and+Significance+of+Human+Rights&rlz=1C1GCEU_enBIN8 20IN820&oq=Meaning+and+Significance+of+Human+Rights&aqs=chrome..69i57j0l5.1710j0j7&sourceid=c hrome&ie=UTF-8

2. https://www.equalityhumanrights.com/en/human-rights/what-are-human-rights

## Evaluation Scheme:

| S. No | Exam | Marks | Duration | Coverage / Scope of Examination |
|-------|------|-------|----------|---------------------------------|
| 1 | T-1 | 15 | 1 Hour. | Syllabus covered upto T-1 |
| 2 | T-2 | 25 | 1.5 Hours | Syllabus covered upto T-2 |
| 3. | T-3 | 35 | 2 Hours | Entire Syllabus |
| 4. | Teaching Assessment | 25 | Entire Semester | Assignment (5) - 10 <br><br> Presentation (1)- 10 <br><br> Attendance - 5 |

## Course Outcomes (COs) contribution to the Programme Outcomes(POs)

| Course outcomes (Human Rights for Technocrats ) | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 | PO-8 | PO-9 | PO-10 | PO-11 | PO-12 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-1 | 0 | 0 | 3 | 0 | 0 | 3 | 3 | 3 | 3 | 3 | 0 | 3 | 1.75 |
| CO-2 | 0 | 3 | 0 | 3 | 0 | 3 | 3 | 3 | 3 | 3 | 0 | 3 | 2 |
| CO-3 | 0 | 0 | 0 | 3 | 0 | 3 | 3 | 3 | 3 | 3 | 0 | 3 | 1.75 |
| CO-4 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 3 | 3 | 3 | 0 | 3 | 1.5 |
| CO-5 | 0 | 3 | 0 | 0 | 0 | 3 | 3 | 3 | 3 | 3 | 0 | 3 | 1.75 |
| Average | 0 | 1.2 | 0.6 | 1.2 | 0 | 3 | 3 | 3 | 3 | 3 | 0 | 3 | |

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY WAKNAGHAT, SOLAN (H.P.) INDIA

# COURSE DESCRIPTION

| | |
|---|---|
| **Course Name:** | **Image Processing** |
| **Course Code:** | 10B1WCI737 |
| **Course Credits:** | 3 (3-0-0) |
| **Branch and Semester:** | B.Tech – 7th Semester (CSE/IT/ECE) |
| **Faculty Coordinator:** | Mr. Nitin Kumar |

**Pre-requisites:** Linear algebra, Matrices, Matrix Operations, Determinants, Systems of Linear Equations, Eigen values, Eigenvectors, Statistics and probability, Programming experience, preferably in matlab, and/or C/C++/C#/Python/Java

**Objective:** The aim of the course is to introduce the student to various image processing techniques. The student learns about image fundamentals, describes the main characteristics of digital images, how they are represented, mathematical transforms such as such as Fourier, Cosine transforms, Singular value decomposition, 2D Wavelet transform, image enhancement techniques, Image restoration and denoising, segmentation, lossy and lossless data compression algorithms, binary and color image processing. The student will be exposed to dealing with image data through programming assignments using matlab, and/or C/C++/C#/Python/Java.

**Learning Outcome:**

Upon completion of this course, a successful student should be able to design and implement programs that deal with image data.

- To understand how digital images are represented, manipulated, encoded and processed, with emphasis on algorithm design, implementation and performance evaluation.

197
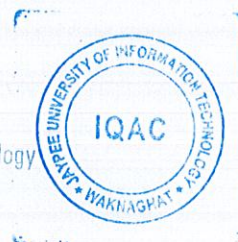
- Emphasis will be to develop engineering skills and intuitive understanding of the tools used in Image Processing.

- The students would be encouraged to design and develop the image processing algorithms/tools to real life problems.

**Course Outcomes:**

| S.NO | Course outcomes | Level of Attainment |
|------|-----------------|---------------------|
| CO-1 | To understand the different images and its processing | Familiarity |
| CO-2 | To understand the concept of Image transformation Algorithms/techniques | Assessment |
| CO-3 | To understand the concepts of lossy and Lossless compression Algorithms/techniques | Assessment |
| CO-4 | To understand the concepts of Image enhancement and Segmentation Algorithms/techniques | Assessment |
| CO-5 | To understand the concepts of Image Restoration and Denoising Algorithms/techniques | Technical skills |
| CO-6 | To understand the concepts of Binary and Color image processing | Assessment |
| CO-7 | You shall be exposed to various recent Image Processing Applications | Technical skills |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

**Course contents:**

| S. No. | Topic | L |
|---|---|---|
| 1 | **Introduction to Digital Image Processing** <br> Introduction to images and its processing, Components of image processing systems, image representations, Image file formats, Applications of digital image processing, image sampling and quantization, Image Analysis, Intensity transformations, contrast stretching, Correlation and convolution, Smoothing filters, sharpening filters, gradient and Laplacian. | 5 |
| 2 | **Image Transformation Techniques** <br> Need for transform, Fourier, Cosine transforms, Haar, KL Transform, Singular value decomposition, 2D Wavelet transform, Different properties of image transform techniques. | 8 |
| 3 | **Image Compression Basics** <br> Concept of image compression, lossless techniques (Huffman Coding, Arithmetic and Lempel-Ziv Coding, Other Coding Techniques) and lossy compression techniques (Transform Coding & K-L Transforms, Discrete Cosine Transforms, and BTC), Multi-Resolution Analysis, and Still Image Compression Standards (JBIG and JPEG), | 8 |
| 4 | **Image Enhancement** <br> Enhancement in spatial and transform domain, histogram equalization DirectionalSmoothing, Median, Geometric mean, Harmonic mean, Cont raharmonic mean filters, Homomorphic filtering,Color image enhancement. | 5 |
| 5 | **Image Restoration and Denoising** <br> Image degradation, Type of image blur, Classification of image restoration techniques, ,image restoration model, Linear and non linear restoration techniques, Image denoising, Median filtering | 5 |
| 6 | **Image Segmentation** <br> Classification of image segmentation techniques, Boundary detection based techniques, Point, line detection, Edge detection, Edge linking, local processing, regional processing, Hough transform, Thresholding, Iterative thresholding, Otsu's method, Moving averages, Multivariable thresholding, Region-based segmentation, Watershed algorithm, Use of motion in segmentation | 5 |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

199

IQAC

| 7 | **Binary and Color image processing**<br>Binarization, Basic Set theory, Binary morphological operations and its properties, Color Image Representation in MATLAB, Converting Between Color Spaces, The Basics of Color Image Processing, Color Transformations, Spatial Filtering of Color Images, Working Directly in RGB Vector Space | 5 |
|---|---|---|
| 8 | **Image Processing Applications:** Case studies | 4 |
| | **Total Hours** | 45 |

**Evaluation Scheme:**

| S.No | Exam | Marks | Duration | Coverage/Scope of Examination |
|---|---|---|---|---|
| 1 | Test -1 | 15 | 1 hr. | Syllabus covered up to Test- 1. |
| 2 | Test -2 | 25 | 1.5 hr. | Syllabus covered up to Test- 2. |
| 3 | Test -3 | 35 | 2 hr. | Complete Syllabus. |
| 4 | Assignments/Homework/Small Projects (5),<br>Quizzes (5),<br>Regularity in Attendance (5),<br>Researching and presenting a technology review topic (10) | 25 | Entire Semester | 5+5+5+10 |
| | **TOTAL =** | **100** | | |

**Recommended Books**
1. Digital Image Processing, R.C. Gonzalez and R.E. Woods, 2nd edition, Pearson Prentice Hall, 2008
2. Anil K. Jain, *Fundamentals of Digital Image Processing*, Prentice Hall, 1989.
3. Digital Image processing, S Jayaraman, TMH, 2012
4. William K. Pratt, *Digital Image Processing*, 3rd Edition, John Wiley, 2001.

# Immunotechnology

**COURSE CODE** 14M11BT212

**COURSE CREDITS: 3**

CORE/ELECTIVE: CORE

L-T-P: 3-0-0

---

**Pre-requisites:** Fundamentals of Biology and preliminary Immunology

**Course Objectives:**

1. The objective of the course is to develop a sound knowledge of immunological principles and be able to understand different technology driven immunological applications in disease and health.

**Course Outcomes:**

| Sr. No. | Course outcomes | Level Attainment |
|---|---|---|
| CO I | Use correct scientific terminologies to describe & explain fundamental concepts in immunology | Familiarity |
| CO II | Able to interpret and apply knowledge in context of immunology based techniques in health and disease | Assesment |
| CO III | Students with plans to carry out higher studies should be able to relate and apply immunological principles in their research while students inclined towards industrial career should be able to envision themselves as a part of the R &D sector in the area of immunology | Usage |

. **Topics Covered:**

| S.N. | Content | Lecture required |
|---|---|---|
| 1 | **Immunoglobins and antigens**: Immunoglobins: structure and function, immunoglobin classes | 3 |
| 2 | **Antigens:** Immunogenicity, antigenicity, epitopes, haptens, mitogens; Antigen Recognition by immune system: recognition of antigens by T and B Cells: Antigen processing and presentation, MHCs, role of MHC molecules in antigen presentation and co stimulatory signals. | 5 |
| 3 | **Production, Detection, measurement and characterization of antibodies and their use as research and diagnostic tools:** Production of antibodies: monoclonal and polyclonal antibodies, Anti-immunoglobulin antibodies; Monoclonal Antibody – Concept, Hybridoma technology, Strategy and protocol for production, examples. Monoclonal Antibody Types - murine, chimeric, humanized, human – limitations, applications. Cancer Immunotherapy. | 10 |
| 4 | **Antigen-Antibody Interactions and Techniques :** Introduction, Lattice Theory, Precipitin Curve, specific and cross reactivity, Microscopy and Imaging- Immunohistochemistry, Immunoprecipitation and co-immunoprecipitation, Immunoblotting Simple Immunodiffusion (Radial Immunodiffusion – Qualitative, Quantitative); Double Diffusion (Mechanism of Reaction of Identity, Partial – Identity, and Non-Identity); Immunoelectrophoresis; Agglutination – Antibody titer, Prozone Phenomenon, Direct and Indirect Agglutination, Hemagglutination, ABO Blood typing, Agglutination Inhibition; Immunofluorescence, Radioimmunossay; ELISA – Theory, Designing an ELISA method, Types – Direct, Indirect, Sandwich, Competitive, Dot ELISA | 12 |
| 5 | **Characterization and analysis of cellular and soluble immune components:** | 7 |

Approved in Academic Council Meeting held on 28 July, 2021

| | | |
|---|---|---|
| | Isolation and enrichment of specific immune cells, ELISPOT, Flow-cytometer and FACS for quantitative/qualitative analysis and sorting of different immune cell subsets, Cell functional assays- lymphoproliferation, Cell cytotoxicity, mixed lymphocyte reaction, apoptosis. | |
| 6 | **Vaccination strategies:** Active immunization: Sub unit vaccines; Recombinant DNA and protein based vaccines, Peptide vaccines, conjugate vaccines; Passive Immunization: Antibody, Cell based vaccines , high throughput identification of pathogen specific potential antigens for vaccine development, Immunoinformatics and vaccine design. | 5 |
| | **No of lectures** | 42 |

**Reference Books:**

1. Kenneth Murphy (Charles A Janeway, Paul Travers, Mark Walport) 8$^{th}$ Edition: **Immunobiology**
2. Abbas AK, Lichtman AH and Pillai S **(2001) Cellular and Molecular Immunology**; Elsevier, USA, 7$^{th}$ Ed.
3. Kindt, T.J., Goldsby, R.A. and Osborne, B.A. (2007). **Kuby Immunology** W.H. Freeman and Co., New York, 7$^{th}$ Ed.
4. Roit, I. (2012). **Essential Immunology**. Blackwell Scientific Publications, Oxford, 12$^{th}$ Ed.
5. Primrose SB, Twyman RM and Old RW (2002) **Principle of gene manipulation**. Wiley-Blackwell, UK, 6$^{th}$ Ed.

**Evaluation Scheme:**

| Assessment | Max. marks | Duration | Course Covered |
|---|---|---|---|
| T1 Test | 15 | 1 hr. | Syllabus covered upto T-1 |
| T2 Test | 25 | 1.5 hrs. | Syllabus covered upto T-2 |
| End Term Test | 35 | 2 hrs. | Entire Syllabus |
| Teacher Assessment | 25 | Entire Sem | Based on Assignments, quizzes etc. |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

Approved in Academic Council Meeting held on 28 July, 2021

# Industrial Biotechnology

**COURSE CODE** 14M11BT211

**COURSE CREDITS: 3**

CORE/ELECTIVE: CORE

L-T-P: 3-0-0

Pre-requisite: B. Tech Biotechnology

## Course Objectives

1. The course emphasizes mainly on the biotechnological applications in different industries along with the fundamentals of Industrial Biotechnology. As a part of the course curricula, discussion about the recent advances in fermentation technology, immobilization have been included in the course content.
2. Introduction of biotechnological applications in different industries
3. Fundamentals of biocatalysts/ Microbes improvement through immobilization, Directed evolution and systems biology approach

## Course Outcomes

| Sr. No. | Course outcomes | Level Attainment |
|---|---|---|
| CO I | Fundamentals, History and Scope of Industrial Biotechnology | Familiarity |
| CO II | Fermentation technologies, Industrial enzymes production and Downstream Processing | Familiarity |
| CO III | Role of IB in different industries | Assessment |
| CO IV | Enhancement of biocatalysts/microbes through immobilization, Directed Evolution and systems biology approaches | Assessment |
| CO V | Environmental, Economic and Societal issues of Industrial Biotechnology | Usage |

## Topic Covered

| S. No. | Topics Covered | Teaching required |
|---|---|---|
| 1 | Introduction to Industrial Biotechnology: History of Industrial Biotechnology in allied areas; Scope of Industrial Biotechnology | 4 |
| 2 | Fermentation Technology; Industrial Production of Enzymes; Downstream processing in Industrial Biotechnology | 12 |
| 3 | Industrial Biotechnology in Chemical, Pharmaceutical, Food, Feed, Biofuel, Pulp & Paper and allied sectors | 12 |
| 4 | Directed evolution of Industrial Biocatalysts, Applied Biocatalysis; NanoBiotechnology; Industrial systems biology | 10 |
| 5 | Environmental, Economic and Societal issues of Industrial Biotechnology | 4 |
| | No. of lectures | 42 |

## TEXT BOOKS

1. Industrial Biotechnology: Sustainable Growth and Economic Success by Soetaert and Erick J. Vandamme

Approved in Academic Council Meeting held on 28 July, 2021

2. Fermentation and Biochemical Engineering Hand Book by HC Vogel
3. Industrial Biotechnology by J. Thompson
4. Industrial Biotechnology by AS Maturiya
5. Industrial Biotechnology by IS Thakur

## REFERENCE BOOKS
1. Review articles from Science Direct, Springer, Wiley and PubMed Publishers

**Evaluation Scheme:**

| Assessment | Max. marks | Duration | Course Covered |
|---|---|---|---|
| T1 Test | 15 | 1 hr. | Syllabus covered upto T-1 |
| T2 Test | 25 | 1.5 hrs. | Syllabus covered upto T-2 |
| End Term Test | 35 | 2 hrs. | Entire Syllabus |
| Teacher Assessment | 25 | Entire Sem | Based on Assignments, quizzes etc. |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

Approved in Academic Council Meeting held on 28 July, 2021

# COURSE DESCRIPTION

| | |
|---|---|
| **Course Name:** | Information Retrieval and Data Mining |
| **Course Code:** | 11B1WCI832 |
| **Course Credits:** | 3 (3-0-0) |
| **Branch and Semester:** | 8th Semester [CSE, IT] |
| **Faculty Coordinators:** | **Dr. Jagpreet Sidhu** |

## Description & Rationale:

Data Mining studies algorithms and computational paradigms that allow computers to find patterns and regularities in databases, perform prediction and forecasting, and generally improve their performance through interaction with data. It is currently regarded as the key element of a more general process called Knowledge Discovery that deals with extracting useful knowledge from raw data. The knowledge discovery process includes data selection, cleaning, coding, using different statistical, pattern recognition and machine learning techniques, and reporting and visualization of the generated structures.

This course will offer a comprehensive coverage of well-known Data Mining topics including classification, clustering and association rules. Several specific algorithms and techniques under each category will be discussed. Methods for feature selection, dimensionality reduction and performance evaluation will also be covered. Students will learn and work with appropriate software tools and packages in the laboratory. They will be exposed to relevant Data Mining research.

## Course Outcomes:

| S.No. | Course outcomes ( Data Analysis and Simulation Techniques) (16B28CI681) | Level of Attainment |
|---|---|---|
| CO-1 | To introduce students to the basic concepts and techniques of Data Mining | Familiarity |
| CO-2 | To learn how to categorize and carefully differentiate between situations for applying different data mining techniques. | Assessment |
| CO-3 | To study performance evaluation parameters for different data mining algorithms on real data sets. | Assessment |

| CO-4 | To develop skills of using recent data mining software for solving practical problems. | Usage |
|---|---|---|

**Course Contents / Lecture Plan:**

| S.No. | Topics | Hrs. |
|---|---|---|
| 1 | Introduction to Information Retrieval, Boolean Retrieval, Vocabulary of terms. | 3 |
| 2 | Introduction to Data Mining, Motivation behind Data Mining, Steps in Data Mining | 3 |
| 3 | **Data:** Type of Data, Data Quality, Data Pre-processing, Similarity and Dissimilarity. | 4 |
| 4 | **Classification:** Basic concepts, Model Over-fitting, Performance of Classifier. | 4 |
| 5 | Rule based Classifier, Nearest Neighbor Classifier, Bayesian Classifier, Artificial Neural Network, Support Vector Machine, Class Imbalance problem | 6 |
| 6 | **Association Analysis:** Basic concepts, Frequent Itemset Generation, Rule Generation, FP-Growth Algorithm, Evaluation of Association Patterns. | 6 |
| 7 | Sequential Patterns, Sub-graph patterns, Infrequent patterns. | 4 |
| 8 | **Cluster Analysis:** Basic concepts, K-means algorithm, DBSCAN, Prototype clustering, density based clustering, graph based clustering, cluster evaluation | 6 |
| 9 | **Anomaly Detection:** Basic concepts, Statistical Approaches, Proximity based outliner detection, Density based Outliner Detection, Clustering based techniques. | 6 |
| | Total | 42 |

**Maintenance of Records:**

Students are expected to keep records of homework assignments (to be posted on students resource from time to time) neatly in suitable hard bound notebooks separately (one for each).

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

IQAC

**Teaching and Learning Strategies:**

Delivery consists of a series of lectures that introduce and develop the core principles. A project problem is to be taken up and implemented as a continuous assessment in the semester to give a hands-on exposure on integrating various concepts taught and integrating them into a problem solving exercise.

The students are expected to spend time on unsupervised self-study. The course is structured so that each unit builds upon previous knowledge. Programming and implementation on different topics will be available that will be implemented in the semester.

**Tools and Technologies:**

Weka, Matlab, R Statistical Language

**Evaluation Scheme:**

| S.No | Exam | Marks | Duration | Coverage / Scope of Examination |
|------|------|-------|----------|---------------------------------|
| 1 | T-1 | 15 | 1 Hour. | Syllabus covered uptoT-1 |
| 2 | T-2 | 25 | 1.5 Hours | Syllabus covered upto  T-2 |
| 3. | T-3 | 35 | 2 Hours | Entire Syllabus |
| 4. | Tutorials / Assignments, Quizzes, Attendance | 25 | Entire Semester | Assignment (2)  -10<br>Quizzes (2)   - 10<br>Attendance  -5 |

**Text Book:**

T1: Introduction to Data Mining, Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Pearson Education (Addison Wesley), 0-321-32136-7, 2006.
T2: An Introduction to Information Retrieval,  2008 Cambridge UP

**References:**

R1: Mining of Massive Data Sets, Anand Rajaram, Jure Leskovec and Jeff Ullman, Cambridge University Press
R2: Data Mining Concepts and Techniques, J. Han and M. Kamber, Morgan Kaufmann, 2006, ISBN 1-55860-901-6

R3: Data Mining Community Top Resource for Analytics, Data Mining, and Data Science Software, Companies, Data, Jobs, Education, News, and more. http://www.kdnuggets.com/

**Datasets:**
https://archive.ics.uci.edu/ml/datasets.html

## Course Introduction - 13B1WHS832 International Business Management

International Business and Trade is a complex system and navigating it is a challenging and exciting task. It is an integral part of the World Economic System and no country can survive without getting involved in it. Because of the forces of Globalization we cannot avoid the competition, even if we don't go out some other company from another country may come at our doorstep. Globalization of markets increases global competition and requires enterprises to continuously improve their performance to sustainably survive.

Political/Economic/Social/Technological/Environmental/Legal (PESTEL) conditions are different for different countries and it extremely important not only for managers but also for employees to understand the differences so that they can make an optimal decision.

**Engineers substantially contribute to the success of an enterprise provided they understand and follow fundamental international market forces, economic basics and operational business management.**

Therefore, one has to have a complete understanding of dynamics of International Business to survive successfully in the long run. The aim of the present course is to develop the understanding of the complexities of international business and trade and different factors which govern them like socio-cultural, political, economic factors etc.

## 13B1WHS832 International Business Management

### Course Goal

To develop the understanding of the complexities of international business and trade and different factors which govern them like socio-cultural, political, economic factors etc.

### Course Objectives

1. Understand different issues of International Business.
2. Analyze how different environment affects the business of a Multi National Companies.
3. Analyze the effect of changing dynamics of international business on Indian Economy.
4. Understand the importance of different theories of explaining international trade and businesses.
5. Understand the role of International Institutions in promoting and stabilizing the international integration.

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

IQAC

6. Design a suitable strategy for international trade, for a firm, depending upon the economic conditions of both home and host countries.

## Detailed Syllabi

### Lecture-wise Breakup

| Subject Code | 13B1WHS832 | Semester | VIII | |
|---|---|---|---|---|
| Subject Name | International Business Management | | | |
| Credits | 3 | Contact Hours | 3 | |
| Faculty (Names) | Coordinator(s) | | | |
| | Teacher(s) (Alphabetically) | | | |

| Module No. | Subtitle of the Module | Topics | No. of Lectures |
|---|---|---|---|
| 1. | Introduction | Introduction and Basic Understandings of World Map | 2 |
| 2. | Understanding Globalization | Globalization and International Business | 3 |
| 3. | International Business Environment | a) Socio-Cultural Environment<br>b) Political and Legal Environment<br>c) Economic Environment | 6 |
| 4. | International Trade and Investment Theories | a) International Trade Theories<br>b) Foreign Exchange Markets<br>c) Foreign Direct Investment<br>d) Regional Economic Integrations | 12 |
| 5. | Institutional Framework for International Business | a) WTO (GATT)<br>b) The World Bank Group<br>c) International Monetary Fund (IMF)<br>d) UNCTAD<br>e) Indian Institutions | 9 |
| 6. | International Business Strategy | a) Organization and Strategy of International Business<br>b) Country Evaluation and Selection<br>c) Entry Strategy and Strategic | 10 |

| | | Alliances (includes Export-Import, Direct Investments and Collaborative Strategies) | |
|---|---|---|---|
| | | **Total number of Lectures** | 42 |

**Evaluation Scheme**

| S.No. | Component | Weightage |
|---|---|---|
| 1. | Test – 1 (1 Hr) | 15 |
| 2. | Test – 2 (1 Hr 30 mins) | 25 |
| 3. | Test – 3 (2 Hrs) | 35 |
| 5. | Internal <br> • Presentation <br> • Class Participation <br> • Attendance | 10 <br> 10 <br> 5 |

**Recommended Readings**

| | |
|---|---|
| 1. | International Business by Daniels, Radebaugh, Sullivan and Salwan; Pearson (**Text Book**) |
| 2. | International Business by Hill and Jain; TMH. |
| 3. | International Business by Czinkota, Ronkainen and Moffet; Wiley. |
| 4. | International Business by Cherunilam; PHI |
| 5. | International Business by Justin Paul; PHI. |
| 6. | International Business by Rakesh Mohan Joshi; Oxford. |
| 7. | Newspapers, magazines and internet |

# 14B1WHS832  International Human Resource Management

## Course Goal

This course is designed to introduce students to the nature of managing human resources in multinational firms. It explores the complexities of IHRM and distinguishes international from domestic HR practices. The purpose of the course is provide students with an in-depth understanding of the basic problems inherent in IHRM to either prepare them for further work in the IHRM field or to give them a sound basis to understand the international corporate dimensions of their own careers. This course will help students identify differences in operating a domestic versus an international business and how business practices need to be adapted to operate successfully in foreign markets.

## Course Objective:

1 .Students gain insight into and appreciation for the complexities and differences of operating a business in an international context as it applies to HRM.
2. Understand human resource management systems and their main challenges in multinational companies and improve their performance accordingly,
3. Efficiently implement specific IHRM activities in multinational companies,
4. Make better strategic decisions about people in international settings and
5. Design effective IHRM systems and practices for MNCs.
6..The course also facilitates cross-cultural sensitivity, systemic thinking, context screening, and ethical behavior in international setting

## Detailed Syllabi

## Lecture-wise Breakup

| Subject Code | 14B1WHS832 | | Semester | 2 | |
|---|---|---|---|---|---|
| Subject Name | International Human Resource Management | | | | |
| Credits | 3 | | Contact Hours | 3 | |
| Faculty (Names) | Coordinator(s) | | 1.Dr. Tanu Sharma | | |
| | Teacher(s) (Alphabetically) | | | | |
| Module No. | Subtitle of the Module | | Topics | | No. of Lectures |

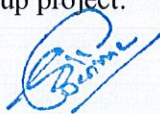| Chapter | Topic | | Hours |
|---|---|---|---|
| 1 | **Introduction**<br>**Case** : NCR in Scotland | Defining International HRM<br>Variables that moderate differences between domestic and international HRM<br>Applying a strategic view of IHRM | 3 |
| 2 | **Internationalization of HRM :Socio-Cultural Contexts**<br><br>**Case:** Oki UK ltd | National Culture and HRM<br>HRM and its broad context<br>National Culture and Specific HRM Issues<br>Business imperatives and Other non – cultural influences on HRM | 3 |
| 3 | **National Context of HRM: case of 7 major economies**<br><br>**Case** :Litton imports cell manufacturing from Sweden | Major economies and their HRM practices<br>  1.HRM in Japan<br>  2. HRM in the United States<br>  3. HRM in the United Kingdom<br>  4. HRM in Turkey<br>  5. HRM in the Arab Middle East<br>  6. HRM in India<br>  7. HRM in China | 5 |
| 4 | **Staffing International operations for sustained global growth** | Approaches to staffing<br>Transferring staff for international business activities<br>The roles of an expatriate<br>The role of expatriates<br>Return on investment of international assignments<br>The role of the corporate HR function in MNEs | 3 |
| 5 | **Recruiting and selecting staff for international assignments** | Issues in staff selection<br>Factors moderating performance<br>Selection Criteria<br>Dual career couples<br>Are female expatriates different? | 3 |
| 6 | **International training and development**<br>**Case** : Seiko Instruments<br>**Case** : Transfer of Knowledge in Oki-Training and development | The role of expatriate training<br>Components of effective pre-departure training programmes<br>The effectiveness of pre-departure training<br>Developing staff through international | 5 |

| | | | |
|---|---|---|---|
| | | assignments<br>Trends in international training and development | |
| 7 | **International compensation**<br>**Case** : News International plc | Objectives of international compensation<br>Key components of an international compensation program<br>Approaches to international compensation | 3 |
| 8 | **Re-entry and career issues** | The repatriation process<br>Individual reactions to re-entry<br>Multinational responses<br>Designing a repatriation programme | 3 |
| 9 | **IHRM in the host country context** | Standardization and localization of HRM practices<br>Factors driving standardization<br>Factors driving localization<br>Code of conduct- monitoring HRM practices in the host country<br>Managing human resources in off shoring countrie | 4 |
| 10 | **International industrial relations**<br><br>**Case :** Elementis and Michelin | Key issues in international relations<br>Trade unions and international industrial relations<br>The response of trade unions to multinationals<br>Regional integration: the European Union | 4 |
| 11 | **Performance Management**<br>**Case :** Tubular Industries Scotland Ltd. | Multinational performance management<br>Performance management of international employees<br>Performance appraisal of international employees | 3 |
| 12 | **IHRM trends: complexity, challenges and choices in the future**<br>**Case :** Orgaon laboratories ltd, scotland | Strategic HRM: research issues and theoretical developments | 3 |

Methodology

The format will emphasize capstone lectures, class discussion of assigned readings and other topics, in-class exercises, case analysis, and a group project.

**Evaluation :**

| Exam | Marks |
|---|---|
| Test 1 | 15 |
| Test 2 | 25 |
| Test 3 | 35 |
| Case study\Assignment\Presentations | 25* |

| **Recommended Reading** (Books/Journals/Reports/Websites etc.: Author(s), Title, Edition, Publisher, Year of Publication etc. in IEEE format) | |
|---|---|
| 1. | Peter J. Dowling, Marion Festing & Allen D. Engle, SR.: International Human Resource Management (fifth Edition) |
| 2. | D. Briscoe, R. Schuler, & I. Tarique (2012). **International Human Resource Management (4th Edition).** London/New York: Routledge. |
| 3. | Jackson, T.: **International dimensions of human resource management.** London, 2002. |
| 4. | Dessler, G.: **Human Resource Management**. 9th ed., New York, 2003. |
| 5. | Harzing, A. W. & Ruysseveldt, J. (2004). **International human resource management (2th Ed.).** Sage Publication: London. |
| 6. | Briscoe, D. R., Claus , L. M., Schuler , R. S. (2009). **International human resource management: Policies and practices for multinational enterprises.** Routledge |
| | |

*Break up of internal marks

| Internal marks | Total \25 | | |
|---|---|---|---|
| | Case Study 1 | 10 | T1 /5 |
| | Case Study 2 | 10 | |
| | Case Study 3 | 10 | T2/5 |
| | Case Study 4 | 10 | |
| | Case Study 5 | 10 | T3/5 |
| | Case Study 6 | 10 | |
| | Presentations | 10 | |
| | | | |

# Internet Marketing

COURSE CODE: 13B1WHS834

COURSE CREDITS: 3

CORE/ELECTIVE: ELECTIVE

L-T-P: 3-0-0

**Pre-requisite:** None

## Course Objectives:

1. To develop the student's understanding on how the internet has become a necessity in modern business
2. Discover how this medium can assist in marketing. It
3. Examine the fundamental principles associated with the strategic adoption, implementation, use and evaluation of internet in organizations. Essentially, the focus is on
4. Understand how the internet can serve as an invaluable resource for the strategic business and competitive advantage.

## Course Outcomes:

| S.No. | Course Outcomes | Level of Attainment |
|-------|-----------------|---------------------|
| CO-1 | To understand the importance of Internet marketing | Familiarity |
| CO-2 | Gain familiarity with fundamental marketing concepts | Assessment |
| CO-3 | Develop Internet marketing mix | Assessment |
| CO-4 | Evaluate modern day internet marketing technology | Usage |
| CO 5 | To understand and decipher elements of electronic service quality and CRM | Assessment |

## Course Contents:

| Module No. | Subtitle of the Module | Topics | No. of Lectures |
|------------|------------------------|--------|-----------------|
| 1. | **Marketing management Fundamentals:**Concept, Segmentation, Targeting , Positioning, Marketing mix | | 4 |

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY WAKNAGHAT, SOLAN (H.P.) INDIA
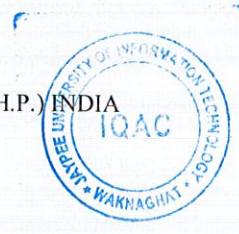
| 2. | **Introduction to Internet marketing** Relevance of the Internet to the modern marketing concept, Internet marketing, E-marketing, E-commerce and E-business, Differences between Internet marketing and traditional marketing. Internet & different marketing functions. | 3 |
|---|---|---|
| 3. | **Internet micro and macro environment** Different elements of the Internet environment - competitor, customer and intermediary use of the Internet. Changes in business models enabled by e-commerce .Legal, moral and ethical constraints and opportunities on an organization. Social media marketing | 5 |
| 4. | **Internet Marketing Mix** Internet marketing strategy to marketing and business strategy ,opportunities and threats arising from the Internet, elements of the marketing mix in an online context, characteristics of an online brand | 4 |
| 5. | Consumer Behavior Online Changing Patterns of Consumer behaviour,Use of Market segmentation in Consumer Behaviour, Dimensions of Consumerism, Process of Motivation | 4 |
| 6. | **Interactive marketing communications** Communications characteristics between digital and traditional media, methods for online and offline promotion. Importance of integrating online and offline promotion. methods of measuring site effectiveness | 4 |
| 7. | **E-service quality** Different stages involved in creating a new site or relaunching an existing site. Design elements that contribute to effective web site content.Factors that are combined to deliver an effective online customer experience. | 4 |
| 8. | **Customer relationship management** Concepts of relationship direct and database marketing on the Internet, potential of the Internet to support one-to-one marketing and the range of techniques and systems available to support dialogue with the customer over the Internet. | 4 |
| | **Business-to-business Internet marketing** Principal uses of the Internet in business-to-business markets. Impact of Internet technologies on buyer/supplier processes, relationships and markets. | 4 |
| | | |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

Department of Humanities and Social Sciences

| | Advanced Topics | 6 |
|---|---|---|
| | SEO, SEM, TEES, Commercial aspects of Cloud Computing, Big Data & Marketing Intelligence, E-Squal, Digital India | |
| **Total lectures** | | **42** |

## Suggested Text Book(s):

1. E-Marketing 5/E by Judy Strauss and Raymond Frost ©2009 Pearson Education, Inc. Publishing as Prentice Hall
2. Internet Marketing: Strategy, Implementation and Practice, 3/e by Dave Chaffey

3. Understanding Digital Marketing: Marketing Strategies for Engaging the Digital Generation, Damian Ryan

## Other useful resource(s):

1. http://www.digitalindia.gov.in/

2. http://www.socialbeat.in/2016/07/19/digital-marketing-industry-report-india-2016/

## Evaluation Scheme:

| S. No | Exam | Marks | Duration | Coverage / Scope of Examination |
|---|---|---|---|---|
| 1 | T-1 | 15 | 1 Hour. | Syllabus covered upto T-1 |
| 2 | T-2 | 25 | 1.5 Hours | Syllabus covered upto T-2 |
| 3. | T-3 | 35 | 2 Hours | Entire Syllabus |
| 4. | Teaching Assessment | 25 | Entire Semester | Assignment :10 Class activities :10 Attendance:5 |

## Course Outcomes (COs) contribution to the Programme Outcomes (POs)

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | x | 2 | x | x | x | x | x | x | x | 1 | 3 | 1 | 0.58 |

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT, SOLAN (H.P.) INDIA

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO2 | x | 2 | x | x | x | x | 1 | x | x | x | 3 | 1 | 0.58 |
| CO3 | x | 2 | 3 | x | 2 | x | x | x | 3 | x | 3 | 1 | 1.17 |
| CO4 | 1 | 2 | 3 | 2 | 2 | x | x | x | x | x | 3 | 1 | 1.17 |
| CO5 | x | 2 | x | x | x | 2 | 1 | 2 | 3 | 1 | 3 | 1 | 1.25 |
| Average | 0.20 | 2.00 | 1.20 | 0.40 | 0.80 | 0.40 | 0.40 | 0.40 | 1.20 | 0.40 | 3.00 | 1.00 | |

Department of Humanities and Social Sciences

# Department of CSE and IT
## Jaypee University of Information Technology, Waknaghat

### OUTLINE SYLLABUS

This document contains the outline syllabus for following courses offered in the Department of CSE and IT:

Departmental Courses.

- B.Tech. Courses(Theory- Core Course)
- B.Tech. Courses(Theory- Elective Courses)
- B.Tech. Courses(Labs- Core Courses)
- M.Tech. Courses(Theory- Core Courses)
- M.Tech. Courses(Theory- Elective Courses)
- M.Tech. Courses(Labs- Core/Elective Courses)

Other Department Courses(HSS/ECE/PHY/MATH/ENV).

- Department of HSS Theory Courses
- Departmant of Mathematics Theory Courses
- Departmant of Physics and Material Science Engg Theory Courses
- Department of Electronics & Communication Engg Theory Courses
- Department of Civil Engg Theory Courses
- All Other Department Lab Courses.

## Departmental Courses

### B.Tech. Courses(Theory- Core Course)

1. **Introduction to Computer and Programming (10B11CI111)**
I Sem (All Branches) Credits-4(3-1)

Basic Computer Architecture. Programming Language hierarchy. Program translation and execution. Algorithms, Pseudo codes and flowcharts. Program design and Basic SDLC. Program as State machine. Basic Testing and Debugging. Number system. Character & Instruction Representation. Structured Programming. Selection. Control Flow. Looping control structure. Arrays and Strings. Pointers. Functions. Structures and Unions. Enumerations. Preprocessor. Iteration. Recursion. Dynamic Memory Allocation. Linked-lists. File I/O. Basic Graphics. C Libraries. User defined header files.

2. **Introduction to Computers and Basic Programming(13B21CI121)**
I Sem (BT) Credits-4(3-1)
Introduction to Computers, the Internet and the World Wide Web, Bits, Data Types and Operations, The von Neumann Model, Introduction to C programming, C Program Control, C Functions, C Arrays, C Pointers, C Characters and Strings, C Formatted Input/Output, C Structures, Unions, Bit Manipulations and Enumerations, C File Processing
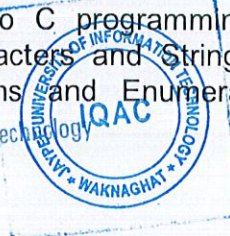
3. **Data Structure (10B11CI211)**
II Sem (CSE/IT/ICT/ECE/BI) Credits-4(3-1)

Interactive Software. Problem analysis and Data design. Introduction to Complexity

# Machine Learning and Data Analytics–I

COURSE CODE:18B1WEC733

COURSE CREDITS: 3

CORE/ELECTIVE: ELECTIVE

L-T-P: 3-0-0

**Pre-requisite:** None

## Course Objectives:

5. To provide a broad survey of approaches and techniques in machine learning;
6. To develop the basic skills necessary to pursue research in machine learning.

## Course Outcomes:

| S.No. | Course Outcomes | Level of Attainment |
|-------|-----------------|---------------------|
| CO-1 | Understand the basic theory underlying machine learning. | Familiarity |
| CO-2 | Apply machine learning algorithms to solve problems of moderate complexity. | Assessment |
| CO-3 | Formulate machine learning problems corresponding to different applications. | Assessment |
| CO-4 | Understand a range of machine learning algorithms along with their strengths and weaknesses. | Usage |
| CO-5 | Read current research papers and understand the issues raised by current research. | Usage |

## Course Contents:

| Unit | Contents | Lectures required |
|------|----------|-------------------|
| 1 | **Introduction:** Fixed, Adaptive and Intelligent systems; Adaptive techniques: Prediction, Classification, Forecasting, Filtering, Direct and Inverse modeling. | 5 |
| 2 | **Data Exploration and Pre-processing:** Data objects and attributes; Statistical measures, Visualization, Data cleaning and integration | 5 |
| 3 | **Dimensionality Reduction:** Discriminant analysis; Principal component analysis, Independent component analysis; Transform Domain and statistical feature extraction and reduction. | 4 |
| 4 | **Regression:** Linear regression, Multivariate regression, Logistic regression; Support vector machine. | 6 |
| 5 | **Clustering:** K-Means, Hierarchical and Density based clustering. | 7 |
| 6 | **Decision Tree based Learning:** Decision tree induction, Attribute selection and tree pruning. | 4 |
| 7 | **Artificial Neural Networks:** Single layer neural network, Multilayer Perceptron, Back Propagation learning, Functional link artificial | 11 |

| | neural network, Radial basis function network, Recurrent neural networks, Convolution neural network. | |
|---|---|---|
| **Total lectures** | | 42 |

**Suggested Text Book(s):**
9.  C. M. Bishop: Pattern Recognition and Machine learning, Springer, 1st Edition, 2006.
10. J. Han, M. Kamber, J. Pei: Data Mining: Concepts and Techniques, Elsevier Amsterdam, 3rd Edition, 2011

# Suggested Reference Book(s):

4.  T. Hastie, R. Tibshirani, J. Friedman: The Elements of Statistical Learning: Data Mining, Inference, and Prediction, Springer, 2nd Edition, 2013.
5.  H. Simon: Neural Networks and Learning Machines, Prentice Hall, 3rd Edition, 2009.

# Other useful resource(s):

1.  H. Daume: A course in Machine learning, 2015.
http://ciml.info/
2.  Link to NPTEL course contents:Introduction to Machine Learning https://onlinecourses.nptel.ac.in/noc17_cs26/preview
3.  Link to MITOPENCOURESEWARE: Machine Learning
https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-867-machine-learning-fall-2006/

**EvaluationScheme:**

| S. No | Exam | Marks | Duration | Coverage / Scope of Examination |
|---|---|---|---|---|
| 1 | T-1 | 15 | 1 Hour. | Syllabus covered upto T-1 |
| 2 | T-2 | 25 | 1.5 Hours | Syllabus covered upto T-2 |
| 3. | T-3 | 35 | 2 Hours | Entire Syllabus |
| 4. | Teaching Assessment | 25 | Entire Semester | Assignment (3) - 10   Quizzes(3)   -10   Attendance - 5 |
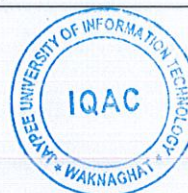
## 07B31PD303 Managerial Economics

**Course Goal**

To integrate the basic concepts of economics with the tools of mathematics and statistics in order to analyze and make optimal business decisions.

**Course Objectives**

1. Understand concept of economic problem of scarce resources, unlimited wants and economic decision making
2. Understand the internal and external decisions to be made by managers
3. Analyze the demand and supply conditions and assess the position of a company
4. Design competition strategies, including costing, pricing, product differentiation, and market environment according to the natures of products and the structures of the markets.
5. Analyze real-world business problems with a systematic theoretical framework.
6. Make optimal business decisions by integrating the concepts of economics, mathematics and statistics.

### Detailed Syllabi

### Lecture-wise Breakup

| Subject Code | 07B31PD303 | Semester | 3 | |
|---|---|---|---|---|
| Subject Name | Managerial Economics | | | |
| Credits | 3 | Contact Hours | 3 | |
| Faculty (Names) | Coordinator(s) | 1. Dr. Amit Srivastava | | |
| | Teacher(s) (Alphabetically) | 1. Dr. Sakshi Khanna <br> 2. Ms. Triambica Gautam | | |
| Module No. | Subtitle of the Module | Topics | | No. of Lectures |

| 1. | Introduction | The Economic Problems; The Art and Science of Economic Analysis; Some Pitfalls of Faulty Economic Analysis; Choice and Opportunity Cost; Comparative Advantage, Specialization and Exchange; The Economic System; The Economic Decision Making by Firms, Households | 6 |
|---|---|---|---|
| | | and Government; Defining Managerial Economics; Economics and Managerial Decision Making | |
| 2. | Basics of Demand, Supply and Equilibrium | Demand; Supply; Demand and Supply Create a Market; Changes in Equilibrium and Quantity; Disequilibrium | 4 |
| 3. | Elasticity of Demand and Supply | Price Elasticity of Demand; Determinants of the Price Elasticity of Demand; Price Elasticity of Supply; Other Elasticity Measures; Applications of theory of Demand and Supply | 4 |
| 4. | Demand Estimation and Forecasting | Introduction to Regression Analysis; Estimating and Testing Regression Equation; Problems in the Use of Regression Analysis, Introduction to Forecasting; Prerequisites of a Good Forecast; Forecasting Techniques – Expert opinion, Opinion Polls and Market Research, Surveys, Economic Indicators, Projections and econometric Models | 5 |
| 5. | The Theory of Production and Cost | Cost and Profit; Production in the Short Run; Production in the Long Run; Cost in the Short Run; Cost in the Long Run | 9 |
| 6. | Perfect Competition | An Introduction to Perfect Competition; Short-Run Profit Maximization; Minimizing Short-Run Losses; The Firm and Industry Short-Run Supply Curves; Perfect Competition in the Long Run; The Long Run Industry Supply Curves; Perfect Competition and Efficiency | 4 |

| 7. | Monopoly | Barriers to Entry; Revenue for Monopolist; The Firm's Costs and Profit Maximization; Monopoly and Allocation of Resources; Problems Estimating the Deadweight Loss of Monopoly; Price Discrimination | 5 |
|---|---|---|---|
| 8. | Monopolistic Competition and Oligopoly | Monopolistic Competition; An Introduction to Oligopoly; Models of Oligopoly; Comparison of Oligopoly and Perfect Competition | 5 |
| | | **Total number of Lectures** | 42 |

**Evaluation Scheme**

| S.No. | Component | Weightage |
|---|---|---|
| 1. | Test – 1 (1 Hr) | 15 |
| 2. | Test – 2 (1 Hr 30 mins) | 25 |
| 3. | Test – 3 (2 Hrs) | 35 |
| 5. | Internal <br> • Assignment <br> • Quiz <br> • Class Participation <br> • Attendance | 5 <br> 5 <br> 10 <br> 5 |

**Recommended Readings**

| 1. | Micro ECON – A South-Asian Perspective: William A. McEachern and Simrit Kaur, Cengage (**Text Book**) |
|---|---|
| 2. | Managerial Economics - Principles and Worldwide Application: Dominik Salvatore and Ravikesh Srivastava, Oxford Higher Education. |
| 3. | Managerial Economics: Craig H. Petersen, W. Chris Lewis and Sudhir K. Jain, Pearson Education. |
| 4. | Managerial Economics – Foundations of Business Analysis and Strategy: Christopher R. Thomas and S. Charles Maurice, McGraw Hills. |

| 5. | Managerial Economics - Economic Tool for Today's Decision Makers: Paul G. Keat, Philip K. Y. Young and Sreejata Banerjee, Pearson Education. |
| --- | --- |
| **Web Resources** | |
| | • Online Resource of the Text Book at Cengage Learning Website<br>• http://pearsoned.co.in/prc/book/h-craig-petersen-managerial-economics-4e-4/9788177583861<br>• http://pearsoned.co.in/prc/book/paul-g-keat-managerial-economics-economic-tools-todaysdecision-makers-6e-6/9788131733530<br>• http://www.onlinevideolecture.com/mba-programs/kmpetrov/managerialeconomics/?course_id=4207<br>• http://ocw.mit.edu/courses/economics/ |

**Course Goal**

At the completion of this course, the student should have the basic understanding of different materials and their properties. Students would be able to properly select suitable material for different engineering application and thus design better products.

**Course Objectives**
1. To enable the students to get better understanding about materials and their applications in engineering.
2. To familiarize students for making proper selection of materials for different applications.
3. To enable the students to use the knowledge about materials for their projects and ultimately apply the materials knowledge in their respective professional career.
4. At the conclusion of the course, the student should have a far greater capacity to read and understand technical articles such as those seen in the IEEE Transactions on Electron Devices, IEEE Transactions on Nanotechnology, Computer-aided design, Computational Materials Science *etc.*

**Course Outcomes:**
At the end of this course students will be able to understand the microscopic and macroscopic behavior of various materials. Students will be able to select material as per specific application in engineering field.
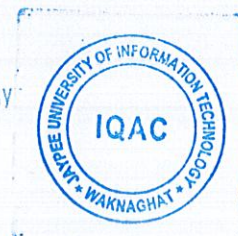
**Course Evaluation:**

| | |
|---|---|
| Test - I | 15 |
| Test - II | 25 |
| Test - III | 35 |
| Teacher Assessment | 25 |
| **Total Marks** | **100** |

**Detailed Syllabi**
**Lecture-wise Breakup**

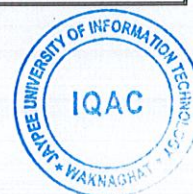| Subject Code | 10B11PH611 | Semester | 6 | |
|---|---|---|---|---|
| **Subject Name** | Materials Science | | | |
| **Credits** | 4 | **Contact Hours** | 4 | |
| **Module No.** | **Subtitle of the Module** | **Topics** | | **No. of Lectures** |
| 1. | Dielectric Materials | Polarization mechanism & Dielectric Constant, Behavior of polarization under impulse and frequency switching, Dielectric loss, Spontaneous polarization, Piezoelectric | | 10 |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

| | | effect; Applications of Dielectric Materials. | |
|---|---|---|---|
| 2. | Polymers | Various types of Polymers and their applications; Mechanical behavior of Polymers, synthesis of polymers. Conducting polymers | 4 |
| 3. | Optical Fiber | Light propagation in fibers and Graded Index fibers, Numerical Aperture and Attenuation, Single and Multimode. | 3 |
| 4. | Display Devices | Fluorescent Materials, LCD | 2 |
| 5. | Magnetic Materials | Concept of magnetism, Classification, dia-, para-, ferro-, antiferro- and ferri-magnetic materials, Their properties and Applications; Hysteresis; Applications. | 9 |
| 6. | Superconducting Materials | Meissner effect, Critical field, type-I and type-II superconductors; Field penetration and London equation; High temperature Superconductors and their Applications. | 4 |
| 7. | Ceramics | Structure, Types, Properties and Applications of Ceramics; Mechanical behavior and Processing of Ceramics | 3 |
| 8. | New Engineering Materials | Metallic Glasses, Shape Memory Alloys, Memory Effect, Nano-materials- significance of nanoscale, 0-Dimensional, 1- Dimensional, 2- Dimensional, 3-Dimensional nanostructures, Applications. | 7 |
| | | **Total number of Lectures** | 42 |

| | Recommended Reading (Books/Journals/Reports/Websites etc.: Author(s), Title, Edition, Publisher, Year of Publication etc. in IEEE format) |
|---|---|
| 1. | Charles Kittel, Introduction to Solid State Physics. John Wiley & Sons, 8th edition 2005. |
| 2. | S. O. Pillai, Solid State Physics, New age international publishers, 7th edition (2016). |
| 3. | William D. Callister and David G. Rethwisch, Materials science and engineering: an introduction, John Wiley & Sons, 8th edition (2010). |
| 4. | S.L. Kakani and Amit Kakani, Material Science (Science and Engineering of Materials), New age international publishers, 3rd edition (2016). |
| 5. | M. A. Wahab, Solid State Physics: Structure and Properties of Materials, Narosa, 3rd edition, (2015). |
| 6. | http://web.stanford.edu/~richlin1/sma/sma.html |
| 7. | http://www.nanowerk.com/nanotechnology/introduction/introduction_to_nanotechnology_1a.p |

| | |
|---|---|
| | hp |
| 8. | http://www.advancedsciencenews.com/best-of-advanced-optical-materials/ |

# MICROPROCESSORS AND CONTROLLERS

COURSE CODE: 10B11CI401

COURSE CREDITS: 4

CORE/ELECTIVE: CORE

L-T-P: 3-1-0

**Pre-requisite:** None

## Course Objectives

1. To study the Standard Intel Architectures.
2. To gain proficiency in Assembler language.
3. To gain experience in programming peripheral and I/O devices.
4. To acquire the background for understanding next-generation CPUs.
5. To learn concepts associated with interfacing a microprocessor to memory and to I/Odevices.
6. To learn how to control components of a microprocessor based system though the use ofinterrupts.
7. To learn about Embedded Systems and micro controller architecture, I/O interfacing andprogramming.
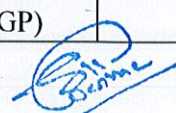
## Course Outcomes:

| S.No. | Course Outcomes | Level of Attainment |
|-------|-----------------|---------------------|
| CO-1 | The Standard Architecture of Intel Microprocessors | Familiarity |
| CO-2 | Instruction set of Intel 80x86 processors and proficiency in assembly language programming | Assessment |
| CO-3 | Concepts associated with interfacing a microprocessor to memory and to I/O devices and tolearn the programming of peripheral I/O devices | Familiarity |
| CO-4 | Control components of a microprocessor based system though the use of interrupts | Familiarity |
| CO-5 | Background knowledge for understanding next-generation CPUs | Assessment |
| CO-6 | Embedded system programming through 8051 architecture, I/O interfacing, programming andtesting | Familiarity |

## Course Contents

| Unit | Topics | References (chapter number, page no. etc) | Lectures |
|------|--------|-------------------------------------------|----------|
| 1 | Introduction to Microprocessor. Overview of the Intel Family of the Microprocessors, The 8086 microprocessor architecture | Berry Brey: Chapter 2 | 4 |
| 2 | Addressing Modes; Register Addressing; Immediate Addressing; Direct Data Addressing; Register Indirect Addressing; Base-Plus-Index Addressing; Register Relative Addressing; Base Relative-Plus-Index Addressing | Berry Brey: Chapter 3 | 2 |
| 3 | 8086 Instruction Set: Data movement Instructions, Arithmetic and Logic Instructions, Program control instruction | Berry Brey: Chapters 4,5,6 | 4 |
| 4 | Using assembly language with C/C++; Using Assembly Language with C++ for 16-bit DOS Applications, Mixed Assembly and C++ Objects | Berry Brey: Chapter 7 | 2 |
| 5 | Programming the 8086 microprocessor; Modular Programming, Using the Keyboard and Video Display, Disk Files | Berry Brey: Chapter 8 | 2 |
| 6 | 8086 Hardware specifications; Pin-Outs and the Pin Functions, Clock Generator (8284A), Bus Buffering and Latching, The 8288 Bus Controller | Berry Brey: Chapter 9 | 4 |
| 7 | 8086 Memory Interface; Memory Devices, Address Decoding, Memory Interface, Dynamic RAM | Berry Brey: Chapter 10 | 4 |
| 8 | Basic I/O Interface; I/O Port Address Decoding, Programmable Peripheral Interface (8255), Programmable Interval Timer (8254), Programmable Communications Interface (16550), ADC(ADC804) and DAC (DAC830) | Berry Brey: Chapter 11 | 5 |
| 9 | Interrupts; 8259A Interrupt controller | Berry Brey: Chapter 12 | 2 |
| 10 | Direct memory access and DMA-controlled I/O; 8237 DMA controller | Berry Brey: Chapter 13 | 2 |
| 11 | The arithmetic coprocessor; MMX, and SIMD technologies, 8087 arithmetic coprocessor | Berry Brey: Chapter 14 | 2 |
| 12 | Bus interface; ISA Bus, PCI Bus, Parallel Printer Interface, Serial COM Ports, Universal Serial Bus (USB), Accelerated Graphics Port (AGP) | Berry Brey: Chapter 15 | 2 |

| 13 | Intel Pentium and Core2 Processors | Berry Brey: Chapter 18 | 4 |
|---|---|---|---|
| 14 | Embedded Systems and 8051 Architecture, Hardware specifications, Memory System, I/O interfacing, Programming | Kenneth Ayala: Chapters 3,5,6,7,8 | 5 |
| | | **Total Number of Lectures** | 44 |

## Text Books

1. Berry B.Brey, "The Intel Microprocessors : Architecture, Programming, and Interfacing,"Eighth Edition, Prentice Hall, 2009

2. Kenneth Ayala, "The 8051 microcontroller," Third Edition, Thomson, 2005

## Reference Books

1. Douglas V Hall, "Microprocessors & Interfacing, Programming & Hardware," SecondEdition, Tata McGraw Hill

2. Yu-Cheng Liu,Glenn A. Gibson , "The 8086/8088 Family Architecture, Programming &design", Second Edition, PHI.

3. Kenneth Ayala "The 8086 microprocessor programming and Interfacing the PC," CengageLearning

4. Tom Shanley, "Protected Mode Software Architecture," Addison-Wesley, 1996

## Evaluation Scheme:

| S. No | Exam | Marks | Duration | Coverage / Scope of Examination |
|---|---|---|---|---|
| 1 | T-1 | 15 | 1 Hour. | Syllabus covered upto T-1 |
| 2 | T-2 | 25 | 1.5 Hours | Syllabus covered upto T-2 |
| 3. | T-3 | 35 | 2 Hours | Entire Syllabus |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

IQAC

| 4. | Teaching Assessment | 25 | Entire Semester | Assignment (2) - 10 |
|----|---------------------|-----|-----------------|---------------------|
| | | | | Quizzes (2) - 10 |
| | | | | Attendance - 5 |

## Course Outcomes (COs) contribution to the Programme Outcomes(POs)

| Course outcomes (Operating System ) | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 | PO-8 | PO-9 | PO-10 | PO-11 | PO-12 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-1 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 3 | 1 | 3 | 2.4 |
| CO-2 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 2 | 2 | 3 | 1 | 3 | 2.5 |
| CO-3 | 3 | 3 | 3 | 2 | 2 | 3 | 1 | 2 | 3 | 3 | 1 | 3 | 2.4 |
| CO-4 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 1 | 3 | 2.6 |
| CO-5 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 1 | 3 | 2.6 |
| CO-6 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 3 | 1 | 3 | 2.5 |
| Average | 3 | 3 | 3 | 2 | 2.7 | 2.8 | 2 | 2 | 2.5 | 3 | 1 | 3 | |

# MICROPROCESSORS AND CONTROLLERS LAB

COURSE CODE: 10B17CI407

COURSE CREDITS: 1

CORE/ELECTIVE: CORE

L-T-P: 0-0-2

## Pre-requisite: None

## Course Objectives

1. To develop, implement, and debug 8086 assembly language programs that meet stated specifications.
2. To understand and be able to explain bus transactions, memory organization and addressdecoding, basic I/O interfaces and port addressing.
3. To get familiarize with interfacing of various peripheral devices with the microprocessor
4. To control the components of a microprocessor based system through the use of interrupts.
5. To develop, implement, and debug 8051 assembly language programs and I/O interfaces thatmeet stated specifications.
6. To lay a foundation for pursuing some additional career options

## Course Outcomes:

| S.No. | Course Outcomes | Level of Attainment |
|-------|-----------------|---------------------|
| CO-1 | To increase proficiency in using assembly language to develop microprocessor basedapplications. | Familiarity |
| CO-2 | To learn to control components of a microprocessor based system though the use of interrupts. | Assessment |
| CO-3 | Gain practical experience in programming memory and peripheral devices like timers/counters, parallel peripheral devices, serial communication interfaces and I/O devices. | Assessment |
| CO-4 | To gain practical experience in programming with coprocessor and DMA controller | Assessment |
| CO-5 | To work with 8051 microcontroller and interfaces like digital to analogue converters andanalogue to digital converters etc. | Usage |
| CO-6 | To develop a microprocessor/microcontroller | Usage |

# List of Experiments

### Exp. 1 To get familiar with ET-8086LCD kit and its commands
**Activity 1**: Basic introduction of ET-8086LCD kit's component.
**Activity 2:** To get familiar with common monitor commands:
> (i) S: Substitute Memory, I/O, Register
> (ii) E: Expand Monitor (Assembler)
> (iii) G: Execute Machine Code (Go To)
> (iv) M: Move a block of data from one memory location to other
> (v) C: Compare a block of data on a memory location

### Exp.2 Data transfer and Arithmetic operations
**Activity 1**. Write a programme starting from the memory location 1000:1000H
to move a 16bit data toAX register and then move the data to the
memory location 1000:0000H
**Activity 2**. Write a programme to add, subtract, multiply and divide two 16bit nos.
stored at locations1000:0000H and 1000:0002H. Store the result starting
from 1000:0004H
Note: Find out the total memory used and machine cycles requited for the
programs.

### Exp.3 Branch/Loop instructions and string instructions
**Activity 1.** Write memory efficient and time efficient programs to find the
largest and smallest nos. in a string of 10 bytes, stored at location
starting from 1000:0100H. Store the result at 1000:0200H and
1000:0201H
**Activity 2.** Write memory efficient and time efficient programs to sort a string
of 10 bytes stored atlocation starting from 1000:0300H in
ascending and descending order.

### Exp. 4 Interrupts
**Activity 1.** Write a program to display the current time on the
LCD in 24Hr format **Activity 2.** Write a program to display three
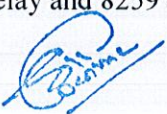names successively on the LCD with a delay

### Exp. 5 Keyboard and LCD display interfacing
**Activity 1.** Convert Fahrenheit to Celsius and display on the LCD
**Activity 2**. To check for palindrome in the given string

### Exp. 6 On-board interfaces 8255, 8253, 8259
Write a program to output 55H and AAH repeatedly with a delay of 1sec at a
port of 8255 using 8253for delay and 8259 for interrupt.

### Exp. 7 Serial communication interface 8251

Communicate between two microprocessor kits using serial communication interface 8251 andestimate the minimum time to transmit 10 characters.

### Exp.8 Coprocessor 8087

Find the logarithm of a number using Math coprocessor 8087 and compare its execution time with8086.

### Exp. 9 DMA controller 8089 for high speed data transfer.

Write a program to transfer data from peripheral to Memory through DMA controller 8089

### Exp. 10 Woking with BIOS and DOS interrupts

Write a program to create a file 'myfile.txt' and write your bio-data in it. Save the file into the subdirectory MYDIR. Read and display the contents of the file.

### Exp.11 8051 programming

**Activity 1.** Familiarize with the 8051 kit

**Activity 2.** Acquire analog voltage signal from ADC and process it by removing noise using averagefilter. Output the filtered signal in analogue form using DAC.

### Exp. 12 Mini project

Select any project of your choice

## Evaluation Scheme:

| 1 | Mid Sem. Evaluation | 20 Marks |
|---|---------------------|----------|
| 2 | End Sem. Evaluation | 20 Marks |
| 3 | Attendance | 15 Marks |
| 4 | Lab Assessment | 45 Marks |
| | Total | 100 marks |

**Text Books**

1. "The Intel Microprocessor 80x86, Pentium, Pentium Pro processor, Pentium II Pentium III, Pentium IV Architecture, Programming, and Interfacing " by **Berry B.Brey,** Eighth Edition, Prentice Hall, 2003
2. "The 8051 microcontroller" by Kenneth Ayala is recommended for 8051 only "Microprocessors & Interfacing, Programming & Hardware", by Douglas Hall, 2nd Edn. TataMcGraw Hill.

**Course Outcomes (COs) contribution to the Programme Outcomes (POs)**

| CO/PO | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | Average |
|---------|------|------|------|------|------|------|------|------|------|-------|-------|-------|---------|
| CO1 | 3 | 3 | 3 | 1 | 2 | 1 | 3 | 3 | 2 | 3 | 3 | 3 | 2.5 |
| CO2 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 2.8 |
| CO3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 2.8 |
| CO4 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 2.8 |
| CO5 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 2.8 |
| C06 | 3 | 3 | 3 | 1 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2.8 |
| Average | 3 | 3 | 3 | 2.3 | 2 | 2 | 3 | 3 | 2.2 | 3 | 3 | 3 | |

# MULTIMEDIA DEVELOPMENT LAB-I

COURSE CODE: 10B28CI408

COURSE CREDITS: 1

CORE/ELECTIVE: CORE

L-T-P: 0-0-2

---

**Pre-requisite:** None

## Course Objectives:

This course focuses on the development of applications that manipulate media assets. Significant time is spent on intermediate to advanced programming and scripting as well as the synchronization of aural and graphical components. Students are requited to plan, design and implement lab projects.

## Course Outcomes:

| S No | Course Outcomes | Level of Attainment |
|------|-----------------|---------------------|
| CO1 | To learn how to design and develop multimedia for real-world e-learning, practice software engineering in a learner-oriented project and to learn and apply cognitive principles of user interface design. | Familiarity |
| CO2 | To learn how to implement multimedia e-learning in Macromedia Flash, Demonstrate mastery of scripting in a multimedia development environment, Create multi-user multimedia applications, and Use the basic tools used by an Android programmer. | Assessment |
| CO3 | Configure an Android emulator and a hardware connection to an Android device, Describe the Android development lifecycle and Define XML and give examples of how it is used to express data. | Assessment |
| CO4 | Write interactive programs on the Android, Demonstrate the use of activity lifecycles to control an app, and Analyze a design's ability to support multiple screen resolutions and natural languages. | Assessment |
| CO5 | Design dynamic UIs using fragments and the Android support library, Analyze a design's ability to interact with other apps on the device, and Use layout hierarchies to produce reusable layouts. | Assessment |
| CO6 | Demonstrate the use of animation, digitized sound, video control, and scanned images and Develop conceptual maps of content and process for interactive multimedia instructional programs | Usage |

**Course Contents:**

| S.No | Topic | No of Labs |
|------|-------|------------|
| 1 | Basic Animation Concepts, Introduction to Flash | 1 |
| 2 | Basic Assignment to understand the fundamental of Flash | 1 |
| 3 | Tween motion and Break Apart functionalities | 1 |
| 4 | Action Scripting | 1 |
| 5 | Introduction to android & Environment Setup | 2 |
| 6 | Create Android Application , UI Controls | 2 |
| 7 | Resources Organizing & Accessing , activities | 2 |
| 8 | Services , Broadcast Recievers, Sending SMS | 2 |
| 9 | Event Handling | 1 |
| 10 | Database in android using SQLLite | 1 |

**Suggested Resources:**

- "Flash MX Action Script Programming" by Robert Reinhardt and Joey Lott, Wiley Publisher
- "Flash 5 Magic with Action Script" by J. Scott Hamlin and David J. Emberton, Techmedia Publisher
- "Beginning Android Application Development" by Wei-Meng Lee, Paperback Publisher

**Evaluation Scheme:**

| S No | Exam | Coverage/Scope of Examination | Marks |
|------|------|-------------------------------|-------|
| 1 | Mid Term Test | Viva and Written Exam | 20 |
| 2 | End Term Test | Viva and Written Exam | 20 |
| 3 | Lab Records | | 15 |
| 4 | Teacher Assessment | (Quality and quantity of experiment performed, learning laboratory skills) | 30 |
| 5 | Attendance and discipline in lab | | 15 |
| 6 | Total | | 100 |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

**Course Outcomes (COs) contribution to the Programme Outcomes (POs)**

|      | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | Avg |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|-----|
| CO1  | 3   | 3   | 3   | 3   | 2   | 2   | 1   | 1   | 1   | 1    | 1    | 1    | 1.8 |
| CO2  | 3   | 3   | 3   | 3   | 3   | 1   | 1   | 1   | 1   | 1    | 1    | 3    | 2   |
| CO3  | 3   | 3   | 2   | 3   | 2   | 3   | 2   | 1   | 1   | 1    | 2    | 1    | 2   |
| CO4  | 3   | 3   | 3   | 2   | 3   | 2   | 1   | 1   | 1   | 1    | 1    | 1    | 1.8 |
| CO5  | 2   | 2   | 3   | 3   | 3   | 3   | 1   | 1   | 1   | 1    | 1    | 1    | 1.8 |
| C06  | 2   | 3   | 3   | 3   | 2   | 2   | 2   | 2   | 2   | 2    | 2    | 2    | 2.3 |
| Avg  | 2.7 | 2.8 | 2.8 | 2.8 | 2.5 | 2.2 | 1.3 | 1.2 | 1.2 | 1.2  | .1.3 | 1.5  | 2   |

## 6. Advanced Algorithms (10M11CI211)
II Sem (CSE), IV Sem Elective (ECE) Credits-4(3-1)

Review of Algorithms. Algorithm correctness and efficiency. Growth of functions. Algorithm analysis methods, recurrences, divide and conquer, backtracking, dynamic programming. Sorting. Search pruning. Heuristic methods. NP – completeness. Matrix operations. String matching. Computational geometry. Approximation algorithm. Linear programming.

## 7. Advanced OS (10M11CI212)
II Sem (CSE), II Sem Elective (ECE) Credits-4(3-1)

Review of OS principles. Synchronization mechanisms. Process deadlocks. Resource models. Theoretical foundations. Inherent limitations of distributed operating systems. Event ordering. Timestamps. Distributed mutual exclusion. Token and non-token based algorithms. Comparative performance analysis. Concurrency control. Agreement protocols for handling processor failures. Coordination of processes and related algorithms. Failure handling and recovery mechanisms. Multiprocessor operating systems and related thread handlings.

## 8. Advance Software Engineering (10M11CI213)
II Sem (CSE) Credits-4(3-1)

Review of software Engineering. PSP.TSP. Usability. Agile Methods. Agile Development. Iterative Scrum. Extreme Programming. Unified Process. Evolution. Requirements engineering.Meta Modeling.Software Architecture and Design Patterns Software Metrics and Software Reliability. Testing Strategies. Planning and Automated Testing. Aspect Oriented Programming (AOP).

## 9. Multimedia Systems(10M11CI214)
II Sem (CSE/ECE) Credits-4(3-1)

Introduction. Multimedia Data Encoding (Audio, Image, Video, and Animation). Quality of Service. Multimedia Operating Systems: Process Management. Inter-process Communication
and Synchronization. Memory Management. Device Management. Media Server Architecture and Storage Management. Networks Services, Protocols, Layers, and Synchronization.
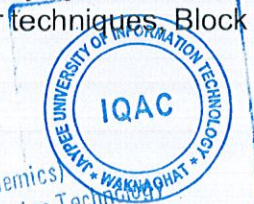
### M.Tech. Courses(Theory- Elective Courses)

## 1. System and Network Security Techniques(09M11CI421)
I Sem CSE Credits-3(3-0)
Introduction to System security, network security,security system model, ITU TX-800, mathematical foundations for security, classical cipher techniques, Block ciphers: DES,

# 11B1WCI836: Network Management.

## COURSE DESCRIPTION

| Department: CSE/IT | | Course Coordinator: Brig(Retd) S P Ghrera |
|---|---|---|
| Course: Network Management | Course Code: 11B1WCI836 | Course Credits: 3 (3-0-0) |

Prerequisites:
Computer Networks, Cryptography and Network Security
Objective:
To manage Computer Networks.

Course Outline:

| Srl | Topics | Chapter | Lectures |
|---|---|---|---|
| 1 | Data Communications and Network Management Overview | 1 | 3 |
| 2 | Review of Computer Network Technology | 2 | 4 |
| 3 | Basic Foundations of Network management, standards, models and languages | 3 | 3 |
| 4 | SNMP v1 Organisation and Information models | 4 | 4 |
| 5 | SNMP v1 Communication and functional Models | 5 | 4 |
| 6 | SNMP v2 | 6 | 4 |
| 7 | SNMP v3 | 7 | 4 |
| 8 | SNMP management RMON | 8 | 2 |
| 9 | Network Design | - | 2 |
| 10 | Broadband Network Management: ATM Networks | 9 | 2 |
| 11 | Broadband Network Management: Access Networks | 10 | 2 |
| 12 | TMN | 11 | 2 |
| 13 | Network Management Tools, systems and applications | 12 | 2 |
| 14 | Network Management applications | 13 | 2 |
| 15 | Web Based Management | 14 | 2 |

| | | **Total** | | 42 |
|---|---|---|---|---|

**Evaluation scheme:**

| | |
|---|---|
| Test 1 | 30 |
| Test 2 | 45 |
| Internal | 25 |
| | |
| Total | 100   marks |

Textbook:

Mani Subramanian., Pearson Education, *Network Management Principals and Practices*

# 10B1WCI735: Network Security and Cryptography Techniques

**Course Structure**:    3 Credits(3L)

**Prerequisites:**    Introduction to Computers
                     Knowledge of Computer Networks

**Note:**    **This course will be a prerequisite for Network Management Course to be offered in 8<sup>th</sup> sem.**

## Course Outcomes(Cos):

| Srl | Course outcomes ( Network Security and Cryptography Techniques)  10B1WCI735 | Level of Attainment |
|---|---|---|
| CO-1 | Understand the basic security services e.g.Authentication, Access Control, Confidentiality, Integrity, and Non repudiation).[Familiarity] | Familiarity |
| CO-2 | Learn standard symmetric encryption algorithms[] | Assessment |
| CO-3 | Learn the architecture for public and private key cryptography and how public key infrastructure (PKI)supports network security. [Assessment] | Assessment |
| CO-4 | Learn the methods of digital signature and encryption. [Assessment] | Assessment |
| CO-5 | Learn key management and how key exchange protocols work. [Familiarity] | Usage |
| CO-6 | Learn futuristic cryptographic techniques like Eliptic Curve and quantum cryptography.[Assessment] | Assessment |

**Course Text:** "Cryptography & Network Security" by Stallings, William (Fourth Edition or later) will be used as the main text book, however the inputs will be supplemented with information from elsewhere wherever the same is required.

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

IQAC

## Course Outline:

| S.No. | Topics | Chapter | Lectures |
|---|---|---|---|
| 1 | Foundation of Security & Cryptography: OSI security architecture, Security Policy,Classical encryption techniques(Substitution Techniques, Transposition Techniques and Staganography) | 1,2 | 3 |
| 2 | Mathematical Tools for Cryptography: Finite fields, number theory | 4,8 | 1 |
| 3 | Design Principle of Block Ciphers:DES | 3 | 2 |
| 4 | Block Cipher Algorithms: AES | 5 | 3 |
| 5 | Pseudo Random Numbers & Stream Ciphers: Multiple Encryption, Block Cipher modes of operation, stream ciphers, Confidentiality | 6,7 | 4 |
| 6 | Public Key Cryptography: RSA, Key management | 9,10 | 4 |
| 7 | Hashes & Message Digest:Authentication functions,Message authentication codes,Hash functions and their security | 11,12 | 4 |
| 8 | Digital Signature, Certificates & standards | 13 | 3 |
| 9 | Authentication:X.509 Authentication service | 14 | 3 |
| 10 | Electronic Mail Security:S/MIME | 15 | 3 |
| 11 | IP and Web Security Protocols:IPsec, Secure socket layer and transport layer security, secure e-transaction. | 16,17 | 4 |
| 12 | System Security : Computer Virus, Firewall & Intrusion Detection , Trusted systems, Security Investigation/Audit | 18,19,20 | 4 |
| 13 | Cyber Laws: IT ACT 2000, IT amendment ACT 2008 | | 3 |
| | Total | | 42 |

## Evaluation Scheme:

| | |
|---|---|
| Test 1 | 15 |
| Test 2 | 25 |
| Test 3 | 35 |
| Attendence, Assignments etc | 25(quiz=12,Assignment=9,Regularity=4) |
| Total | 100 |

# Object Oriented Programming

**COURSE CODE:** 10B11CI311

**COURSE CREDITS:** 4

**CORE/ELECTIVE:** CORE

**L-T-P:** 3-1-0

---

**Pre-requisite Course:** Introduction to C Programming

## Course Objectives:

➢ Explain what constitutes an object-oriented approach to programming and identify potential benefits of Object-oriented programming over other approaches.

➢ Analyze and decompose problem specifications from Object Oriented Perspectives and represent the solution, using UML notation.

➢ Explain the benefits of object oriented design and the types of systems in which it is an appropriate methodology.

➢ Apply an object-oriented approach to developing applications of varying complexities.

➢ Augment a class definition using constructors, destructors, member functions, helper functions and custom input/output operators to add functionality to a programming solution

➢ Manage an object's resources using dynamic memory allocation and deallocation to access data stored outside the object's memory

➢ Read from and write to files using objects from the standard input output library and custom file operators for future restoration

## Course Outcomes:

| S.No. | Course Outcomes | Level of Attainment |
|---|---|---|
| CO-1 | To learn the concepts of Objects, Classes, Methods, Constructors and Destructors | Usage |
| CO-2 | To learn the designing of complex classes: Friend Functions and Static member functions, Inline functions, constant functions. | Usage |
| CO-3 | To learn Inheritance: Single Inheritance, Multiple Inheritance, Multi-level Inheritance, Hierarchical Inheritance and Hybrid Inheritance. | Usage |
| CO-4 | To learn the concept of Abstract classes and interfaces | Usage |
| CO-5 | To learn the concepts of Operator overloading and conversion function | Usage |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

| CO-6 | To learn File Handling. Writing and reading data from the file, reading and writing the objects into the file. | Usage |
|---|---|---|
| CO-7 | To learn the Exception Handling: try --catch and finally block, making user-defined exceptions. | Usage |
| CO-8 | To learn the Unified Modeling Language (UML): Use Case Diagrams, State Diagrams, Sequence Diagrams, Communication Diagrams, and Activity Diagrams. | Familiarity |

## List of Experiments:

| S No | Topic | Hrs |
|---|---|---|
| 1 | Review of Structured programming in C, Structured versus O-O programming, O-O paradigm | 4 |
| 2 | Objects, Classes, Methods, Constructors and destroying objects in C++ | 6 |
| 3 | Object-oriented Analysis –Class diagrams and Object Diagrams | 6 |
| 4 | File Handling in C++ and JAVA | 6 |
| 5 | Friend Functions, Static member functions in C++ and JAVA | 4 |
| 6 | Complex Objects and Classes | 3 |
| 7 | Inheritance, Multiple Inheritance in C++ | 3 |
| 8 | Polymorphism and Virtual Functions in C++ | 2 |
| 9 | RTTI and Casting types in C++ | 2 |
| 10 | Function and Operator overloading in C++ | 2 |
| 11 | Namespace and Templates in C++ | 2 |
| 12 | STL-Container classes, Sequence, Iterators | 2 |
| 13 | Java GUI and AWT | 3 |
| 14 | Introduction to Swing and Applet | 4 |
| 15 | Arrays | 1 |
| 16 | Inheritance and Abstract Classes in JAVA | 2 |
| 17 | Packages, Class path, Interfaces in JAVA | 2 |
| 18 | Basic OO Testing and Exception Handling in C++ and JAVA | 2 |
| | TotalT | 56 |

## Evaluation Scheme:

| 1 | Mid Sem. Evaluation | 20 Marks |
|---|---|---|
| 2 | End Sem. Evaluation | 20 Marks |

| | | |
|---|---|---|
| 3 | Attendance | 15 Marks |
| 4 | Lab Assessment | 45 Marks |
| | Total | 100 marks |

## References

1. Lafore R., Object oriented programming in C++, Waite Group
2. Java 2: The Complete Reference, Fifth Edition -- by Herbert Schildt
3. Deitel and Deitel How to Program C++
4. Stroustrap B., The C++ Programming Language, Addison Wesley
5. Bruce Eckel, Thinking in Java
6. Java Swings by Robert Eckstein, Marc Loy & Dave Wood, Orelly's

## Course Outcomes (COs) contribution to the Programme Outcomes (POs)

| Course outcomes (Object-Oriented Systems and Programming) | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 | PO-8 | PO-9 | PO-10 | PO-11 | PO-12 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-1 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 2.8 |
| CO-2 | 3 | 3 | 3 | 2 | 1 | 1 | 2 | 3 | 2 | 3 | 3 | 3 | 2.4 |
| CO-3 | 3 | 3 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 2.3 |
| CO-4 | 3 | 3 | 3 | 2 | 2 | 1 | 2 | 3 | 2 | 3 | 3 | 3 | 2.5 |
| CO-5 | 3 | 3 | 3 | 3 | 2 | 1 | 2 | 3 | 2 | 1 | 3 | 3 | 2.4 |
| CO-6 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 2.7 |
| CO-7 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 2.6 |
| CO-8 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 1 | 3 | 1 | 2.5 |
| Average | 3 | 3 | 2.8 | 2.5 | 2 | 1.8 | 2.4 | 2.8 | 2 | 2.4 | 3 | 2.8 | |

# OBJECT-ORIENTED PROGRAMMING LAB

COURSE CODE: 10B17CI371

COURSE CREDITS: 1

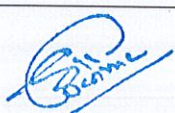CORE/ELECTIVE: CORE

L-T-P: 0-0-2

---

**Pre-requisite:** Introduction to Computer Programming

## Course Objectives:

1. To use object modelling technique to analyze problem requirements, design a solution to the problem and then implement the solution in Object-Oriented Programming Language(s) or database.
2. To strengthen their problem solving ability by applying the characteristics of an object-oriented approach.
3. To strengthen ability to design and represent solutions to problems using UML notations.
4. To introduce object-oriented concepts in C++ and Java.

## Course Outcomes:

| S.No. | Course Outcomes | Level of Attainment |
|-------|-----------------|---------------------|
| CO1 | To learn the concepts of Objects, Classes, Methods, Constructors and Destructors | Usage |
| CO2 | To learn the designing of complex classes: Friend Functions and Static member functions, Inline functions, constant functions. | Usage |
| CO3 | To learn Inheritance: Single Inheritance, Multiple Inheritance, Multi-level Inheritance, Hierarchical Inheritance and Hybrid Inheritance. | Usage |
| CO4 | To learn the concept of Abstract classes and interfaces | Usage |
| CO5 | To learn the concepts of Operator overloading and conversion function | Usage |
| CO6 | To learn File Handling. Writing and reading data from the file, reading and writing the objects into the file. | Usage |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

IQAC

| | | |
|---|---|---|
| CO7 | To learn the Exception Handling: try --catch and finally block, making user-defined exceptions. | Usage |
| CO8 | To learn the Unified Modeling Language (UML): Use Case Diagrams, State Diagrams, Sequence Diagrams, Communication Diagrams, and Activity Diagrams. | Familiarity |

**List of experiments**

| Topics | Labs | Hours |
|---|---|---|
| 1. Objects, Classes, Methods, Constructors and Destructors | 2 | 4 |
| 2. Static members and Friend Functions | 2 | 4 |
| 3. Inheritance and its forms (in C++ & Java) | 4 | 8 |
| 4. File Handling in C++ | 2 | 8 |
| 5. Operator Overloading and Conversion Functions in C++ | 4 | 8 |
| 6. Polymorphism and Virtual Functions in C++ | 2 | 4 |
| 7. Template functions and classes in C++ | 4 | 8 |
| 8. Abstract classes in Java | 2 | 4 |
| 9. Packages and Interfaces in Java | 2 | 4 |
| 10. Container classes in Java | 2 | 4 |
| 11. Exception Handling | 2 | 4 |
| Total = | 28 | 56 |

**Evaluation Scheme:**

| | | |
|---|---|---|
| 1 | Mid Sem. Evaluation | 20 Marks |
| 2 | End Sem. Evaluation | 20 Marks |
| 3 | Attendance | 15 Marks |
| 4 | Lab Assessment | 45 Marks |
| | Total | 100 marks |

**Reference Material:**
- Grady Booch, James Rambaugh, Ivar Jacobson, "Unified Modelling Language user'sguide", Addison Wesley Limited

- Lafore R., Object oriented programming in C++, Waite Group
- Stroustrap B., The C++ Programming Language, Addison Wesley
- Langsam,Augestein,Tenenbaum: Data Structures using C and C++
- Sahani, Sartaj: Data Structures in C++/Data Structures in Java
- Java 2: The Complete Reference, Fifth Edition -- by Herbert Schildt

**Course Outcomes (COs) contribution to the Programme Outcomes (POs)**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | Average |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|---------|
| CO1 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 2.8 |
| CO2 | 3 | 3 | 3 | 2 | 1 | 1 | 2 | 3 | 2 | 3 | 3 | 3 | 2.4 |
| CO3 | 3 | 3 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 2.3 |
| CO4 | 3 | 3 | 3 | 2 | 2 | 1 | 2 | 3 | 2 | 3 | 3 | 3 | 2.5 |
| CO5 | 3 | 3 | 3 | 3 | 2 | 1 | 2 | 3 | 2 | 1 | 3 | 3 | 2.4 |
| C06 | 3 | 3 | 3 | 3 | 2 | 1 | 2 | 3 | 2 | 2 | 3 | 3 | 2.5 |
| CO7 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 2.6 |
| CO8 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 1 | 3 | 1 | 2.5 |
| Average | 3 | 3 | 2.8 | 2.5 | 2 | 1.5 | 2.4 | 2.8 | 2 | 2.4 | 3 | 2.8 | |

## 21. Data Mining (10B22CI622)
VI Sem(IT/ICT) Credits-4(3-1)

Introduction. Data Warehouse Software Engineering: Requirement Analysis, Data modeling, Design, Project Management, Building, and Testing. Hypothesis testing. Online analytical Process models. Query Access Architectures. Extraction Transformation Loading. OLAP. Data warehouse security. Metadata. Data mining Models. Statistical Data mining. Classification Techniques. Clustering Techniques. Association Rules.

## 22. Compiler Design (10B11CI612)
VI Sem(CSE) Credits-4(3-1)

Introduction. Lexical Analysis. Syntax Analysis. Top down and Bottom-up Parsers. Semantic Analysis. Symbol Table Management. Storage Management. Error Handling. Code Optimization. Code Generation.

## 23. Computer Organisation and Architecture (10B11CI613)
VI Sem(CSE), III Sem(ICT) Credits-4(3-1)

System level design, Register level design, Processor level design. Advanced data representation. Instruction set architecture level. Data-path Design. Hardwired control unit, micro-programmed control unit, pipeline control unit. Structured Memory Design. Bus System. System control. I/O Control. Performance analysis. Processor array. Multi-computer and Multi-processor.

## 24. Object Oriented Systems and Programming (10B11CI614)
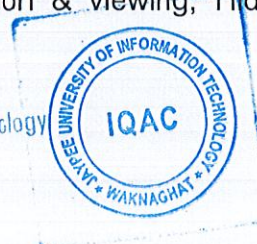VI Sem (ECE) Credits-4(3-1)

Interactive database driven software. Database Environment. Relational Model. SQL. PL/SQL. ER & EER Modeling. Normalization. Database Connectivity. Transactions Processing. 3-tier Architecture. O-O paradigm. Objects, Classes, Methods, Constructors and Destructors. File Handling. Friend Functions and Static members functions. Inheritance. Polymorphism and Virtual Functions. Interfaces in JAVA. Exception Handling in C++ and JAVA. Basic principals of Software engineering. System analysis, design, testing and debugging.

## 25. Computer Graphics (11B1WC1611)
VI Sem(CSE), V Sem(ICT) Credits-4(3-1)

Computer representation of image, Graphics programming , User – computer interface, Components of Graphics Systems, Output primitives, Area filling, Windowing and clipping, 3D object representation, 3D Transformation & viewing, Hidden surface and Hidden line, Illumination models and shading

Basic HTML Concepts- Frame, Table, Form, Image Positioning, Implementation of CSS in/with HTML, Java Script, JAVA, DHTML, XML, XHTML, Server Side Scripting Languages- PHP and JSP.

### 17. Software Engineering Lab( 10B17CI572)
V Sem CSE& IT Credits-1

Software Project Management, Requirement Engineering, Analysis Modeling and Design, UML Tools, Software Architecture, User Interface Design, Software Metrics, Reengineering, Project.

### 18. Operating Systems Lab(10B17CI571)
V Sem (CSE& IT) Credits-1

Design and implementation of an operating system, basic operations, OS subsystems, process management, processes, threads, CPU scheduling, synchronization, and deadlock, memory management, segmentation, paging, swapping, file systems. The course programming assignments are in C.

### 19. Object-Oriented Systems and Programming Lab (10B17CI674)

VI Semester (ECE) Credits-2

Unified Modeling Language: (Use Case Diagrams, State Diagrams, Sequence Diagrams, Communication Diagrams, Activity Diagrams), Objects, Classes, Methods, Constructors and destroying objects in C++ , Friend Functions, Static data and  member functions, const data and functions, inline functions, Inheritance in C++ and Java, File Handling in C++ and Java, Polymorphism and Abstract classes in C++ and Java, Interfaces and Packages in JAVA, Exception Handling in C++ and Java, SQL, PL/SQ Database Connectivity

### 20. Data Mining Lab (10B22CI622)
VI Sem (IT) Credits-1

Pattern Search, Mean, Median, Mode and Standard Deviation Computation, Redundancy Analysis: Correlation Analysis, Normalization Techniques: Min-Max, Z-Score and Decimal Scaling Normalization, Noise Removal using Binning: Mean, Mode  and  Min-Max Bin, PCA (Principal Component Analysis), Single and Multiple Linear Regression, Bayes Classification, Iterative Dichotomiser 3, K-means Clustering.

### 21. Computer Networks Lab(10B17CI671)
VI Sem (CSE/ICT) Credits-1

Socket programming, Network Representation, Topology, MAC, Routing, TCP, UDP, Application Layer, Network security, Project.
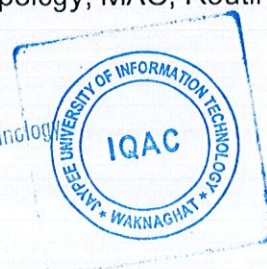
# Operating System

COURSE CODE: 07B51CI107

COURSE CREDITS: 4

CORE/ELECTIVE: CORE

L-T-P: 3-1-0

**Pre-requisite:** Proficiency in UNIX Based Programming (C, C++), Data structures and Computer Organization.

## Cousre Objectives

The major objective of this course is to study and examine the operations of operating systems. The course focuses on

- Computer and operating system structures
- Process and thread management
- Process synchronization and communication
- Memory management
- Virtual memory
- File system
- I/O subsystem and device management
- Selected examples in networking, protection and security

## Course Outcomes:

| S.No. | Course Outcomes | Level of Attainment |
|-------|-----------------|---------------------|
| CO-1 | An appreciation of the role of an operating system. | Familiarity |
| CO-2 | Create processes and threads. | Assessment |
| CO-3 | Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time. | Assessment |
| CO-4 | For a given specification of memory organization develop the techniques for optimally allocating memory to processes by Increasing memory utilization and for improving the access time | Assessment |
| CO-5 | Design and implement file management system. | Assessment |
| CO-6 | For a given I/O devices and OS (specify) develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers. . | Usage |

## Course Contents:

| Unit | Contents | Lectures required |
|:---:|---|:---:|
| 1 | **Introduction:** Concept of Operating Systems, Generations of Operating systems, Types of Operating Systems, OS Services, System Calls, Structure of an OS - Layered, Monolithic, Microkernel Operating Systems, Concept of Virtual Machine. Case study on UNIX and WINDOWS Operating System. | 4 |
| 2 | **Process:** Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching. **Thread:** Definition, Various states, Benefits of threads, Types of threads, Concept of multithreads. | 4 |
| 3 | **Process Scheduling:** Foundation and Scheduling objectives, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time; Scheduling algorithms: Pre-emptive and Non pre-emptive, FCFS, SJF, Priority, RR; Multiprocessor scheduling: Real Time scheduling: RM and EDF | 4 |
| 4 | **Inter-process Communication:** Critical Section, Race Conditions, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson's Solution, Lamport's Bakery Algorithm, The Producer\ Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem etc. | 10 |
| 5 | **Deadlocks:** Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery. | 4 |
| 6 | **Memory Management:** Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation – Fixed and variable partition–Internal and External fragmentation and Compaction; Paging: Principle of operation – Page allocation – Hardware support for paging, Protection and sharing, Disadvantages of paging. | 6 |

| 7 | **Virtual Memory**: Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault, Working Set , Dirty page/Dirty bit – Demand paging, Page Replacement algorithms: Optimal, First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU). | 5 |
|---|---|---|
| 8 | **I/O Hardware:** I/O devices, Device controllers, Direct memory access Principles of I/O Software: Goals of Interrupt handlers, Device drivers, Device independent I/O software, Secondary-Storage Structure: Disk structure, Disk scheduling algorithms. **File Management:** Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), efficiency and performance. **Disk Management:** Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk reliability, Disk formatting, Boot-block, Bad blocks. | 5 |
| **Total lectures** | | 42 |

**Evaluation Scheme:**

| S.No. | Exam | Marks | Duration | Coverage/Scope of Examination |
|---|---|---|---|---|
| 1 | Test-1 | 12 | 1Hr. | Syllabus covered upto T-1 |
| 2 | Test-2 | 25 | 1 ½ hr. | Syllabus covered upto T-2 |
| 3 | Test-3 | 35 | 2 Hrs. | Syllabus covered upto T-3 |
| 4 | | 25 | Entire Semester | Regularity – 5 Assignments – 10 Quizzes – 10 |

**Text Book(s):**

1. "Operating System Concepts" 9th Edition by Silberschatz, Peter Galvin, Greg Gagne, Wiley Asia Student Edition.
2. "Operating Systems: Internals and Design Principles" 9th Edition, William Stallings, Pearson.
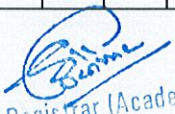
**Reference Book(s):**

1. "Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, Irwin Publishing
2. "Operating Systems: A Modern Perspective" 2nd Edition by Gary J. Nutt, Addison-Wesley
3. Design of the Unix Operating Systems, 8th Edition by Maurice Bach, Prentice-Hall of India.
4. Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reilly and Associates

**Course Outcomes (COs) contribution to the Programme Outcomes(POs)**

| Course outcomes (Operating System ) | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 | PO-8 | PO-9 | PO-10 | PO-11 | PO-12 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-1 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 3 | 1 | 3 | 2.4 |
| CO-2 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 2 | 2 | 3 | 1 | 3 | 2.5 |
| CO-3 | 3 | 3 | 3 | 2 | 2 | 3 | 1 | 2 | 3 | 3 | 1 | 3 | 2.4 |
| CO-4 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 1 | 3 | 2.6 |
| CO-5 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 1 | 3 | 2.6 |
| CO-6 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 3 | 1 | 3 | 2.5 |
| Average | 3 | 3 | 3 | 2 | 2.7 | 2.8 | 2 | 2 | 2.5 | 3 | 1 | 3 | |

90

# Operating Systems Lab

COURSE CODE: 07B51CI708

COURSE CREDITS: 1

CORE/ELECTIVE: CORE

L-T-P: 0-0-2

**Pre-requisite:** Introduction to Computer Programming, Basics of Data Structures

**Course Objective:** To study and develop various programming assignments to study operating system and its functions.

**Course Outcomes:**

| S.No. | Course Outcomes | Level of Attainment |
|-------|-----------------|---------------------|
| CO-1 | Understand the Requirement Engineering. Identifying the Requirements from Problem Statements for a case study. | Familiarity |
| CO-2 | To understand the working of UML tools. Create and edit UML diagrams (Requirement Engineering, Design Tools,) and Reverse engineering tools. | Assessment |
| CO-3 | To understand the E-R Modeling. To draw UML diagrams for a case study. | Assessment |
| CO-4 | To understand the Structured analysis/ structured design (SA/SD). To draw Data Flow Diagrams for a case study | Assessment |
| CO-5 | To Understand the User Interface Design | Assessment |
| CO-6 | Analyze and Apply project management techniques for a case study | Usage |

**Lab Content:**

| S. No | Topics | Hours |
|-------|--------|-------|
| 1 | Basic System Call | 4 |
| 2 | Process Management | 4 |

| | | |
|---|---|---|
| 3 | Process Scheduling Algorithms | 6 |
| 4 | Resource Utilization, Deadlock Handling Problems | 4 |
| 5 | Page replacement algorithms | 6 |
| 6 | Memory Management | 4 |
| | Total | **28** |

**References:**

1. Tanenbaum, A.S. (1990). Structured Computer Organisation. Prentice-Hall (3rd ed.).
2. Patterson, D. & Hennessy, J. (1998). Computer Organisation and Design. Morgan Kaufmann (2nd ed.).
3. Bacon, J. & Harris, T (2003). Operating Systems. Addison-Wesley (3rd ed.).
4. Silberschatz, A., Peterson, J.L. & Galvin, P.C. (1998). Operating Systems Concepts. Addison-Wesley (5th or 6th ed).
5. Leffler, S. (1989). The Design and Implementation of the 4.3BSD Unix Operating System. Addison-Wesley.
6. Solomon, D. & Russinovich, M (2000). Inside Windows 2000. Microsoft Press (3rd ed.).

**Evaluation Scheme:**

| | | |
|---|---|---|
| 1 | Mid Sem. Evaluation | 20 Marks |
| 2 | End Sem. Evaluation | 20 Marks |
| 3 | Attendance | 15 Marks |
| 4 | Lab Assessment | 45 Marks |
| | Total | 100 marks |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

## Course Outcomes (COs) contribution to the Programme Outcomes(POs)

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 1 | 1 | 2 | 2 | 1 | 3 | 3 | 2 | 2 | 2 | 2.1 |
| CO2 | 3 | 3 | 2 | 1 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2.2 |
| CO3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 1 | 2 | 2 | 2.2 |
| CO4 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 3 | 2.6 |
| CO5 | 3 | 3 | 1 | 2 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2.3 |
| C06 | 3 | 1 | 3 | 2 | 1 | 2 | 3 | 3 | 2 | 3 | 2 | 1 | 2.2 |
| Average | 3 | 2.7 | 2 | 1.8 | 1.8 | 2 | 2.3 | 3 | 2.2 | 2.2 | 2 | 2 | 2.3 |

# 11B1WCI833: Parallel Computing Algorithms

**Course Credit: 3**

**Semester: VIII**

## Introduction

Parallel programming developed as a means of improving performance and efficiency in a parallel program, the processing is broken up into parts, each of which can be executed concurrently. The instructions from each part run simultaneously on different CPUs. These CPUs can exist on a single machine, or they can be CPUs in a set of computers connected via a network. Parallel programming is an efficient form of information processing which emphasizes the exploitation of concurrent events in the computing process. The objective of the subject is to provide the knowledge and basic applications of parallel processing concepts, parallel environments and architectures, parallel algorithms and parallel programming. The format of the course will be lecture-discussions, assignments. Students are strongly encouraged to participate actively in class discussions.

## Course Objectives (Post-conditions)
### Knowledge objectives:
At the conclusion of the course, following learning objectives are expected to be achieved:

1. Describe different parallel processing architectures based on relationships between processing elements, instruction sequence, memory and interconnected network
2. Identify algorithms, which require parallelization as part of system design or performance enhancement
3. Classify shared and distributed memory parallel systems according to their properties and usage models
4. Design and develop parallel algorithms for shared and distributed memory models
5. Evaluate the performance of parallel algorithms designed based on shared and distributed memory models as well as against serial based algorithm designs

## Application objectives:

The homework portions of the course are intended to help you apply your understanding,

1. Ability to acquire and apply fundamental principles of science and engineering
2. Ability to apply parallel programming constructs to make software execution parallel
3. Ability to think about different phenomenon in nature for their occurrence in parallel.

## Expected Student Background (Preconditions)

Students are expected to have a solid grasp of the fundamentals of computer system, including a basic understanding of the operation of the computer, especially CPU. In addition, students are expected to know application development environment and programming concepts. Assembly programming ability will be helpful, as we will be looking to understand architecture of contemporary computers.

## Topics Outline:

| S NO | Topics | Hrs |
|------|--------|-----|
| 1 | Introduction to Parallel Computers | 3 |
| 2 | Message-Passing Computing and Programming | 5 |
| 3 | Multithread Programming,OpenMP Programming | 5 |
| 4 | OpenMP Programming | 3 |
| 5 | Embarrassingly Parallel Computations | 5 |
| 6 | Partitioning and Divide-and-Conquer Strategies | 5 |
| 7 | Pipelined Computations and Synchronous Computations | 5 |
| 8 | Load Balancing and Termination Detection | 5 |
| 9 | Sorting Algorithms | 3 |
| 10 | Numeric Algorithms | 3 |
| | **Total** | 42 |

## References
1. Barry Wilkinson and Michael Allen, "Parallel Programming: Techniques and Applications Using Networked Workstations and Parallel Computers", Pearson Prentice Hall, 2004. (Textbook) .
2. Multi-Core Programming - Increasing Performance through Software Multi-Threading, Shameem Akhter and Jason Roberts, Intel Press 2006.
3. Parallel Programming in C with MPI and OpenMP, Michael J. Quinn, McGraw Hill 2003.

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat 228 stt. Solan (H.P.)

IQAC
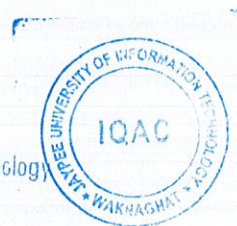
**Evaluation Scheme:**

| S.No | Examination | Marks |
|------|-------------|-------|
| 1 | T-1 | 15 |
| 2 | T-2 | 25 |
| 3 | T-3 | 35 |
| 4 | *Internal Marks | 25 |

*Internal Marks Breakdown:

| | |
|---|---|
| Assignments | 9 marks (3x3) |
| Quizzes | 12 marks (3x4) |
| Regularity | 4 Marks |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

229

# 10B17PH171 Physics Lab-I

## Course Goal

At the end of the lab course, the students will have the test of all knowledge through experiments. Students will gain sufficient scientific understanding of different phenomena associated with the respective theory paper Physics -I.

## Course Objectives

1. **The Art of Experimentation:** The introductory laboratory engages each student in significant experiences with experimental processes, including some experience in investigation.
2. **Experimental and Analytical Skills:** The laboratory help the student develop a broad array of basic skills and tools of experimental physics and data analysis.
3. **Conceptual Learning:** The laboratory help students master basic physics concepts.
4. **Understanding the Basis of Knowledge in Physics:** The laboratory help students understand the role of direct observation in physics and to distinguish between inferences based on theory and the outcomes of experiments.
5. **Developing Collaborative Learning Skills:** The laboratory helps students to develop collaborative learning skills that are vital to success in many lifelong endeavors.

## Course Outcomes:

The student after doing this laboratory course will have
- insight of core Physics-I theory course
- ability to correlate their theoretical knowledge with experiment directly.
- working knowledge and principle of various instruments
- the aptitude to design new experiment.

## Course Evaluation:

| | |
|---|---|
| Day to day work 60%: Break-up of Day to day work will be as follows:<br>(i)  Attendance 15%<br>(ii)  Quantity & Quality of Experiments including Performed, Learning laboratory Skills and handling Laboratory Equipment, Instruments, Gadgets, Components, Materials and Software etc. 30%<br>(iii)  Laboratory record 15%. | 60 |
| Mid Term Test (Viva + performance) | 20 |
| End Term Test (Viva + Performance) | 20 |
| **Total marks** | **100** |

## List of Experiments

## Lab-wise Breakup

| Subject Code | 10B17PH171 | | Semester | 1 |
|---|---|---|---|---|
| Subject Name | Physics Lab - I | | | |
| Credits | 1 | | Contact Hours | 2 |

| Module No. | Subtitle of the Module | Topics | No. of Lab Hours |
|---|---|---|---|
| 1. | Interference | To determine the wavelength of sodium light by measuring the diameters of Newton's Rings | 4 |
| 2. | Interference | To find the wavelength of sodium light using Fresnel's biprism. | 4 |
| 3. | Diffraction | To measure the wavelengths of certain lines in the spectrum of the mercury lamp using plane transmission grating. | 4 |
| 4. | Dispersion | To determine the dispersive power of the material of prism with the help of a spectrometer. | 4 |
| 5. | Magnetism | To determine the magnetic susceptibility of a given paramagnetic liquid using Quinck's method. | 4 |
| 6. | Polarization | To find the specific rotation of sugar solution by using a half shade polarimeter. | 4 |
| 7. | Polarization | To find the specific rotation of sugar solution by using a biquartz polarimeter. | 4 |
| | | **Total number of Lab Hours** | 28 |

| Recommended Reading (Books/Journals/Reports/Websites etc.: Author(s), Title, Edition, Publisher, Year of Publication etc. in IEEE format) | |
|---|---|
| 1. | S. P. Singh, Advanced Practical Physics, Pragati Prakashan, Vol. 1 (2013). |
| 2. | C. L. Arora, Practical Physics, S. Chand Company Limited, 20th edition (2004). |
| 3. | N. Subrahmanayam, Brij Lal and M.N. Avadhanulu, A Text Book of Optics, S. Chand (2012) |
| 4. | Ajoy Ghatak, Optics, Tata McGraw Hill, 5th addition, (2012) |
| 5. | F.A. Jenkins and H.E. White, Fundamentals of Optics, McGraw-Hill (1981). |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

IQAC

# 10B17PH271 Physics Lab-II

## Course Goal

At the end of the lab course, the students will have the test of all knowledge through experiments. Students will gain sufficient scientific understanding of different phenomena associated with the respective theory paper Physics-II.

## Course Objectives

1. **The Art of Experimentation:** The introductory laboratory engages each student in significant experiences with experimental processes, including some experience in investigation.
2. **Experimental and Analytical Skills:** The laboratory help the student develop a broad array of basic skills and tools of experimental physics and data analysis.
3. **Conceptual Learning:** The laboratory helps student's to understand basic physics concepts.
4. **Understanding the Basis of Knowledge in Physics:** The laboratory help students understand the role of direct observation in physics and to distinguish between inferences based on theory and the outcomes of experiments.
5. **Developing Collaborative Learning Skills:** The laboratory helps students to develop collaborative learning skills that are vital to success in many lifelong endeavors.
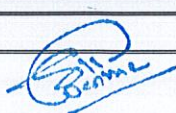
## Course Outcomes:

The student after doing this laboratory course will have
- insight of core Physics-II theory course
- ability to correlate their theoretical knowledge with experiment directly.
- working knowledge and principle of various instruments
- the aptitude to design new experiment.

## Course Evaluation:

| | |
|---|---|
| Day to day work 60%: Break-up of Day to day work will be as follows:<br>(i) Attendance 15%<br>(ii) Quantity & Quality of Experiments including Performed, Learning laboratory Skills and handling Laboratory Equipment, Instruments, Gadgets, Components, Materials and Software etc. 30%<br>(iii) Laboratory record 15%. | 60 |
| Mid Term Test 20% (Viva + performance) | 20 |
| End Term Test 20% (Viva + Performance) | 20 |
| **Total marks** | **100** |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

<div align="center">

**List of Experiments**
**Lab-wise Breakup**

</div>

| Subject Code | 10B17PH271 | | Semester | 2 |
|---|---|---|---|---|
| Subject Name | Physics Lab - II | | | |
| Credits | 1 | | Contact Hours | 2 |

| Module No. | Subtitle of the Module | Topics | No. of lab Hours |
|---|---|---|---|
| 1. | Optical Fiber | To determine the numerical aperture, losses, attenuation coefficient E-O and O-E convertor characteristics of an optical fibre using LED as a light source. | 4 |
| 2. | Solid state Physics | To measure resistivity of semiconductor and band gap of the semiconductor using four probe method. | 4 |
| 3. | Solid state Physics | To study Hall effect in semiconductor and determination of its allied parameters. | 4 |
| 4. | Electromagnetism | To calculate the e/m ratio for an electron using Thomson method/Bar magnet method | 4 |
| 5. | Solid state Physics | To study magnetostriction in magnetic materials using He-Ne laser. | 4 |
| 6. | Solid state Physics | To study the coercivity, saturation magnetization, retentivity of given materials. | 4 |
| 7. | Solid state Physics | Experimental Determination of Planck's constant using Light Emitting Diodes (LEDs) and Photoelectric Effect. | 4 |
| | | **Total number of Lab hours** | **28** |

| Recommended Reading (Books/Journals/Reports/Websites etc.: Author(s), Title, Edition, Publisher, Year of Publication etc. in IEEE format) | |
|---|---|
| 1. | S. P. Singh, Advanced Practical Physics,Pragati Prakashan, Vol. 1 (2013). |
| 2. | C. L. Arora, Practical Physics, S. Chand Company Limited, 20th edition (2004). |
| 3. | Charles Kittel, Introduction to Solid State Physics. John Wiley & Sons, 8th edition 2005. |
| 4. | S. O. Pillai, Solid State Physics, New age international publishers, 7th edition (2016). |
| 5. | Gerd Keiser, Optical Fiber Communication, Tata McGraw-Hill, 5th edition (2013). |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

IQAC

# 10B11PD111 Presentation and Communication Skills

## Course Goals

This course is aimed to equip students of engineering with effective oral and written communication. In this course, students will learn some theoretical inputs into the process of communication, its different types, and the difference between written and oral communication, and presentation skills, the process of writing, its different types and the correct format of business documents.

## Course Objectives

1. Analyze communication situations and audiences to make choices about the most effective and efficient way to communicate and deliver messages.
2. Understand the nature, scope, and power of communication processes.
3. Deliver effective presentations in contexts that may require power point, extemporaneous or impromptu oral presentations
4. Provide feedback, accept feedback, and use feedback to improve communication skills
5. Understand the nature, importance, and process of written communication.
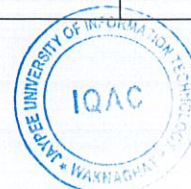6. Write grammatically correct business documents using appropriate business style.

## • **Detailed Syllabi**

### Lecture-wise Breakup

| Subject Code | 10B11PD111 | Semester | 1 | |
|---|---|---|---|---|
| Subject Name | Presentation and Communication skills | | | |
| Credits | 3 | Contact Hours | 3 | |
| Faculty (Names) | Coordinator(s) | 1.Dr. Tanu Sharma | | |
| | Teacher(s) (Alphabetically) | 1. Dr Tanu Sharma  2. Dr Papiya Lahiri | | |
| Module No. | Subtitle of the Module | Topics | | No. of Lectures |
| 1 | Concept and Nature of | What is communication? | | 6 |

| | | Communication | Stages of communication Ideation, encoding, transmission, decoding & response Channels of communication Downward, upward, horizontal & diagonal Communication in organizational settings Internal & external Barriers to effective communication Guidelines to overcome communication barriers | |
|---|---|---|---|---|
| 2 | Listening | | The listening process Listening with a purpose Barriers to listening Effective listening strategies | 3 |
| 3 | Non verbal communication | | What is non-verbal communication Gesture cluster Acoustic features | 6 |
| 4 | Effective presentation | | Pre- presentation jitters Preparation and practice Delivering the presentation Qualities of a skilful presenter Capturing and maintaining attention Handling questions Power point presentations | 6 |
| 5 | Technical Writing Process | | Selection of words Construction of clear sentences & paragraphs Using unbiased language Principals of effective writing | 6 |
| 6a | Writing Neutral, positive and Negative messages | | Neutral message Positive message Negative message | 3 |
| 6b | Writing Persuasive messages | | Persuasive message | 3 |
| 7 | Technical Communication: | | | 3+6 |
| | | • Report writing | Importance, structure, drafting of reports, Sales letters, claim and adjustment letters, inviting/sending quotations, Tenders, Memorandum, Job Application, Project Reports * | |
| | | • Business Writing | letter, Preparing a personal resume, notices, agenda and minutes of meeting | |
| | | | **Total Hours** | 42 |

**\*For Project Report writing faculty from ECE, CSE, IT, CE, BI and BT to be engaged.**

## Methodology

The course will be delivered with the help of lectures, interactive sessions, extemporize, presentations, cases and introspection. Students will be engaged in Language lab where they will develop listening skills, comprehension and grammar.

## Evaluation

| Sr. No. | Components | Total Marks |
|---------|-----------|-------------|
| 1 | **Test 1** | 15 |
| 2 | **Test 2** | 25 |
| 3 | **Test 3** | 35 |
| 4 | **Internal Assessment** | Total 25 |
|   | Group Presentation | 8 |
|   | Individual Presentation | 6 |
|   | Tutorial  activities | 8 |
|   | Language lab activities | 3 |

| **Recommended Reading** (Books/Journals/Reports/Websites etc.:  Author(s), Title, Edition, Publisher, Year of Publication etc. in IEEE format) | |
|---|---|
| **1.** | Williams, K., Krizan, A. C., Logan, J. & Merrier, P. (2011) *Business Communicating in Business 8th Ed*. New Delhi: Cengage Learning. |
| **3.** | Murphy, Herta A., Herbert Hildebrandt, Jane Thomas (2008) *Effective Business Communication 7th Ed*. New Delhi:Tata Mcgraw Hill Education Private Limited. |
| **4.** | Guffey, M. A. (2000) *Business Communication: Product & Process* South-Western College Publishing. |
| **5.** | Lesikar, R. V., Flatley, M.E., Rentz, K. & Pande, N. (2009) Business communication 11th Ed. New Delhi: Mc Graw Hill. |
| **6.** | Business correspondence and Report Writing: by R. C. Sharma & Krishna Mohan |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

## 10B11MA411    PROBABILITY THEORY AND RANDOM PROCESSES

*Lectures 3 Tutorials 1 Practical 2 **Credits 5***

**For CSE, ECE and IT**

**Pre-requisites:** Basic knowledge of calculus-based integration (10B11MA111)

**Objective:** To provide the students with knowledge about the random variable, random process to build and analyze probabilistic models in both the discrete and continuous contexts of engineering applications.

**Course Assessment:**

| | | |
|---|---|---|
| Teacher Assessment (Based on Assignments, quizzes etc.) | 25 | Duration |
| Test 1 | 15 | 1 Hour |
| Test 2 | 25 | 1 Hour 30 Min |
| End Semester Exam | 35 | 2 Hours |
| Total | 100 | |

**Course Outcomes:** On successful completion of this course, the students should will be able to gain enough knowledge and understanding of the essentials of the probability and random processes; able to identify and associate a suitable probability model for a problem in reality:

| | |
|---|---|
| CO-1 | Construct sample spaces of random experiments; identify and specify events, and perform set operations on events; compute probabilities by counting; evaluate conditional probability, and apply Bayes' theorem to simple situations. |
| CO-2 | Understand the axiomatic approach of probability theory and intrinsic need of (functions of) random variables for the analysis of random phenomena; express discrete random variables by using CDFs, PMFs; calculate moments related to random variables; understand the concept of inequalities and probabilistic limits; compute reliability measures associated with a system. |
| CO-3 | Compute probability distributions and correlation measures of bivariate random variables; obtain marginal and conditional distributions of random variables; find probabilities for outcomes of various events related to an uncertain phenomenon using appropriate probability distributions as models. |
| CO-4 | Identify and classify random processes and determine covariance and spectral density of stationary random processes; demonstrate specific applications to special processes such as Poisson, discrete-time Markov chain, and Gaussian processes - identify appropriate stochastic process model(s) for a given applied problem. |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

Probability and Random Processes (10B11MA411) CO Revised

**Probability**: Random experiments, sample space, events. Three basic approaches to probability, combinatorial probability problems. Conditional probability, total probability theorem, Bayes' theorem. [CO-1]

**Random variables**: Univariate random variables – discrete, continuous and mixed random variables, probability distributions (mass function, density function and cumulative distribution function and conditional distributions). Mathematical expectation, moments and moment generating function and characteristic function of random variables. Chebyshev's inequality. Bivariate random variables - joint, marginal, conditional distributions and generating functions, covariance and correlation. Transformations of random variables - distribution function technique, inverse mappings and method of moment generating function. [CO-2, CO-3]

**Special distributions**: Bernoulli, binomial, Poisson, exponential, gamma, Earlang, Chi-square, geometric, negative binomial, uniform, beta, normal, log-normal, Rayleigh, Rician and Weibull distributions. [CO-2, CO-3]

**Reliability:** Introduction, reliability measures - reliability function, hazard rate function, mean-time-to-failure (MTTF), residual life with the reliability models of exponential and weibull distributions. [CO-2]

**Random processes:** Introduction and classification of random processes. Ensemble (statistical) averages – mean function, autocorrelation (crosscorrelation) function, autocovariance (crosscovariance) function. Stationary processes – strict-sense stationary (SSS) process and wide-sense stationary (WSS) process with properties of autocorrelation function. Ergodic processes – time averages. Markov processes - Markov chains – transition probability matrix, state-diagram and steady-state probabilities. Processes with independent and stationary increments: Poisson process with-distributions of interarrival and waiting times, Brownian motion – simple random walk. Gaussian process - covariance matrix. Linear system with random inputs - system in the form of convolution, power spectral density, noise in communication systems, white Gaussian noise and idea of filters. [CO-4]

## Text Books:

1. Oliver C. Ibe: ``Fundamentals of applied probability and random processes'', Academic press, 2005.
2. A. Papoulis and S. U. Pillai: ``Probability, random variables and stochastic processes'', Tata McGraw-Hill, 4$^{th}$ Edition, 2002.

## Reference Books:

1. Henry Stark and John W. Woods: ``Probability and random processes with applications to signal processing'', Pearson education, 3$^{rd}$ edition, Asia, 2002
2. T. Veerarajan: ``Probability, statistics and random processes'', Tata McGraw-Hill, 2008.

# Course Description

**Course Name:** PROJECT MANAGEMENT

**Course Code:** 10B11 PD611

**Course Credit:** 3

**Semester:** 6

**Course Type:** Core (All B. Tech. students)

**Department:** Humanities and Social Sciences

**Course Coordinator:** Dr Sakshi Khanna

**Course Objectives:** The purpose of this course is to lay the foundation for a firm understanding of project management concepts and principles and to acquaint students with the complexity and challenge of managing public or private projects with stringent schedules and limited resources. Students will gain a sound understanding of project management concepts and principles by applying relevant tools and techniques and by their involvement in case studies and exercises to assimilate that knowledge.

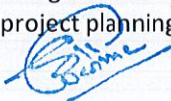**Learning Outcomes:** At the completion of the course, the learner should be able to:

1. Distinct between management of projects and operational activities.
2. Screen and select projects.
3. Assess the costs, people, time and quality associated with the projects.
4. Apply quantitative tools and techniques for risk management, budgeting and scheduling.
5. Appreciate the critical role of human resources in successful management of projects.

## Course Outline

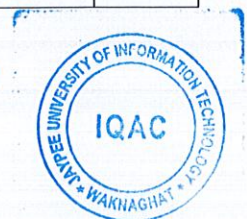| Sr. No. | Chapter | Learning Outcomes | Hours |
|---|---|---|---|
| 1 | **Introduction**<br><br>• The Definition of a "Project<br>• The Relationships Among Portfolios, Programs, and Projects<br>• Why Project Management<br>• The Project Life Cycle<br>• Role of the Project Manager<br>• Responsibilities and Competencies of the Project Manager<br><br>**TB1 : pgs 9-12**<br><br>**TB2: pgs 2-18; 38-41** | • Understand the characteristics and structure of projects ; distinguish with operations<br>• Comprehend the variation of activities through the project phases<br>• Identify with the criticality of project manager's role | 4 |
| 2 | **Selection of project**<br><br>• Project Selection and Criteria of Choice | • Understand the systematic process of | 3 |

| | | | |
|---|---|---|---|
| | • The Nature of Project Selection Models<br>• Types of Project Selection Models<br><br>**TB1 : pgs 40 -46** | • project selection<br>• knowledge of the criteria used in project selection | |
| 3 | **Risk analysis of the project**<br><br>• Analysis under Uncertainty—The Management of Risk<br>• Identify Risks: Inputs; Tools and Techniques<br>• Quantitative Risk Analysis: Tools and Techniques<br>• Plan and Control Risk Responses<br><br>**TB1 : pgs 58;**<br>**TB2 : pgs 319-324;  335,336; 343** | • Ability to identify the various type of risks in execution of project<br>• Knowledgeable about risk mitigation strategies | 4 |
| 4 | **Project organization**<br><br>• The Project in the Organizational Structure<br>• The Project as Part of the Functional Organization<br>• Pure Project Organization<br>• The Matrix Organization<br>• Mixed Organizational Systems<br>• Choosing an Organizational Form<br>• The Project Team<br>• Human Factors and the Project Team<br>**TB1 : pgs  191-217**<br>**TB2 : 255 -284** | • Knowledgeable about the various forms of organizing the project<br><br>• Analyse the pros and cons of each organizational design | 4 |
| 5 | **Planning the project**<br><br>• Project Activity Planning 239<br>• Initial Project Coordination and the Project Plan 242<br>• Systems Integration 251<br>• The Action Plan 252<br>• The Work Breakdown Structure and Linear Responsibility Chart 261<br>• Plan Scope Management: Define, Inputs., Tools and Techniques, Output<br>**TB1 : pgs  239-261** | • Comprehend the criticality of project planning<br><br>• Understand the systematic process of planning the projects<br><br>• Design documents which facilitate project planning | 5 |

| | TB2 : pgs 107 -109 | | |
|---|---|---|---|
| 6 | **Budgeting and financing the project**<br><br>• Estimating Project Budgets<br>• Improving the Process of Cost Estimation<br>• Plan Cost Management: Inputs, Tools and techniques, outputs, control process<br><br><br><br>TB1 : pgs  294 -305<br>TB2 : pgs 195 -220 | • Ability to develop project budgets<br>• Analyse the process of cost estimation | 4 |
| 7 | **Scheduling (Gantt chart, PERT, CPM)**<br><br>• Plan Schedule Management : Inputs, Tools and Techniques, Outputs<br>• Define Activities , Sequence Activities<br>• Network Techniques: PERT (ADM) and CPM (PDM) 337<br><br>TB1 : pgs  337-365<br>TB2 : pgs 145 -156 | • Awareness about the criticality of project schedule<br>• Learn the techniques for  project scheduling | 6 |
| 8 | **Resource allocation and monitoring**<br><br>• Resource Allocation<br>• Crashing a Project<br>• The Resource Allocation Problem<br>• Resource Loading  and Levelling<br>• Goldratt's Critical Chain<br>• Project procurement management<br><br>TB1 : pgs  383 -415<br>TB2 : 355 -366 | • Understand the basics of resource allocation for the project<br>• Discern the trade offs of time and cost in context to project crashing | 4 |
| 9 | **Project control**<br><br>• The Planning-Monitoring-Controlling Cycle<br>• Information Needs and Reporting<br>• Fundamental Purposes of Control<br>• Three Types of Control Processes<br>• The Design of Control Systems Control: A Primary Function of Management<br>• Control of Change and Scope Creep<br><br>TB1 : pgs  436 -501 | • Understand the systems for project control<br>• Develop an understanding about the factors that are pertinent to project control | 4 |

| 10 | Project completion | | 2 |
|---|---|---|---|
| | • The Varieties of Project Termination<br>• When to Terminate a Project<br>• The Termination Process<br>• The Final Report—A Project History<br><br>**TB1 : pgs 552-556** | • Aware of the importance of pursuing activities for the fine finish of the project<br>• Knowledgeable about the components that are vital to develop the project history | |

## Methodology

The lecture will focus the basic concepts and tutorials will focus real project problems, case-studies and will be computer biased (like use of MS-Project software).

## Evaluation

| Sr. No. | Components | Weightage |
|---|---|---|
| 1 | Test 1 | 15 |
| | Test 2 | 25 |
| 2 | Test 3 | 35 |
| 3 | Internal assessment<br>• Quiz<br>• Individual assignment (written)<br>• Class Participation<br>• Attendance | Total 25<br>10 Marks<br>5 Marks<br><br>5 Marks<br>5 Marks |

- Learning outcome nos. 1, 3 and 5 will be tested through presentations, role play and group discussion
- Learning outcome no. 2 will be tested in mid semester exam.
- Learning outcome no., 4 will be tested in class test, software application and end semester exam.

## Text Book

1. Project Management – A Managerial Approach – *Jack R. Meredith and Samuel J. Mantel, Jr.* Seventh edition, Wiley Publications **[TB1]**

2. A Guide to the Project Management Body of Knowledge (PMBOK® Guide) – Fifth Edition published by Project Management Institute, Inc (USA). **[TB2]**

## Suggested Readings

1. Project Management – A Managerial Approach – *Jack R. Meredith and Samuel J. Mantel, Jr.*
2. Project Management – System Approach to Planning, Scheduling and Controlling – *Harold Kerzner.*
3. Project Management – *Harvey Maylor.*
4. Projects – Planning, Analysis, Financing, Implementation and Review – *Prasanna Chandra.*

4

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

IQAC

5. Practical Project Management – *R.G. Ghattas and Sandra L. McKee*.
6. Project Management – *Garry R. Heerkens*.

**Online Resources**

- http://www.projectminds.com/
- http://www.projectmanagement.com/
- http://www.projectsatwork.com/
- http://www.pmi.org/
- http://managementhelp.org/projectmanagement/
- office.microsoft.com/en-in/project/
- www.emeraldinsight.com/journal/ijmpb
- www.cio.com/.../project-management/12-common-project-management

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

5

# Robotic Systems and Control

COURSE CODE: 18B1WEC737

COURSE CREDITS: 3

CORE/ELECTIVE: ELECTIVE

L-T-P: 3-0-0

Pre-requisite: Differential equations and Linear algebra, knowledge of Control Systems

Course Objectives:

1. The Robotics' chief objective has always been associated with working for new and updated technologies for example embedded systems, microcontrollers and VLSI.
2. To use the robotic system for logic building & programming and to solve many engineering problems.

Course Outcomes:

| S. No. | Course Outcomes | Level of Attainment |
|---|---|---|
| CO-1 | Students will be equipped with the automation and brief history of robot and applications. | Familiarity |
| CO-2 | Students will be equipped with the principles of various sensors, actuators and their applications in robots. | Assessment |
| CO-3 | Be able to analyze any physical system using mathematical model. | Assessment |
| CO-4 | Be able to do the path planning on robotic systems using various control strategies. | Assessment |
| CO-5 | Students will be equipped with the simulation and hands on robotic kits | Usage |

Course Contents:

| Unit | Contents | Lectures required |
|---|---|---|
| 1 | Introduction to Robotics: Introduction – brief history, types, classification and usage, Science and Technology of robots, textbooks and research journals, introduction to simulation environment. | 3 |
| 2 | Elements of Robots -- joints, links, actuators, and sensors: Position and orientation of a rigid body, Homogeneous transformations, Representation of joints, link representation using D-H parameters, Examples of D-H parameters and link transforms, different kinds of actuators – stepper, DC servo and brushless motors, model of a DC servo motor, Types of transmissions, Purpose of sensors, internal and external sensors, common sensors – encoders, tachometers, strain gauge based force- torque sensors, proximity and distance measuring sensors, and vision. | 10 |
| 3 | Robot Arm Kinematics and Dynamics: forward kinematics, Inverse kinematics, Lagrange formulation of dynamics | 8 |
| 4 | Motion Planning and Control: Joint and Cartesian space trajectory planning and generation, Classical control concepts using the example of control of a single link, Independent joint PID control, Control of a multi-link manipulator, Non-linear model based control schemes, Simulation and experimental case studies on serial and parallel manipulators | 10 |
| 5 | Modeling and Control of Flexible Robot Manipulators: Models of flexible links and joints, Kinematic modeling of multi-link flexible robots, Dynamics and control of flexible link manipulators, Numerical simulations studies | 6 |
| 6 | Robot Programming: MATLAB and other simulation platforms, Hands on experiment on robotic kits, working and implementing various Ad-on modules. | 5 |
| | Total lectures | 42 |

Approved in Academic Council held on 25.10.2018

Suggested Text Book(s):
1. J. J. Craig, "Introduction to Robotics- Mechanics and Control", Pearson, 3$^{rd}$ Edition, 2009.
2. Spong and Vidyasagar, "Robot Dynamics and Control", Wiley Student Edition, John Wiley and Sons, 2013.

Suggested Reference Book(s):

1. Sciavicco and Siciliano, "Modeling and Control of Robot Manipulators", Springer, 2$^{nd}$ Edition, 2002.
2. D.K. Pratihar, "Fundamentals of Robotics", Narosa Publishing House, 1$^{st}$ Edition, 2017.

Other useful resource(s):

1. Link to NPTEL course contents: https://nptel.ac.in/courses/112101099/
2. Other links to course material: https://nptel.ac.in/downloads/112101098/
3. Material provided by IIT Bomaby under eLSI project

Evaluation Scheme:

| S. No | Exam | Marks | Duration | Coverage / Scope of Examination |
|---|---|---|---|---|
| 1 | T-1 | 15 | 1 Hour. | Syllabus covered upto T-1 |
| 2 | T-2 | 25 | 1.5 Hours | Syllabus covered upto T-2 |
| 3. | T-3 | 35 | 2 Hours | Entire Syllabus |
| 4. | Teaching Assessment | 25 | Entire Semester | Assignments (2) - 10<br>Quizzes (2)   - 10<br>Attendance - 5 |

Course Outcomes (COs) contribution to the Programme Outcomes (POs)

| Course outcomes (Robotic Systems and Control) | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 | PO-8 | PO-9 | PO-10 | PO-11 | PO-12 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-1 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 3 | 3 | 1.9 |
| CO-2 | 3 | 3 | 3 | 2 | 3 | 2 | 1 | 1 | 1 | 1 | 2 | 3 | 2 |
| CO-3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 3 | 2 | 2 | 3 | 2.6 |
| CO-4 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 2 | 2 | 3 | 3 | 2.5 |
| CO-5 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 2 | 1 | 2 | 3 | 2.4 |
| Average | 3 | 3 | 2.8 | 2.6 | 2.8 | 2.6 | 1.6 | 1 | 1.8 | 1.6 | 3 | 3 | |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

Approved in Academic Council held on 25.10.2018

# SIGNALS AND SYSTEMS
## (Core Subject)

| Course Code: | 10B11EC301 | Semester: | 3$^{rd}$ Semester, B. Tech (ECE) <br> 4$^{th}$ Semester, B. Tech (CSE/IT) |
|---|---|---|---|
| Credits: | 4 | Contact Hours: | L-3, T-1, P-0 |

## Course Objectives

1. To study the properties and representation of discrete and continuous signals.
2. To study the analysis and synthesis of discrete time systems.
3. To study the sampling process and analysis of discrete systems using z-transforms.
4. To represent periodic signals using Fourier series
5. To find the spectral components of signals using Fourier transform
6. To analyze continuous signals using Laplace transform
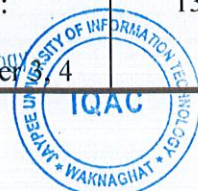7. To analyze discrete signals using z- transform.

## Course Outcomes

Students will be able to

1. Classify signals and systems based on their properties and determine the mathematical representations of signals and systems.
2. Explain the role of convolution in the analysis of LTI systems and also able to formulate and solve differential /difference equations describing LTI systems.
3. Analyze the spectral characteristics of signals using Fourier analysis and analyze system properties based on impulse response and Fourier analysis.
4. Apply the Laplace transform and Z- transform for analysis of continuous-time and discrete-time signals and systems.
5. Understand the process of sampling and the effects of under sampling.

## Course Contents

| Unit | Topics | References (chapter number, page no. etc) | Lectures |
|---|---|---|---|
| 1. | Continuous-time and discrete-time signals, signal energy and power, periodic signals, even-odd signals, exponential and sinusoidal signals, Unit impulse and step functions, continuous and discrete time systems, System classifications, system properties. | A.V. Oppenheim: Chapter 1 <br> B.P. Lathi: Chapter 1 & 8 | 8 |
| 2. | Convolution integral and convolution sum, properties of LTI systems, LTI systems described by differential and difference equation, response of LTI systems. | A.V. Oppenheim: Chapter 2 <br> B.P. Lathi: Chapter 2 & 9 | 5 |
| 3 | Fourier series representation of continuous and discrete time signals, properties, Fourier | A.V. Oppenheim: Chapter 3-5 <br> B.P. Lathi: Chapter 3, 4 | 13 |

| | | & 10 | |
|---|---|---|---|
| 4 | The Laplace Transform, ROC, properties of Laplace-transform, analysis and characterization of LTI systems using Laplace Transform. | A.V. Oppenheim : Chapter 9 B.P. Lathi: Chapter 6 | 6 |
| 5 | The z-transform, ROC and pole-zero-plot, properties of z-transform, analysis and characterization of LTI systems using z-transform. Stability criterion. | A.V. Oppenheim : Chapter 10 B.P. Lathi: Chapter 11 | 7 |
| 6 | Sampling, types of sampling, Analog to digital conversion, Signal reconstruction. | A.V. Oppenheim : Chapter 7 B.P. Lathi: Chapter 5 | 3 |
| | **Total Number of Lectures** | | 42 |

## Evaluation Scheme

1. Test 1 : 15 marks
2. Test 2 : 25 marks
3. Test 3 : 35 marks
4. **Internal Assessment** : 25 marks
   - 10 Marks : Class performance, Tutorials & Assignments
   - 10 Marks : Quizzes
   - 5 marks : Attendance

## Text Books

1. A.V. Oppenheim & A.S. Willsky & S.H. Nawab, "Signals & Systems", 2nd Ed., Prentice Hall.

## Reference Books

1. B.P. Lathi, "Signal Processing and Linear Systems", 2nd Ed., Oxford University Press.
2. Simon Haykin, Barry Van Veen, "Signal & Systems", 2nd Ed., John Willey and Sons.

# SIGNALS AND SYSTEMS LAB
## (Core Subject)

| Course Code: | 10B17EC307 | Semester: | 3rd Semester, B. Tech (ECE) |
| --- | --- | --- | --- |
| | | | 4th Semester, B. Tech (CSE/IT) |
| Credits: | 1 | Contact Hours: | L-0, T-0,P-2 |

## Course Objectives

The primary objective of this course is to provide a thorough understanding and analysis of signals and systems using MATLAB.

## Course Outcomes

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

1. Understand basics of MATLAB syntax, functions and programming.
2. Generate and characterize various continuous and discrete time signals.
3. Perform the basic operations on the signals.
4. Design and analyze linear time-invariant (LTI) systems and compute its response.
5. Analyze the spectral characteristics of signals using Fourier analysis.
6. Analyze the systems using Laplace transform and Z-transform.

## List of Experiments

1. Introduction to MATLAB
2. To create user defined functions for generating sinusoidal signal, delta function, unit step function and periodic signal.
3. To create user defined functions for signal operation: signal addition, time shifting, time scaling and time inversion.
4. To compute convolution of two signals and verify its properties.
5. To compute auto-correlation and cross-correlation of two signals and verify its properties.
6. To obtain the response of LTI system defined by linear constant coefficient difference equations.
7. To synthesize the periodic signal using Fourier series.
8. To analyze the spectrum of the signal using Fourier transform and verify its properties.
9. To compute and plot the impulse response and pole-zero diagram of transfer function using Laplace transform.

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

IQAC

10. To compute and plot the impulse response and pole-zero diagram of transfer function using Z-transform.

## Evaluation Scheme

| | | |
|---|---|---|
| 1. | Mid Sem. Evaluation | 20 Marks |
| 2. | End Sem. Evaluation | 20 Marks |
| 3. | Attendance | 15 Marks |
| 4. | Class response | 30 Marks |
| 5. | File | 15 Marks |
| | **Total Marks** | **100 Marks** |

## Text Books

- B.P. lathi, Linear Systems and Signals, 2$^{nd}$ Edition, Oxford University Press, India.
- Barry Van Veen & Simon Haykin "Signals and Systems, 2$^{nd}$ Edition" Willey Publishers
- Oppenheim, Alan S. Willsky, S. Hamid Nawab, "Signals and Systems". 2$^{nd}$ Edition, PHI, India.

# COURSE DESCRIPTION

| | |
|---|---|
| **Course Name:** | SIMULATION TECHNIQUES LAB |
| **Course Code:** | 16B28CI681 |
| **Course Credits:** | 1 (0-0-2) |
| **Branch and Semester:** | 6th Semester [IT] |
| **Session:** | Jan – Jun, 2018 |
| **Last updated on:** | 04-12-2017 |
| **Faculty Coordinators:** | **Dr. Rajinder Sandhu** |
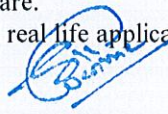
**Pre-requisite Course:** Programming experience in C/C++, working knowledge of UNIX operating system, basic probability and statistics.

**Description & Rationale:**

A laboratory course designed to provide a hands-on introduction to the development and application of simulation. Topics include an introduction to one or more discrete event simulation tools, common modeling constructs, data gathering and input data modeling, design of simulation experiments, output data analysis, and verification and validation. The design and implementation of a series of increasingly complex simulations of various discrete event systems are conducted.

**Objectives:**

- Understand basic concepts, applications and terminology of computer simulation.
- Develop ability to design and model simulations.
- Introduce students to data analysis techniques and methods.
- Develop ability to evaluate different simulation software.
- Apply simulation techniques to various examples and real life applications

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

**Course Outcomes:**

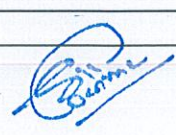| S. No. | Course outcomes ( Data Analysis and Simulation Techniques) (16B28CI681) | Level of Attainment |
|---|---|---|
| CO-1 | To learn the importance of random number generation. | Usage |
| CO-2 | To understand working of queuing model simulations | Usage |
| CO-3 | To study the goodness of fit function for different processes and nets. | Assessment |
| CO-4 | To conduct the statistical analysis of data. | Usage |

**Lab Contents:**

| S.No. | Topics | No. of Labs |
|---|---|---|
| 1 | Getting acquainted with Random number generation methods. Statistical aspects of simulations: confidence intervals, stopping criteria, variance reduction techniques. | 3 |
| 2 | Getting acquainted with in Monte Carlo Simulation. | 2 |
| 3 | Getting acquainted with Single Server Queuing Simulation | 1 |
| 4 | Getting acquainted with Multi Server Queuing Simulation | 2 |
| 5 | Getting acquainted with Poisson Process and Goodness of Fit for Poisson. | 2 |
| 6 | Getting acquainted with Binomial Process and Goodness of Fit for Binomial | 2 |
| 7 | Getting acquainted with Petri nets. | 2 |
| 8 | Getting acquainted with Statistical Analysis of Simulation Output Data | 2 |
| | | 16 |

**Tools and Technologies:**

C / C++ Compiler (Dev C++ / Borland C++ or any other suitable compiler for windows)

**Evaluation Scheme**:

| | | |
|---|---|---|
| 1. | Mid Term Exam (Viva and Written Exam) | 20 |
| 2. | End term Exam (Viva and Written Exam) | 20 |
| 3. | Lab Records | 15 |
| 4. | Regular Assessment (Quality and quantity of experiment performed, Learning laboratory skills) | 30 |
| 5. | Attendance and discipline in lab | 15 |

**Total**                                    **100**

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

## 10B11PD511 SOCIAL AND LEGAL ISSUES

**Course Goals:**

To provide a perspective of various social issues and challenges faced by Indian society. To develop awareness of basic laws related to individual and organizational set up so that students are acquainted with their rights and duties in society and in working environment.

**Course Objectives:**

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

1. Understand the basic issues and challenges that Indian society is facing today
2. Analyze the impact of technology on individuals, groups and societies.
3. Define business in ethical context and identify challenges in ethical decision making.
4. Know corporate social responsibility in Indian context and will be able to discuss the issues arising there from.
5. Understand the basics of important laws such as factory act, Consumer protection act, IT act, RTI act.
6. Use this basic knowledge in analyzing problems and issues related to individual and working environments.

## Detailed Syllabi

### Lecture-wise Breakup

| Subject Code | 10B11PD 511 | Semester | 5 | |
|---|---|---|---|---|
| Subject Name | Social and legal issues | | | |
| Credits | 3 | Contact Hours | 3 | |
| Module No. | Subtitle of the Module | Topics | | No. of Lectures |
| 1. | Three Major social concerns:<br><br>1.Challenges faced by education sector in India:<br><br>2.Crime in India | • Introduction to Indian social set up and problems faced by Indian society.<br>• Demographic and economic trends, overview of the education system and Challenges<br>• What is crime? Crime report by NCRB, | | 5+2 |

| | | | |
|---|---|---|---|
| | 3.Economic Development in India | • White collar crime: Meaning, sources, Types and examples.<br>• Crime against women: Factors- Social, Political and economical. Administrative measures to reduce crime.<br>• Recommendations of Justice J.S Verma committee suggesting amendments to law against crimes such as rape. Juvenile crime : Meaning, causes, preventive measures<br>• Features of Indian economy, Challenges faced by Indian economy | |
| 2. | Society and Technology | • Society and Economic Development, Social Impact of Technology,<br>• Dynamism between technology and culture,<br>• Impact of Globalization on society, Technology and Social change-Problems Created by technology; Technology and Crime, | 4+3 |
| 3. | Ethics and Business Engineers and ethics | • Ethics in the world of Business, Whistle –Blowing, Gender Issues in workplace,<br>• Marketing ,<br>• Advertising and Product Safety,<br>• **Business Ethics** : Business ethics – overview,<br>• Ethical decision Making in Business<br>• Globalization and Business Ethics,<br>• Employees and Business Ethics,<br>• Consumers and business ethics | 5+4 |
| 4. | Corporate Social Responsibility(CSR) | • What is CSR? Nature of CSR,<br>• CSR in an international context,<br>• Corporate social responsiveness , | 3+3 |

| 5. | Factory Act ,1942 – Overview | • Important provisions,<br>• The Inspecting staff, Health, Safety, Provisions relating to Hazardous Processes,<br>• Welfare measurers,<br>• Working hours of adults,<br>• Special Provisions,<br>• Penalties and Procedure. | 3+1 |
|---|---|---|---|
| 6. | Consumer Protection Act | • Background and Objectives,<br>• Relief under the Consumer Protection Act,<br>• General relief of compensation,<br>• Meaning and scope of consumer and C.P.A, Consumer rights ,<br>• Consumer Protection | 2+1 |
| 7. | RTI Act | • Important provisions,<br>• The central information Commission,<br>• The state Information Commission,<br>• Powers and Functions of the Information commissions, appeal and Penalties,<br>• Remedies Available to aggrieved party | 3+1 |
| 8. | 1. IT Act, 2000 | • Essence of the Act, Exceptions,<br>• Important Provisions,<br>• Digital Signature, Electronic governance,<br>• Regulation of Certifying authorities,<br>• Penalties and Adjudications, Duties of Subscribers,<br>• Regulation of certifying Authorities, Offences, | 3+1 |
|  | 2. Company Act,2013- overview | • The Cyber Regulation appellate tribunal<br>• History<br>• New concepts examples- one person companies, women directors, Class action suits, Serious Fraud Investigation Office |  |

|  |  |  |  |  |
|---|---|---|---|---|
|  |  |  | **Total number of Lectures** | 42 |

| **Methodology and Evaluation Scheme** |
|---|

The course will be a mix of lecture, class discussion, group presentations by students. Students will have to participate actively and will have to refer books, magazines, news papers, and internet on regular basis to keep them up to date about recent developments.

| S.No. | Component | Exam marks |
|---|---|---|
| 1. | Test – 1 (1 Hr) | 15 |
| 2. | Test – 2 (1 Hr 30 mins) | 25 |
| 3. | Test – 3 (2 Hrs) | 35 |
| 5. | **Internal assessment** <br> Casee study/ assignments/ presentations | 25 |

| **Recommended Readings** |
|---|

| 1. | **Social Problems in India: Ram Ahuja: Rawat Publications** |
|---|---|
| 2. | **Ethics and The Conduct of business** : John R. Boatright |
| 3. | *Business ethics: An Indian Perspective*: A.C. Fernando ;Pearson |
| 4. | **Business ethics: South Asia edition: Andrew Crane & Dirk Matten** |
| 5. | **Legal Aspects of Business:** Ravinder Kumar; Cengage learning |
| 6. | **Social Change in India: Crisis and Resillence:Yogendra Singh** |
| 7. | **Business ethics: Ethical decision making and cases;Ferrell;Eighth edition;Cengage Learning.** |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

IQAC

## Course Outcomes (COs) contribution to the Programme Outcomes (POs)

| Course outcomes (Social and Legal Issues) | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 | PO-8 | PO-9 | PO-10 | PO-11 | PO-12 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-1 | 0 | 0 | 3 | 0 | 0 | 3 | 3 | 3 | 3 | 3 | 0 | 3 | 1.75 |
| CO-2 | 0 | 3 | 0 | 3 | 0 | 3 | 3 | 3 | 3 | 3 | 0 | 3 | 2 |
| CO-3 | 0 | 0 | 0 | 3 | 0 | 3 | 3 | 3 | 3 | 3 | 0 | 3 | 1.75 |
| CO-4 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 3 | 3 | 3 | 0 | 3 | 1.5 |
| CO-5 | 0 | 3 | 0 | 0 | 0 | 3 | 3 | 3 | 3 | 3 | 0 | 3 | 1.75 |
| Average | 0 | 1.2 | 0.6 | 1.2 | 0 | 3 | 3 | 3 | 3 | 3 | 0 | 3 | |

# Software Engineering

COURSE CODE: 07B51CI108

COURSE CREDITS: 4

CORE/ELECTIVE: CORE

L-T-P: 3-1-0

---

**Pre-requisite:** Computer Programming, Data Structures and Computer Architecture
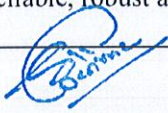
## Course Objective

To review and understand the software Process, software engineering models, Software engineering Practice, data flow diagrams, requirement engineering, object-orientation, understand analysis modeling, design engineering and architectural design, User interface Design and software testing strategies, learn ethical and social implications of computing and exposure to Professional software development tools and techniques.

Appreciate understanding the critical issues involved in software development and accordingly develop analysis and design strategies for tackling the core problems across various industry domains. This would be imparted through hands on exercises and case studies on some real-life and popular software engineering tools and technologies involving databases, CASE Tools, web servers and other web related tools and technologies (for a N-tier architecture) like Eclipse, Rational Rose, C++ / Java etc. through an Enterprise wide software project implementation in a specific domain area

In addition, provided that the student has reached an acceptable standard in the assessments and examinations, the student may then undertake a dissertation / industry project as part of his summer training module. Work on a dissertation / industry project for this course will normally involve an in-depth study in the area of distributed information systems and computing (e.g., a state-of-the-art review together with appropriate software development) and provides the student with an excellent opportunity to demonstrate expertise in this area to future employers or as a basis for future MS/PhD study.

## Course Outcomes:

| S.No. | Course Outcomes | Level of Attainment |
|-------|-----------------|---------------------|
| CO-1 | Ability to apply software engineering principles and techniques. | Familiarity |
| CO-2 | Ability to develop, maintain and evaluate large-scale software systems. | Usage |
| CO-3 | To produce efficient, reliable, robust and cost-effective software | Usage |

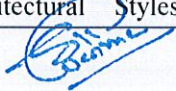| | | |
|---|---|---|
| | solutions. | |
| CO-4 | Ability to perform independent research and analysis. | Usage |
| CO-5 | To learn common lifecycle processes and requirement engineering concept. | Usage |
| CO-6 | Ability to work as an effective member or leader of software engineering teams. | Usage |
| CO-7 | To manage time, processes and resources effectively by prioritizing competing demands to achieve personal and team goals Identify and analyzes the common threats in each domain. . | Familiarity |
| CO-8 | Ability to understand and meet ethical standards and legal responsibilities. | Familiarity |

## Course Contents:

| Unit | Contents | Lectures required |
|---|---|---|
| Module 1 | **Introduction to Software Engineering (4 lectures)**<br><br>Phases in the Development of Software, Maintenance or Evolution, Software Engineering Ethics, Introduction to Software Engineering Management, Planning a Software Development Project, Controlling a Software Development Project<br><br>**The Software Life Cycle:**<br><br>The Waterfall Model, Agile Methods, Prototyping, Incremental Development, Rapid Application Development and DSDM, Extreme Programming, The Rational Unified Process, Intermezzo: Maintenance or Evolution, Software Product Lines, Process Modelling<br><br>**Configuration Management:**<br><br>Tasks and Responsibilities, Configuration Management Plan | 6 |

| Module 2 | **People Management and Team Organization:** | 6 |
|---|---|---|
| | People Management, Coordination Mechanisms, Management Styles, Team Organization, Hierarchical Organization, Matrix Organization, Chief Programmer Team, SWAT Team, Agile Team, Open Source Software Development, General Principles for Organizing a Team | |
| | **Software Quality:** | |
| | A Taxonomy of Quality Attributes, Perspectives on Quality, The Quality System, Software Quality Assurance, The Capability Maturity Model (CMM), | |
| Module 3 | **Cost Estimation:** | 6 |
| | Algorithmic Models, Walston—Felix, COCOMO, Putnam, Function Point Analysis, COCOMO 2: Variations on a Theme, Guidelines for Estimating Cost, Distribution of Manpower over Time | |
| | **Project Planning and Control:** | |
| | A Systems View of Project Control, A Taxonomy of Software Development Projects, Risk Management, Techniques for Project Planning and Control | |
| Module 4 | **Requirements Engineering:** | 6 |
| | Requirements Elicitation, Requirements Engineering Paradigms, Requirements Elicitation Techniques, Goals and Viewpoints, Prioritizing Requirements, COTS selection, Requirements Documentation and Management, Requirements Specification Techniques, Verification and Validation | |
| | **Modeling:** | |
| | Entity--Relationship Modeling, Finite State Machines, Data Flow Diagrams (DFD), CRC Cards, The Unified Modeling Language, The Class Diagram, The State Machine Diagram, The Sequence Diagram, The Communication Diagram, The Component Diagram, The Use Case | |
| Module 5 | **Software Architecture:** | 6 |
| | Software Architecture and the Software Life Cycle, Architecture design, Architectural views, Architectural Styles, Software Architecture | |

| | | |
|---|---|---|
| | Assessment<br><br>**Software Design:**<br><br>Design Considerations, Abstraction, Modularity, Information Hiding, Complexity, System Structure, System Structure, Classical Design Methods, Functional Decomposition, Data Flow Design (SA/SD), Design based on Data Structures, Object-Oriented Analysis and Design Methods, The Booch Method, Fusion. | |
| Module 6 | **Software Testing:**<br><br>Software Testing, Test Adequacy Criteria, Fault Detection Versus Confidence Building, From Fault Detection to Fault Prevention, Testing and the Software Life Cycle, Requirements Engineering, Design, Implementation, Maintenance, Test-Driven Development (TDD), Verification and Validation Planning and Documentation, Manual Test Techniques, Walkthroughs and Inspections, Correctness Proofs, Stepwise Abstraction, Coverage-Based Test Techniques, Control-Flow Coverage, Dataflow Coverage, Coverage-Based Testing of Requirements Specifications, Fault-Based Test Techniques, Error Seeding, Mutation Testing, Error-Based Test Techniques, Comparison of Test Techniques, Comparison of Test Adequacy Criteria, Properties of Test Adequacy Criteria, Experimental Results, Different Test Stages, Estimating Software Reliability | 7 |
| Module 7 | **Software Maintenance:**<br><br>Software Maintenance, Software Maintenance, Major Causes of Maintenance Problems, Reverse Engineering and Refactoring, Reverse Engineering and Refactoring, Organizational and Managerial Issues, Organization of Maintenance Activities, Software Maintenance from a Service Perspective, Control of Maintenance Tasks, Quality Issues | 5 |
| **Total lectures** | | 42 |

## Text Book(s) / Reference Book(s)

T1: R.S. Pressman, "Software Engineering: A Practitioner's Approach", 7Edition, McGraw Hill, 2010
T2: Sommerville, "Introduction to Software Engineering", 8Edition, Addison-Wesley, 2007
R1: Ghezzi, Jazayeri and Mandrioli, "Fundamentals of Software Engineering", 2Edition, Prentice-Hall, 2003
R2: Peters and Pedrycz, "Software Engineering: An Engineering Approach, John Wiley, 2004
R3: Len Bass, "Software Architecture in Practice", 2Edn. Addison Wesley, 2003

R4: Allamaraju, "Professional Java Server Programming", Apress, 2004

R5: Eric Gamma, "Design Patterns: Elements of Reusable OO Software", 1994

R6: James Goodwill, "Professional Jakarta Struts", John Wiley, 2004

R7: Ed Roman, "Mastering Enterprise Java Beans", Wiley, 2005

R8: Dirk Krafzig, Karl Banke, Dirk Slama, "Enterprise Service Oriented Architecture", Prentice Hall, 2004

R9: Russel Miles, "AspectJ Cookbook", O'Reilly, 2004

R10: Craig Walls, Ryan Breidenbach, "Spring in Action", Manning, 2008

R11: John Hunt, "Agile Software Construction", Springer, 2006

R12: Rod Johnson, "Professional Java Development with the Spring framework", John-Wiley, 2005

R13: Jos Warmer, "MDA Explained", Addison Wesley, 2003

R14: Software Engineering related Journals by ACM / IEEE

## Web References

W1: http://nptel.ac.in/courses/Webcourse-contents/IIT%20Kharagpur/Soft%20Engg/New_index1.html

W2: http://www.cs.cornell.edu/Courses/cs5150/2013fa/

W3: http://ocw.mit.edu/courses/aeronautics-and-astronautics/16-355j-software-engineering-concepts-fall-2005/

## Evaluation Components:

| S.No | Exam | Marks | Duration | Coverage/Scope of Examination |
|------|------|-------|----------|-------------------------------|
| 1 | Mid Semester Exam. | 30 | 2 Hrs. | Syllabus covered upto Mid Semester Exam. |
| 2 | End Semester Exam. | 35 | 3 Hrs. | Entire Syllabus |
| 3 | Assignments, Quizzes, Attendance | 25 | Entire Semester | Assignment -10 Quizzes -10 Attendance -5. |
| 4 | Project | 10 | Entire Semester | Entire Syllabus |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

**Course Outcomes (COs) contribution to the Programme Outcomes (POs)**

| | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 | PO-8 | PO-9 | PO-10 | PO-11 | PO-12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | { | | | | | | | | | | | | |

| CO-PO Mappings (Software Engineering Practices) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 | PO-8 | PO-9 | PO-10 | PO-11 | PO-12 | |
| CO-1 | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 2.5 |
| CO-2 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 2.6 |
| CO-3 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2.4 |
| CO-4 | 3 | 2 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2.5 |
| CO-5 | 3 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2.4 |
| CO-6 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 2.6 |
| CO-7 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2.4 |
| CO-8 | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 2.5 |
| | 2.6 | 2.1 | 2.6 | 2.1 | 2.4 | 2.6 | 2.5 | 2.6 | 2.1 | 2.5 | 2.9 | 2.8 | 2.5 |

# SOFTWARE ENGINEERING LAB

COURSE CODE: 07B51CI709

COURSE CREDITS: 1

CORE/ELECTIVE: CORE

L-T-P: 0-0-2

**Pre-requisite:** Basics of Computer Programming, Data Structures and Algorithms

## Course Objectives:

1. Understand the Requirement Engineering. Identifying the Requirements from Problem Statements for a case study.
2. To understand the working of UML tools. Create and edit UML diagrams (Requirement Engineering, Design Tools,) and Reverse engineering tools
3. To understand the Object oriented analysis and Object Oriented Design (OOA/OOD). To draw UML diagrams for a case study.
4. To understand the Structured analysis/ structured design (SA/SD). To draw Data Flow Diagrams for a case study
5. To Understand the User Interface Design.
6. Analyze and Apply project management techniques for a case study

## Course Outcomes:

| S.No. | Course Outcomes | Level of Attainment |
|-------|-----------------|---------------------|
| CO-1 | Understand the Requirement Engineering. Identifying the Requirements from Problem Statements for a case study. | Familiarity |
| CO-2 | To understand the working of UML tools. Create and edit UML diagrams (Requirement Engineering, Design Tools,) and Reverse engineering tools. | Assessment |
| CO-3 | To understand the E-R Modeling. To draw UML diagrams for a case study. | Assessment |
| CO-4 | To understand the Structured analysis/ structured design (SA/SD). To draw Data Flow Diagrams for a case study | Assessment |
| CO-5 | To Understand the User Interface Design | Assessment |
| CO-6 | Analyze and Apply project management techniques for a case study | Usage |

**Contents:**

| S.No | Topic | No of Labs |
|------|-------|------------|
| 1 | Identifying the Requirements from Problem Statements | 2 |
| 2 | Modeling UML use case diagram & capturing use case scenarios | 2 |
| 3 | Modeling UML class diagram & sequence diagrams | 2 |
| 4 | Case Study: a) Use case diagram b) Use Case Template c) activity diagrams  d) sequence diagrams | 1 |
| 5 | State Transition diagram | 1 |
| 6 | CRC Modeling, Case Study | 1 |
| 7 | Data Flow Diagrams | 2 |
| 8 | User Interface Design | 1 |
| 9 | Project Management Activities | 2 |

**Text Book(s):**

1. Sommerville, "Introduction to Software Engineering", 8Edition, Addison-Wesley, 2007
2. R.S. Pressman, "Software Engineering: A Practitioner's Approach", 7Edition, McGraw Hill, 2010

**Reference Book(s):**

3. Ghezzi, Jazayeri and Mandrioli, "Fundamentals of Software Engineering", 2Edition, Prentice-Hall, 2003
4. Peters and Pedrycz, "Software Engineering: An Engineering Approach, John Wiley, 2004
5. Len Bass, "Software Architecture in Practice", 2Edn. Addison Wesley, 2003
6. Allamaraju, "Professional Java Server Programming", Apress, 2004
7. Eric Gamma, "Design Patterns: Elements of Reusable OO Software", 1994 A concise introduction to software Engineering, Pankaj Jalote, Springer

**Evaluation Scheme:**

| | | |
|---|---|---|
| 1 | Mid Sem. Evaluation | 20 Marks |
| 2 | End Sem.  Evaluation | 20 Marks |
| 3 | Attendance | 15 Marks |
| 4 | Lab Assessment | 45 Marks |
| | Total | 100 marks |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

IQAC

**Course Outcomes (COs) contribution to the Programme Outcomes(POs)**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | Average |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|---------|
| CO1 | 3 | 3 | 1 | 1 | 2 | 2 | 1 | 3 | 3 | 2 | 2 | 2 | 2.1 |
| CO2 | 3 | 3 | 2 | 1 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2.2 |
| CO3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 1 | 2 | 2 | 2.2 |
| CO4 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 3 | 2.6 |
| CO5 | 3 | 3 | 1 | 2 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2.3 |
| C06 | 3 | 1 | 3 | 2 | 1 | 2 | 3 | 3 | 2 | 3 | 2 | 1 | 2.2 |
| Average | 3 | 2.7 | 2 | 1.8 | 1.8 | 2 | 2.3 | 3 | 2.2 | 2.2 | 2 | 2 | 2.3 |

# Course Description

| | |
|---|---|
| **Course name:** | **Software Testing and Debugging** |
| **Course Code:** | **08B51CI101** |
| **Course credits:** | **4(3-1-0)** |
| **Branch & Semester:** | **CSE&IT, 5th Semester** |
| **Faculty coordinator:** | **Dr. Pardeep Kumar, Dr. Kapil Sharma and Mr. Praveen Modi** |

## Objective:

The major objective of this course is to study and examine the techniques of software testing and debugging and development of test cases using these techniques. The course focuses on:

- Learning Software testing fundamentals and life cycle models
- Leaning basic testing methodologies of Black box and White Box testing
- Developing various test cases.
- Learning automated software testing techniques.
- Learning use of various automated testing test tools
- Learning various debugging techniques and methodologies.
- Getting familiar with advanced level of testing techniques

## Introduction

This course will examine fundamental software testing and program analysis techniques. In particular, the important phases of testing will be reviewed, emphasizing the significance of each phase when testing different types of software. Students will learn the state of the art in testing technology for object-oriented, component-based, concurrent, distributed, graphical-user interface, and web software. In addition, closely related concepts such as mutation testing and program analysis (e.g., program-flow and data-flow analysis) will also be studied. Emerging concepts such as test-case prioritization and their impact on testing will be examined. By the end of this course, students should be familiar with the state-of-the-art in software testing. Students should also be aware of the major open research problems in testing.

## Course Outcome :

| S.NO | Course outcomes ( Software Testing and Debugging) | Level of Attainment |
|---|---|---|
| CO-1 | To develop, implement black box and white box testing cases. | Familiarity |

Assistant Registrar
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY WAKNAGHAT SOLAN (H.P.) INDIA

| CO-2 | To understand use of Flow graphs and computing cyclomatic complexity using various methods. | Assessment |
| --- | --- | --- |
| CO-3 | To understand and implement automated software testing techniques for Web testing, Performance testing, and GUI testing. | Assessment |
| CO-4 | To develop, implement, and demonstrate the learning through a project that meet stated specifications. | Assessment |
| CO-5 | Debugging of existing program codes and developing test cases. | Assessment |
| CO-6 | You will learn how to make use of Web testing and Automated software testing. | Usage |

## Maintenance of Records:

Students are expected to keep records of labwork and homework assignments (to be posted on students resource from time to time) neatly in suitable hard bound notebooks separately (one for each). The same will be submitted to the TA in the Lab on or before the scheduled time.

## Expected Student Background (Preconditions)

Students should be familiar with programming concepts.

## Topics Outline:

| S NO | Topic | Hrs |
| --- | --- | --- |
| 1 | The Psychology and Economics of Program Testing: What is software testing and why it is so hard? , Error, Fault, Failure, Incident, Principles of Testing, Testing Process (Economics of Testing), Limitations of Testing, No absolute proof of correctness, | 2 |
| 2 | Test Management & Software Development – Software Quality Assurance, ETVX Model, Testing Maturity Model, Testing Life – Cycle, Testing V-Model, Test Planning & Control, Test Completion Criteria, Designing Test case templates | 2 |
| 3 | Static Software Testing & Techniques: Program Inspection, code inspection, An error checklist for inspections, Walkthroughs, Desk checking, peer rating Verification, Validation. Test Case Design – I: Using Black Box Testing- Equivalence Class Testing, Boundary Value Analysis, Decision Table Based Testing, Cause Effect Graphing Technique, Experience based | 2+7 |

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY WAKNAGHAT, SOLAN (H.P.) INDIA

IQAC

| | | | |
|---|---|---|---|
| | | techniques, **State based or graph based testing**. | |
| 4 | | Test Case Degign – II:<br>Using White Box testing-<br>Path testing, DD-Paths, Cyclomatic Complexity, **Graph Metrics**, Data Flow Testing, **Mutation testing**, Fault Injection, Pairwise testing, Predicate based test generation,<br><br>Module Testing:<br>Integration Testing, Top down versus Bottom up Testing, Test case design and Performing the Test, Integration Complexity | 7+ 4 |
| 5 | | Higher Order testing:<br>Function Testing, System Testing, Acceptance Testing, Installation Testing, Performance testing, Database Testing, Regression testing, Ad hoc Testing, Test planning and control, Test completion criteria. | 5 |
| 6 | | Object Oriented Testing:<br>Issues in Object Oriented Testing, Class Testing, Object Oriented Integration and System Testing. | 5 |
| 7 | | Web Testing/GUI testing and Internet Testing<br>Issues, challenges, Automated test oracles for GUIs, Regression testing of GUIs, Mobile Application testing and Tools, Techniques and Levels, Load testing | 3 |
| 8 | | Program Instrumentation: (from e-book of J.C. Huang)<br>Test Coverage Measurement, Test Case Effectiveness Assessment, Instrumenting Program for Assertion Checking, Instrumenting Program for Data Flow-Anomaly Detection. | 2 |
| 9 | | Debugging:<br>Debugging and its Techniques, Taxonomy of Bugs, Bug Life – Cycle, Debugging Techniques | 3 |
| | | Total | 42 |

**Teaching and Learning Strategies:**

Delivery consists of a series of lectures that introduce and develop the core principles. These are further explored and expanded through a series of laboratory-based sessions. A project problem is to be taken up and implemented as a continuous assessment in the semester to give a hands-on exposure on integrating various concepts taught and integrating them into a problem solving exercise.

The students are expected to spend time on unsupervised self-study and laboratory work. The course is structured so that each unit builds upon previous knowledge. Programming and implementation on different topics will be available that will be implemented in the semester.

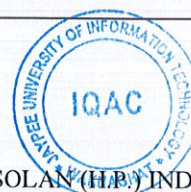JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY WAKNAGHAT, SOLAN (H.P.) INDIA

**Course Outcomes (COs) contribution to the Programme Outcomes(POs)**

| Course Outcomes | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 | PO-8 | PO-9 | PO-10 | PO-11 | PO-12 | Weightage |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-1 | H | H | H | M | M | H | M | M | M | H | L | H | 81% |
| CO-2 | H | H | H | M | H | M | H | M | M | H | L | H | 77% |
| CO-3 | H | H | H | M | M | H | L | M | H | H | L | H | 85% |
| CO-4 | H | H | H | M | H | H | M | M | H | H | L | H | 85% |
| CO-5 | H | H | H | M | H | H | M | M | H | H | L | H | 85% |
| CO-6 | H | H | H | M | H | H | M | M | M | H | L | H | 85% |
| Weightage | 100% | 100% | 100% | 70% | 70% | 80% | 60% | 90% | 83% | 84% | 70% | 100% | 100% |
| | | | | | | | | | | | | | |

**Evaluation Scheme:**

| S.No | Examination | Marks |
|---|---|---|
| 1 | T-1 | 15 |
| 2 | T-2 | 25 |
| 3 | T-3 | 35 |
| 4 | *Internal Marks | 25 |

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY WAKNAGHAT, SOLAN (H.P.) INDIA

**\*Internal Marks Breakdown:**

| | |
|---|---|
| Assignments | 9 marks (3x3) |
| Quizzes | 12 marks (3x4) |
| Regularity | 4 Marks |

## References

1. Paul C. Jorgensen, Software testing: a Craft's man approach, CRC Press Ilene Burnstein, Practical Software Testing, Springer
2. Srinivasan Desikan and G. Ramesh, Software Testing: Principles and Practices, Pearson Education
3. Glenford Myers, "The Art of Software Testing", John Wiley & Sons Inc., New York, 1979.
4. Aditya P. Mathur, "Foundations of Software Testing" Pearson Education 2008
5. Louise Tamres, "Software Testing", Pearson Education Asia, 2002
6. William Perry, "Effective Methods for Software Testing", John Wiley & Sons, New York, 1995.
7. Cem Kaner, Jack Falk, Nguyen Quoc, "Testing Computer Software", Second Edition, Van Nostrand Reinhold, New York, 1993.
8. Boris Beizer, "Software Testing Techniques", Second Volume, Second Edition, Van Nostrand Reinhold, New York, 1990.
9. Roger S. Pressman, "Software Engineering – A Practitioner's Approach", Fifth Edition, McGraw- Hill International Edition, New Delhi, 2001.
10. Boris Beizer, "Black-Box Testing – Techniques for Functional Testing of Software and Systems", John Wiley & Sons Inc., New York, 1995.
11. K.K. Aggarwal & Yogesh Singh, "Software Engineering", New Age International Publishers, New Delhi, 2003.
12. Marc Roper, "Software Testing", McGraw-Hill Book Co., London, 1994.
13. Gordon Schulmeyer, "Zero Defect Software", McGraw-Hill, New York, 1990.
14. Watts Humphrey, "Managing the Software Process", Addison Wesley Pub. Co. Inc., Massachusetts, 1989.
15. Boris Beizer, "Software System Testing and Quality Assurance", Van Nostrand Reinhold, New York, 1984.

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY WAKNAGHAT, SOLAN (H.P.) INDIA

# 07B51CI701: Software Testing and Debugging Lab
**Course Credit: 1**
**Semester: V**

## Introduction

This course will examine fundamental software testing and program analysis techniques. In particular, the important phases of testing will be reviewed, emphasizing the significance of each phase when testing different types of software. Students will learn the state of the art in testing technology for object-oriented, component-based, concurrent, distributed, graphical-user interface, and web software. In addition, closely related concepts such as mutation testing and program analysis (e.g., program-flow and data-flow analysis) will also be studied. Emerging concepts such as test-case prioritization and their impact on testing will be examined. By the end of this course, students should be familiar with the state-of-the-art in software testing. Students should also be aware of the major open research problems in testing.

## Course Objectives (Post-conditions)

### Knowledge objectives:

1. You will broaden your knowledge of software engineering.
2. You will learn Software testing algorithms and programs.
3. You will increase your proficiency in JAVA Language.
4. You will know how strategies and tactics of effective and efficient testing.
5. You will gain practical experience in design, develop, and document static, white-box, black-box tests.
6. You will acquire the background for understanding Test Management and Software Development.
7. You will acquire the knowledge of higher order and object oriented testing.
8. You will learn a effective and efficient use of debugging techniques.
9. You will learn how to make use of Web testing and Automated software testing.

### Application objectives:

1. To develop, implement black box and white box testing cases.
2. To understand use of Flow graphs and computing cyclomatic complexity using various methods.
3. To understand and implement automated software testing techniques for Web testing, Performance testing, and GUI testing.
4. To develop, implement, and demonstrate the learning through a project that meet stated specifications.
5. Debugging of existing program codes and developing test cases.

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY WAKNAGHAT, SOLAN (H.P.) INDIA

Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

IQAC

## Expected Student Background (Preconditions)

Students should be familiar with programming concepts.

## Topics Outline:

| S NO | Topic |
|------|-------|
| 1 | The Psychology and Economics of Program Testing: What is software testing and why it is so hard? , Error, Fault, Failure, Incident, Principles of Testing, Testing Process (Economics of Testing), Limitations of Testing, No absolute proof of correctness, |
| 2 | Test Management & Software Development – Software Quality Assurance, ETVX Model, Testing Maturity Model, Testing Life – Cycle, Testing V-Model, Test Planning & Control, Test Completion Criteria, Designing Test case templates |
| 3 | Static Software Testing & Techniques: Program Inspection, code inspection, An error checklist for inspections, Walkthroughs, Desk checking, peer rating Verification, Validation. Test Case Design – I: Using Black Box Testing- Equivalence Class Testing, Boundary Value Analysis, Decision Table Based Testing, Cause Effect Graphing Technique, Experience based techniques, State based or graph based testing. |
| 4 | Test Case Degign – II: Using White Box testing- Path testing, DD-Paths, Cyclomatic Complexity, Graph Metrics, Data Flow Testing, Mutation testing, Fault Injection, Pairwise testing, Predicate based test generation, Module Testing: Integration Testing, Top down versus Bottom up Testing, Test case design and Performing the Test, Integration Complexity |
| 5 | Higher Order testing: Function Testing, System Testing, Acceptance Testing, Installation Testing, Performance testing, Database Testing, Regression testing, Ad hoc Testing, Test planning and control, Test completion criteria. |
| 6 | Object Oriented Testing: Issues in Object Oriented Testing, Class Testing, Object Oriented Integration and System Testing. |
| 7 | Web Testing/GUI testing and Internet Testing Issues, challenges, Automated test oracles for GUIs, Regression testing of GUIs, Mobile Application testing and Tools, Techniques and Levels, Load testing |

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY WAKNAGHAT, SOLAN (H.P.) INDIA

| 8 | Program Instrumentation: (from e-book of J.C. Huang)<br>Test Coverage Measurement, Test Case Effectiveness Assessment, Instrumenting Program for Assertion Checking, Instrumenting Program for Data Flow-Anomaly Detection. |
|---|---|
| 9 | Debugging:<br>Debugging and its Techniques, Taxonomy of Bugs, Bug Life – Cycle, Debugging Techniques |

## References

1. Paul C. Jorgensen, Software testing: a Craft's man approach, CRC Press
2. Ilene Burnstein, Practical Software Testing, Springer
3. Srinivasan Desikan and G. Ramesh, Software Testing: Principles and Practices, Pearson Education
4. Glenford Myers, "The Art of Software Testing", John Wiley & Sons Inc., New York, 1979.
5. Aditya P. Mathur, "Foundations of Software Testing" Pearson Education 2008
6. Louise Tamres, "Software Testing", Pearson Education Asia, 2002
7. William Perry, "Effective Methods for Software Testing", John Wiley & Sons, New York, 1995.
8. Cem Kaner, Jack Falk, Nguyen Quoc, "Testing Computer Software", Second Edition, Van Nostrand Reinhold, New York, 1993.
9. Boris Beizer, "Software Testing Techniques", Second Volume, Second Edition, Van Nostrand Reinhold, New York, 1990.
10. Roger S. Pressman, "Software Engineering – A Practitioner's Approach", Fifth Edition, McGraw- Hill International Edition, New Delhi, 2001.
11. Boris Beizer, "Black-Box Testing – Techniques for Functional Testing of Software and Systems", John Wiley & Sons Inc., New York, 1995.
12. K.K. Aggarwal & Yogesh Singh, "Software Engineering", New Age International Publishers, New Delhi, 2003.
13. Marc Roper, "Software Testing", McGraw-Hill Book Co., London, 1994.
14. Gordon Schulmeyer, "Zero Defect Software", McGraw-Hill, New York, 1990.
15. Watts Humphrey, "Managing the Software Process", Addison Wesley Pub. Co. Inc., Massachusetts, 1989.
16. Boris Beizer, "Software System Testing and Quality Assurance", Van Nostrand Reinhold, New York, 1984.

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY WAKNAGHAT, SOLAN (H.P.) INDIA

IQAC

# STRATEGIC MANAGEMENT

**Course code: 11B1WPD832 (3-0-0)**
**Course Credits: 3 (3-0-0)**
**Semester: VIII**
**Course Type: Elective (Offered to all B.Tech students)**
**Department: Humanities and Social Sciences**

**Objective:**
To learn the dynamics of the business world and use this knowledge to take better long term decisions.

**Learning Outcomes:**
1. Understand the difference between operational management and strategic management.
2. Understand the special skill set required to take strategic decisions.
3. Analyse the environment of an organisation and be able to chart the future outlook.
4. Define the internal strengths and weaknesses of an organisation in light of the environment it is facing.
5. Understand the strategic alternatives available to a company w.r.t. its SWOT.
6. Learn to select the most appropriate strategic alternative.
7. Understand the difference between developing a strategy and putting it into action.
8. Understand the processes that must be put in place so that successful strategic management is practiced at all times.

**Course outline**

| S. No. | Topics | Learning Outcomes | Hours |
|---|---|---|---|
| 1. | Defining strategy and strategic management: An overview of strategic management and business policy. | • Understand the difference between operational and strategic management<br>• Understand the significance of strategic | 3 |

232

| # | Topic | Learning Outcomes | Lectures |
|---|---|---|---|
| | (Ch: 1, pp. 2- 35) | management for any organisation | |
| 2. | The General Environment:<br>• Scanning, Monitoring and Forecasting changes in the Environment<br>• Scenario planning<br>• PEST analysis<br>• SWOT analysis<br>• General and Competitive analysis | • Understand the significance of identifying signals of change in the environment<br>• Be able to use PEST, SWOT and scenario planning to understand the environmental influences on an organisation | 4 |
| 3. | The competitive environment:<br>• Introduction<br>• Porter's Five forces model<br>• The value net<br>• Strategic Groups<br>• Hypercompetition | • Be able to explain any industry on the basis of Porter's five forces model<br>• Understand the limitations of this model<br>• Understand the use of strategic groups and value net to understand the competitive environment | 4 |
| 4. | The Internal Environment- Value creating activities:<br>• Value chain analysis<br>• SWOT analysis | • Understand the concept of value chain<br>• Use value chain analysis to define the unique capabilities of an organisation | |
| 5. | The Internal Environment- Resource based view:<br>• The Resource Based view<br>• Identifying sustainable competitive advantage<br>• Knowledge Management | • Understand that strategy must evolve from the internal strength of an organisation<br>• Understand the creation and maintainence of uniqueness in an organisation | 3 |
| 6. | Assessing Organisational Performance: | • Understand and be able to use common | 2 |

| # | Content | Learning Outcomes | |
|---|---|---|---|
| | - Defining performance metrics<br>- Financial Analysis<br>- Balanced Scorecard<br>- Benchmarking | performance parmeters to evaluate strategic success in an organisation | |
| 7. | Business Level Strategy:<br>- Defining Business Level Strategy<br>- Generic strategies<br>- Resource based view<br>- Industry Life cycle approach<br>- Strategy and market turbulence | - Understand the difference between corporate level and business level strategies<br>- Be able to use the different frameworks to devise strategy | 5 |
| 8. | Corporate Level Strategy<br>- Growth strategies<br>- Diversification-related and unrelated<br>- Implementing growth strategies<br>- Portfolio analysis<br>- Corporate parenting<br>- Strategic Evaluation | - Understand the different alternatives to strategy<br>- Understand how to choose the appropriate alternative | 6 |
| 9. | International Strategy and Globalisation<br>- Globalisation<br>- Types of international strategy<br>- Entry mode strategies<br>- Porter's Diamond of Competitive advantage | - Understand the importance of globalisation<br>- Understand the way a company can pursue a successful international strategy<br>- Understand that conditions in the home market create constant innovation capabilities in organisations | 4 |
| 10. | Organisational systems and strategy implementation<br>- Organisational structures | - Understand how different structures can enable or hinder strategy | 3 |

| | | | |
|---|---|---|---|
| | • Organisational Processes<br>• Strategic Control Systems<br>• Strategic Change | implementation<br>• Learn the significance of organisational Processes to strategy implementation | |
| 11. | Leadership and strategy implementation<br>• Leadership and management<br>• The learning organisation<br>• Emotional Intelligence and Leadership<br>• Narcissistic Leadership<br>• Leadership-vision, values and culture<br>• Leading strategic Change<br>• Chaos and Innovation | • Understand the impact of leadership on effective strategy implementation | 3 |

## Methodology
The course will be taught with the aid of lectures and case studies.

## Evaluation Scheme

**Total Marks 100**

| Mid sem | 40 marks | End Sem | 60 Marks |
|---|---|---|---|

## Text Book
Understanding Strategic Management: Anthony Henry, Oxford University Press.

## Books for Reference
1. Strategic Management and Business Policy: Azhar Kazmi, Tata Mc Graw Hill.
2. Exploring Corporate Strategy: Gerry Johnson and Kevan Scholes, Pearson Education.

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

**Web Reference:**

- http://global.oup.com/uk/orc/busecon/business/henry2e/
- https://www.wiziq.com/tests/strategic-management
- http://strategyclub.com/students

# SYSTEM AND NETWORK PROGRAMMING LAB

COURSE CODE: 10B17CI673
COURSE CREDITS: 2
CORE/ELECTIVE: CORE
L-T-P: 0-0-4

**Pre-requisite:** None

**Course Objective:**
To study about sockets, different (Client/server) models, protocols, processes, threads, semaphores and their programming.

**Course Outcomes:**

| S.NO | Course outcomes | Level of Attainment |
|------|-----------------|---------------------|
| CO-1 | To learn the basic Network Devices (Gateway, Router, Bridge,Switch). | Familiarity |
| CO-2 | To learn about Sockets (Reading Assignment). | Assessment |
| CO-3 | To learn about program using TCP/IP Sockets. | Assessment |
| CO-4 | To learn concepts associated with subnetting. Understand network industry standards such as: Address Resolution and Reverse Address Resolution Protocols, IP Addresses and Subnetting, MAC Addressing. | Assessment |
| CO-5 | To learn about the program using UDP Sockets. | Assessment |
| CO-6 | You will learn about the program for semaphore set and shared memory | Usage |

## List of Experiments

| S NO | Topics | Hours |
|------|--------|-------|
| 1. | Introduction to Network Devices (Gateway, Router, Bridge,Switch). | 2 |
| 2. | Introduction to Vi editor and Commands related to Unix. | 2 |
| 3. | Introduction of Sockets (Reading Assignment). | 2 |

| 4 | Write a socket program for inputting string from client side and this string will be accepted towards server and will be sent back to client | 2 |
|---|---|---|
| 5. | Write a client server program using TCP/IP Sockets. | 2 |
| 6. | Write a client server program using UDP Sockets. | 2 |
| 7. | Write a program to make calculator using socket (all processing should be on server side). | 2 |
| 8. | Write a program to create process and child process using fork(). | 2 |
| 9. | Write a program that accept a given directory and list all the files in subsequent directory. | 2 |
| 10. | Write a program that write a string to pipe and child reads the string. | 2 |
| 11. | Write a program for semaphore set and shared memory. | 2 |
| 12. | Write a program for Pthreads(Portable threads) Creation and Termination | 2 |
| 13. | Write a program to create a thread to copy a file and make a counter that can be accessed by multiple threads and use the mutex for generating a random number. | 2 |
| 14. | Write a program that detects nearby Bluetooth devices. | 2 |
| | **Total** | **28** |

**Evaluation Scheme:**

| S.No | Exam | Marks |
|---|---|---|
| 1 | Mid Term Exam (Viva and Written Exam) | 20 |
| 2 | End term Exam (Viva and Written Exam) | 20 |
| 3 | Lab Records | 15 |
| 4. | Regular Assessment (Quality and quantity of experiment performed, Learning laboratory skills, Attendance etc.) | 30 |
| 5. | Attendance/Project | 15 |
| | Total Marks | 100 |

**References**
1. UNIX Network Programming by Richard Stevens
2. Internetworking with TCP/IP, Volume 3   by Douglas. E. Comer
3. Java Network Programming (Second Edition) by Elliotte  Rusty,Harold

4. Linux Device Drivers by Jonathan Corbet , Alessandro Rubini and Greg
5. Beginning Linux Programming by Neil Mathew, Richard Stones
6. Unix System Programming    by Terrence Chan

**Course Outcomes (COs) contribution to the Programme Outcomes(POs)**

| CO/PO | PO1 | PO 2 | PO 3 | PO 4 | PO5 | PO6 | PO 7 | PO8 | P O 9 | PO 10 | PO1 1 | PO 12 | Aver age |
|-------|-----|------|------|------|-----|-----|------|-----|-------|-------|-------|-------|----------|
| CO1 | 2 | 1 | 1 | 2 | 1 | 2 | 2 | 1 | | 2 | 1 | 1 | 1.5 |
| CO2 | 1 | 1 | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| CO3 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| CO4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| CO5 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 |
| CO6 | 1 | 1 | 1 | | 1 | 1 | 1 | | | 1 | 1 | 1 | 1 |
| Average | 1.2 | 1 | 1 | 1.3 | 1 | 1.2 | 1.2 | 1 | 1 | 1.2 | 1 | 1 | |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

# TELECOMMUNICATION NETWROKS
## (Core Subject)

| Course Code: | 10B11EC611 | Semester: | 6th Semester, B. Tech (ECE) |
|---|---|---|---|
| Credits: | 4 | Contact Hours: | L-3, T-1, P-0 |

## Course Objectives

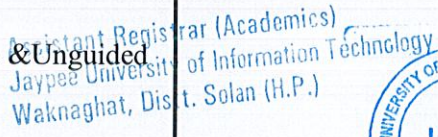At the end of the semester, the students will be able to:

1. Build an understanding of the fundamental concepts of telecommunication networking.
2. Describe communication protocols and layered network architectures.
3. Understand the system design principles of data communication systems.
4. Understand, define, and explain data communication networks concepts.

## Course Outcomes

This course provides the knowledge of data communication and networking. After study through lectures and assignments, students will be able to:

1. Identify the different types of network topologies. And to enumerate the layers of OSI model and TCP/IP model.
2. Utilize the available bandwidth in an efficient way.
3. Understand the basics of circuit switching and the multi-stage switching technologies and apply the same for the analysis and design of optimized switches.
4. Learn the different protocols working at various layers of TCP/IP model and apply the knowledge of same to design a given network.
5. Identify the key metrics required for the performance assessment of IP based networks and then to apply this knowledge to optimize a given network operation based on some specific metrics.
6. Understand various routing algorithms and apply this knowledge to design a network based on given constraints.

## Course Contents

| Unit | Topics | References (chapter number, page no. etc) | Lectures |
|---|---|---|---|
| 1. | Data Communication:<br><br>Introduction: Networks – Protocols and standards – Line configurations – Topology – Transmission mode – Categories of networks – Inter networks.<br>OSI & TCP/IP models: Functions of the layers. Bandwidth Utilization: Multiplexing & Spreading.<br><br>Transmission media: Guided media &Unguided media<br><br>Switching: Circuit Switching and Packet | Forouzan: Chapters 1,2,6,7,8,9 | 14 |

| | | | |
|---|---|---|---|
| | Switching, Structure of switches<br><br>Telephone Network and Cable network for Data Transmission | | |
| 2. | Error Control and Data Link Protocols:<br><br>Error detection and correction: Types of errors, Detection, Linear Block Codes, Cyclic Codes, Checksum<br><br>Data link Control: Framing, Noiseless and Noisy Channel Protocols, HDLC, point-to-point Protocol<br><br>Multiple Access: ALOHA, CSMA, CSMA/CD, CSMA/CA, Controlled Access Methods | Forouzan: Chapters 10,11,12 | 11 |
| 3 | Wired and Wireless LANs:<br><br>Wired LAN: Ethernet, Standard Ethernet, Fast Ethernet, Gigabit Ethernet<br><br>Wireless LAN: Bluetooth<br><br>Connecting LANs: Repeaters, Hubs, Switches, Virtual LANs | Forouzan: Chapters 13,14 | 4 |
| 4 | Logical Addressing, Internet Protocol & Routing:<br><br>IPv4 addresses, IPv6 addresses, transition from IPv4 to IPv6.<br><br>Network protocols: ARP, RARP, BOOTP, DHCP, ICMP, IGMP,<br><br>Unicast Routing Protocols: Distance Vector Routing, Link State Routing, Path Vector Routing | Forouzan: Chapters 19,20,21,22 | 11 |
| 5 | Transport layer protocols: UDP, TCP, SCTP<br><br>Congestion control and Quality of Service | Forouzan: Chapters 23,24 | 4 |
| | | **Total Number of Lectures** | 44 |

## Evaluation Scheme

1. Test 1 : 15 marks
2. Test 2 : 25 marks
3. Test 3 : 35 marks
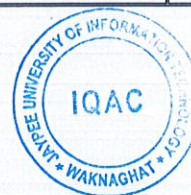
4. **Internal Assessment** : 25 marks
   - 5 Marks : Class performance, Tutorial presentations
   - 15 Marks : Quizzes
   - 5 marks : Attendance

# Text Books

1. B. A. Forouzan: "Data Communications and Networking", Tata McGraw-Hill 4$^{th}$ Edition 2010.

2. A. Tanenbaum: "Computer Networks", Pearson Education, 4$^{th}$ Edition.

# Reference Books
1. William Stallings: "Data Communications and Networking", Pearson Education.

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

## 10B11CE614 TRANSPORTATION ENGINEERING

RAILWAYS: History of railways in India, alignment and project reports, permanent way and track materials, geometric design, railway points and crossings and junction, track laying, track drainage, station yards, maintenance of track.

AIR PORTS: Development of air transport in India ,airport planning, air port design standards, terminal lay out & classification, Design of air port pavements, drainage, marking &lighting, heliports, air traffic control, air cargo, accidents in the air, maintenance of air ports .

DOCKS, HARBOURS AND INLAND WATER WAYS: Historical development in India , tides, winds & waves, docks, harbours, break waters, jetties, landing stages & wharves, dry docks, transit sheds, cargo handling, , inland water transport. Maintenance.

MINOR MODES OF TRANSPORTATION: Pipelines, elevators, belt conveyors, aerial rope ways, & under sea transportation.

## 10B11CE615 ADVANCED STRUCTURAL ANALYSIS

Kani's method to analyze simple portal frames

Basic Principles of matrix method - Flexibility and Stiffness matrices and their generation.

Analysis of Fixed arches

Rolling loads and Influence lines for beams and arches.

Plastic Analysis of beams and frames.

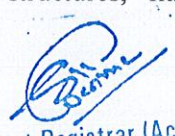Approximate Methods to analyze Portal frames: Portal method, cantilever method

Matrix Methods of Analysis for Discrete Structures

Flexibility and Stiffness matrices and their generation, Concept of stiffness method, types of skeletal structures, degree of freedom, Stiffness matrix for: Truss elements, Beams in 1-D, 2-D and 3-D,

Formation of the Global Analysis Equations, The General Assembly Procedure, Applying Boundary conditions and Calculating Support Reactions, Analysis of simple plane trusses and plane frames with stiffness matrix method

## 10B17CE671  CIVIL ENGINEERING SOFTWARE LAB

1. AutoCAD: Plan, Elevation, Foundation, Column.
2. Spreadsheets: Problem based on civil related topics like structures, fluid mechanics.
3. STAADPro: Introduction, Modeling and Analysis of structures.
4. Ansys: Introduction, Analysis of 2-D structures, Plane frames.
5. MATLAB: Programming of Analysis of building.
6. Primvera: Introduction

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

## 10B17CE672 FOUNDATION ENGINEERING LAB

### List of Experiments

1. Consolidation test
2. Triaxial compression test (Undrained condition)
3. Direct shear box test
4. Vane shear test

IQAC

# UNDERSTANDING INIDA: LITERARY REFLECTIONS

COURSE CODE: 18B1WHS636

COURSE CREDITS: 3

CORE/ELECTIVE: Elective

L-T-P: 3-0-0

**Pre-requisite :** None

## Course Objectives:

1. To understand migration and its impact on individuals.
2. To recognize the impact of displacement on individuals.
3. To explore social, economic, cultural and geographical contexts and its relevance for a holistic living.
4. To look for roots and connections in literature with focus on environment and peace in society.
5. To access the impact of gender on migration.
6. To define identity and what it means in the modern context.

## Course Outcomes:

| S. No. | Course Outcomes | Level of Attainment |
|--------|-----------------|---------------------|
| 1 | Analyze the reason and impact of migration and displacement | Familiarity |
| 2 | Explore and understand the socio-cultural and geographical contexts for a holistic living | Assessment |
| 3 | Demonstrate familiarity with gender issues | Assessment |
| 4 | Understanding the links and connections in construction of identity | Usage |
| 5 | Apprise the students with socio-cultural concepts and historical events like Dalit literature, Bhakti Radicals and Partition literature respectively | Familiarity |

## Course Contents:

| Module No. | Subtitle of the Module | Topics | No. of Lectures |
|------------|------------------------|--------|-----------------|
| 1. | Modern Literature | • Cross-cultural Reflections in Vinay Rai's "A Rainbow of Contradictions" and "The Multitasking Indian" from *Think India* | 3 |
| 2. | From other Margins (Regional environment/ecology, traditions, folklores) | • Mamang Dai's "Sorrow of Women" and "An Obscure Place" <br>• Sanjoy Hazarika's "There are No Shangri-Las Left" | 8 |

| 3. | Indian Culture, tradition and societal norms | • Rajiv Malhotra's "Indian Comfort with Chaos" and "Western Joker and Indian Clown" from *Being Different: An Indian Challenge to Western Universalism* | 8 |
|---|---|---|---|
| 4. | Views on Education, Indian ethos, identity and rural development | • S. Radhakrishnan's "The Adaptive Culture" and "Of One Mind" from *The Adaptive Indian: Identity and Ethos* | 4 |
| 6. | Partition Literature: Migration and Identity | • Jhumpa Lahiri's "The Triangle", "The Second Exile" and "The Wall" from *In Other Words*<br>• Ismat Chugtai's *Roots* | 8 |
| 7. | Bhakti Radicals and Dalit Literature: Human Rights in India against caste system | • The Bhakti Radicals and Untouchability by Gail Omvedt from *Speaking Truth to Power: Religion, Caste and the Subaltern Question in India*<br>• Introduction to Dalit Movement; *Karukku* by Bama | 3 |
| | | **Total number of Lectures** | 42 |

| Recommended Reading (Books/Journals/Reports/Websites etc.: Author(s), Title, Edition, Publisher, Year of Publication etc. in IEEE format) | |
|---|---|
| 1. | Malhotra, Rajiv. *Being Different: An Indian Challenge to Western Universalism.* Harper Collins: Noida, 2013 |
| 2. | Radhakrishnan, S. *The Adaptive Indian: Identity and Ethos.* Orient Paperbacks: New Delhi, 2013 |
| 3. | Lahiri, Jhumpa. *In Other Words.* Penguin: New Delhi, 2017 |
| 4. | Bhagavan, Manu and Anne Feldhaus.Eds. *Speaking Truth to Power: Religion, Caste and the Subaltern Question in India.* OUP: New Delhi, 2008. |
| 5. | Asaduddin, M. *Ismat Chugtai: Lifting the Viel.* Modern Classics. Penguin: New Delhi, 2009 |

**Evalution Scheme:**

| S.No. | Exam | Marks | Duration | Coverage/ Scope of Examination |
|---|---|---|---|---|
| 1. | T-1 | 15 | 1 Hour | Syllabus covered upto T-1 |
| 2. | T-2 | 25 | 1.5 Hours | Syllabus covered upto T-2 |
| 3. | T-3 | 35 | 2 Hours | Entire Syllabus |
| 4. | Teaching Assessment | 25 | Entire | Assignment -6 |

| | | | Semester | Group Discussions -6 Presentations -8 Class Assessment -5 |
|---|---|---|---|---|
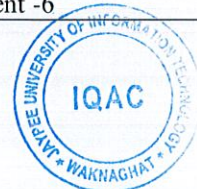
**Course Outcomes (COs) contribution to the Programme Outcomes (POs)**

| Course outcomes (Understanding India: Literary Reflections) | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 | PO-8 | PO-9 | PO-10 | PO-11 | PO-12 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-1 | 1 | 2 | 2 | 2 | 2 | 1 | 3 | 3 | 2 | 2 | 2 | 3 | 2.0 |
| CO-2 | 1 | 3 | 3 | 3 | 3 | 1 | 1 | 3 | 2 | 2 | 1 | 3 | 2.1 |
| CO-3 | 1 | 2 | 2 | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 1 | 3 | 2.0 |
| CO-4 | 1 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 2.5 |
| CO-5 | 1 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 1 | 3 | 2.5 |
| Average | 1 | 2.6 | 2.6 | 2.6 | 2.4 | 2 | 2.4 | 3 | 2 | 2.4 | 1.4 | 3 | |
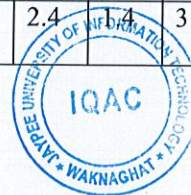
# COURSE DESCRIPTION

## 07B31CI705: UNIX Programming Lab

| | |
|---|---|
| **Course Credits:** | 1 (0-2-0) |
| **Branch and Semester:** | CSE, IT – 3$^{rd}$ Semester |
| **Session:** | Jul – Dec, 2015 |
| **Course Instructors:** | **Arvind Kumar** |

## Objective:

This course introduces basic understanding of UNIX OS, UNIX commands and File system and to familiarize students with the Linux environment. To make student learn fundamentals of shell scripting and shell programming. Emphases are on making student familiar with UNIX environment and issues related to it.

## Learning Outcomes:

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

1. You will be able to run various UNIX commands on a standard UNIX/LINUX Operating system.
2. You will be able to run C programs on UNIX.
3. You will be able to do shell programming on UNIX OS.
4. You will be able to understand and handle UNIX system calls.

## List of Experiments

| Lab Sheet Nos. | Topics | Hrs | Reading Assignment |
|---|---|---|---|
| 1 | Introduction to Unix Operating System and comparing it with Windows OS. Overview to Open Source Software. Writing and studying | 2 | PDF/ Word docs from Lab sheet #1 |

| | | | |
|---|---|---|---|
| | about how to execute C program in Unix environment using GCC compiler along with phases of compilation. Executing simple Hello World C program in UNIX environment using ed / nano / pico editor. | | |
| 2 | Working with the vi editor: Creating and editing a text file with the vi text editor using the standard vi editor commands | 4 | |
| 3 | UNIX for Beginners: Getting hands-on on basic UNIX commands | 2 | Chapter 1 of TEXT #1 |
| 4 | Some more UNIX commands: Working with directories, input-output redirection, Pipes, Processes | 2 | Chapter 1 of TEXT #1 |
| 5, 6 | The UNIX file system | 2 | Chapter 2 of TEXT #1 |
| 7, 8 | Using the Shell | 4 | Chapter 3 of TEXT #1 |
| 9, 10 | Working with filters: grep, sed and awk | 2 | Chapter 4 of TEXT #1 |
| 11-14 | UNIX Shell Programming | 8 | Chapter 5 of TEXT #1 |
| 15 | Programming with standard I/O | 2 | Chapter 6 of TEXT #1 |
| 16 | UNIX System Calls | 2 | Chapter 7 of TEXT #1 |
| | **Total Hrs.** | **30** | |

## References

1. Brian W. Kernighan and Rob Pike, "The UNIX Programming Environment" Prentice Hall India (Edition available in the form of E Book on student resource under PPT and notes folder)

2. Sumitabha Das, "UNIX: Concepts and Applications" Tata McGraw Hill (Latest Edition)

3. Yashwant Kanetkar, "UNIX Shell Programming" BPB Publications (First Edition)

4. Jerry Peek and others, "Unix Power Tools" O'Reilly Publishers

## Evaluation Scheme (To be modified)

- Attendance & Discipline in Lab:      15 marks
- Mid-Term Lab Exam and Viva:      20 marks
- End-Term Lab Exam and Viva:      20 marks
- Lab Records:      15 marks
- Regular Assessment:      30 marks

**Total:**      **100 Marks**

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

hydrograph, flood frequency analysis, flood estimation, flood routing through a reservoir, channel flow routing methods.

Ground water flow : Specific yield, storage coefficient, coefficient of permeability, confined and unconfined aquifers, aquitards, radial flow into a well under confined and unconfined conditions, tube wells, pumping and recuperation tests, ground water potential.

Water Resources : Ground and surface water resource, single and multipurpose projects, storage capacity of reservoirs, reservoir losses, reservoir sedimentation and economics of water resources projects.

Irrigation Engineering: Water requirements of crops, Moisture-crop relationship, Irrigation requirements, duty and delta, Irrigation efficiencies, Design of conventional and modern methods of irrigation, Irrigation of arid lands, Salinity of soil, Salinity control, Quality of irrigation water, Contaminants and their effects on various crop types, Rain water management, conjunctive use of water, Water logging causes and control, drainage system design.

Canals : Distribution systems for canal irrigation, canal capacity, canal losses, alignment of main and distributory canals, most efficient section, lined canals, their design, regime theory, critical shear stress, bed load, local and suspended load transport, cost analysis of lined and unlined canals, drainage behind lining.

River training: Objectives of river training, methods of river training, river training structures

## 10B11CE514 WATER SUPPLY ENGINEERING

Introduction: Importance of planned water supplies; financing, planning and execution of modern water supply schemes.

Water demands: Various types of demands; the per capita demand: variations in demand; design periods; population forecasting by various methods.

Sources of water: Kinds of water sources and their characteristics; factors governing the selection of a source of water supply; storage capacity of impounded reservoir.

Quality of water: physical, chemical and biological characteristics of water, common water born diseases, standards of purified water for various purposes.

Treatment of water: screening and types; aeration units; sedimentation; sedimentation tanks and their types; sedimentation aided with coagulation; classifications of filters and their constructional and operational details.
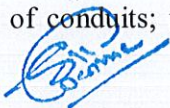
Disinfection: Methods of disinfection; chlorination and its types.

Water softening: Importance of water softening; lime- soda process; Zeolite process.

Miscellaneous treatment methods: Removal of colour, odour and taste, iron and manganese; fluoridation and defluoridation.

Collection and Distribution of water: Intakes and their design for lakes, streams and rivers; methods of distribution; concept of service and balancing reservoirs; capacity of distribution reservoirs; Design of water distribution systems; analysis of pipe networks by Hardy Cross method, equivalent pipe method, method of sections and Newton-Raphson method; Layout of distribution system; the house water connection; construction and maintenance of distribution systems.

Pipes-Joints-Fittings: various types of conduits; testing and inspection; joints in pipes; valves in pipe line.

# Web Technology Lab

COURSE CODE: 07B51CI703

COURSE CREDITS: 1

CORE/ELECTIVE: CORE

L-T-P: 0-0-2

**Pre-requisite:** Introduction to Computer Programming, DBMS

**Course Objective:** To develop the ability to design and implement web enabled applications.

## Course Outcomes (COs)

| S.NO | Course outcomes ( Web Technology Lab 10B28CI581) | Level of Attainment |
|------|--------------------------------------------------|---------------------|
| CO 1 | To understand the WWW, Internet, Protocols, Web browser, Web Server, concept of IP addresses and compression on web. | Familiarity |
| CO 2 | To understand the Web Architecture and how a Web client-server interaction happens. | Usage |
| CO 3 | To understand how a search engine /Meta search engine works. Further, you will become aware of the benefits and future of Web Applications | Familiarity |
| CO 4 | To understand the proficiency in Client side Scripting languages | Assessment |
| CO 5 | To understand the proficiency in Server side Scripting languages | Assessment |
| CO 6 | You shall be exposed to various client side and server side technologies required to design  Database Driven Websites | Usage |

## List of experiments

| S.No | Topic | No of Labs |
|------|-------|------------|
| 1 | Basic HTML Concepts | 2 |
| 2 | Implementation of CSS in/with HTML | 2 |
| 3 | Java Script, JAVA (applets, may be used in the final project of this lab course) | 3 |
| 4 | DHTML | 1 |
| 5 | XML | 2 |

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

IQAC

| | | |
|---|---|---|
| 6 | PHP and Use of Cookies and Session Management in Web pages | 3 |
| 7 | Database connectivity | 1 |
| 8 | Project | 2 |
| | **Total** | **16** |

**Evaluation Scheme:**

| | | |
|---|---|---|
| 1 | Mid Sem. Evaluation | 20 Marks |
| 2 | End Sem. Evaluation | 20 Marks |
| 3 | Attendance | 15 Marks |
| 4 | Lab Assessment | 45 Marks |
| | Total | 100 marks |

**References**

1. "Web Enabled commercial Application development using HTML,DHTML, Java Script, Perl CGI" by Ivan Bayross, BPB Publication
2. "Internet and World Wide Web – How to Program" by Deitel, Deitel and Nieto ,Pearson Education Asia Publication
3. "PHP and MYSQL Manual" by Simon Stobart and Mike Vassileiou
4. "PHP and MYSQL Web Development" by Luke Welling and Laura Thomson(Pearson Education
5. "The XML Bible", by Elliotte Rusty Harold
6. "Step by Step XML" by Michael J. Young Prentice Hall Of India
7. "XML How to Programme" Deitel Pearson Edition
8. "XML Hand Book" 3rd Edition Pearson Edition

Assistant Registrar (Academics)
Jaypee University of Information Technology
Waknaghat, Distt. Solan (H.P.)

IQAC
JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY * WAKNAGHAT *

**Course Outcomes (COs) contribution to the Programme Outcomes (POs)**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | Average |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|---------|
| CO1 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 3 | 1 | 3 | 2.4 |
| CO2 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 2 | 2 | 3 | 1 | 3 | 2.5 |
| CO3 | 3 | 3 | 3 | 2 | 2 | 3 | 1 | 2 | 3 | 3 | 1 | 3 | 2.4 |
| CO4 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 1 | 3 | 2.6 |
| CO5 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 1 | 3 | 2.6 |
| CO6 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 3 | 1 | 3 | 2.5 |
| Average | 3 | 3 | 3 | 2 | 2.7 | 2.8 | 2 | 2 | 2.5 | 3 | 1 | 3 | |