

# **O P JINDAL UNIVERITY**

**Scheme & Syllabus**

**Intel Integrated B. Tech**

**4<sup>th</sup> Semester**

**Department of Computer Science & Engineering**



# **OPJU**

**UNIVERSITY OF STEEL TECHNOLOGY  
AND MANAGEMENT**

**Computer Science and Engineering**  
**L: Lecture, T: Tutorial, P: Practical, C: Credit**

**Scheme of Teaching and Examination**  
**B. Tech (Computer Science and Engineering)**

**Academic Semester IV**

S. No.	Subject Code	Board of Study	SUBJECT	Periods per week			Scheme of Examination and Marks				Credit L+(T+P) /2  (L+T+P)
				L	T	P	PRE**		ESE*	Total Marks	
							Mid Sem	TA			
1	SOE-B-CSE401	MATH	Probability and Statistics	3	1	0	30	20	50	100	4
2	SOE-B-CSE402	CSE	Object Oriented Analysis and Design	2	0	0	15	10	25	50	2
3	SOE-B-CSE403	CSE	Microprocessor and Microcontrollers	2	1	0	20	15	40	75	3
4	SOE-B-CSE404	CSE	Database Management System	2	1	0	20	15	40	75	3
5	SOE-B-CSE405	CSE	Introduction to digital marketing and e-commerce	2	0	0	15	10	25	50	2
6	SOE-B-CSE406	CSE	MOOCS/SWAYAM/Certification/Liberal Arts	2	0	0	0	50	0	50	2
7	SOE-B-CSE407	CSE	Object Oriented Programming Lab	0	0	4	0	50	25	75	2
8	SOE-B-CSE408	CSE	DBMS Lab	0	0	4	0	30	20	50	2
9	SOE-B-CSE409	CSE	Microprocessor Lab	0	0	2	0	30	20	50	1
10	SOE-B-CSE410	CSE	Machine Learning with Python	0	0	4	0	50	25	75	2
11	SOE-B-CSE411	CSE	Mini Project / Case Study	0	0	2	0	30	20	50	1
12	SOE-B-CSE412	Humanities	Professional Development - II	0	0	2	0	30	20	50	1
<b>TOTAL</b>				<b>13</b>	<b>3</b>	<b>18</b>	<b>100</b>	<b>310</b>	<b>340</b>	<b>750</b>	<b>25</b>

\* End Semester Examination

\*\* Progress Review Examination

**Semester: IV** **Branch: Computer Science & Engineering**  
**Subject: Probability and Statistics** **Code: SOE-B-CSE401**

.....

### **Course Description**

The course is related to Probability and Statistics of both function of a single variable as well as functions of several variables. The purpose of studying probability and statistics is to introduce the mind to the scientific method of analysis through which the practical problems can be identified, explanations generated and logical solutions selected which in essence are requisites for the development of good engineering sense.

### **Course Objectives**

- To develop an ability to conceptualize, inquire, reason and communicate mathematically.
- To use the mathematical concepts of Statistics and Probability Distributions.
- To formulate and solve the real-life problems.
- To learn the process of fitting standard curves to the tabulated data.

### **Syllabus:**

#### **Unit-I: Linear Algebra:**

Definition and examples of vector spaces, Subspaces, Linear span, Linear combination, Linear dependence, independence and their basic properties, Basis, Dimension, Linear transformations and their representation as matrices, Quadratic Forms, Rank of matrices, Solving system of linear equations, Gauss elimination method.

#### **Unit-II: Statistics:**

Descriptive measures: Measures of central tendency; Measures of dispersion; Measures of skewness and Measures of kurtosis, Curve fitting: Method of group averages, Method of least squares.

#### **Unit-III: Probability:**

Basic probability theory; Axiom of probability; Some elementary theorems; Conditional probability; Bayes' theorem. Discrete Random variables; Discrete probability distribution; Continuous Random variables; Continuous probability distribution; Expectation; Variance; Standard deviation; Moments; Moments generating function; Coefficient of skewness and coefficient of kurtosis; Binomial, Poisson, Normal and Exponential Distribution.

#### **Unit-IV: Sampling, Estimation and Testing of Hypothesis:**

Sampling: Sampling Distribution of the Mean, Sampling Distribution of the Variance, chi-square, t and F distribution

Point and Interval Estimation: Point Estimation Methods by Method of Moments and Maximum Likelihood. Confidence Intervals for mean and variance of various distribution, Maximum Likelihood Estimators of Certain Functions of Parameters. Hypothesis Testing: Tests of Statistical Hypotheses for Single-Sample Case and Multiple-Sample Case, Tests Concerning Means, Tests Concerning Differences Between Means, Tests Concerning Variances, Tests Concerning Proportions.

### **Unit-V: Regression and Correlation:**

Scatter plots, Simple linear regression, Multiple regression, Drawing Conclusions, Regression diagnostics, Outliers and influence, Data Mining Approach to regression, logistic regression, Correlation, Introduction to Classification modelling (Machine Learning Approach).

### **Course Outcomes**

- After completion of the course, students will be able to learn how to use the topics while reading Artificial intelligence and neural network.
- The students will be able to formulate the real world problems.
- They will be able to draw conclusions out of the curves made by using above mentioned techniques.
- They will be able to solve problems of multiple domains.

### **Text Books**

- Elementary Linear Algebra by Stephen Andrilli, David Hecker, Fourth Edition, Academic Press.
- Elementary Linear Algebra: A Matrix approach, by Spence and Friedberg, PEARSON.
- Statistical Methods by N G Das, McGraw Hill.
- Fundamentals of Statistics by S C Gupta, Himalaya Publishing House.
- Random Phenomena Fundamentals of Probability and Statistics for Engineers by Babatunde A. Ogunnaike.
- Probability and Statistics for Engineers, 5th Edition by Richard L. Scheaffer, Madhuri S. Mulekar, James T. McClave. Brooks/Cole, Cengage Learning.
- Introduction to Probability and Statistics for Engineers and Scientists by Sheldon M. Ross, Elsevier Academic Press.
- Introduction to Probability and Statistics for Science, Engineering, and Finance by Walter A. Rosenkrantz, CRC Press.
- John E. Freund's Mathematical Statistics with Applications Irwin Miller Marylees Miller, Eighth Edition, PEARSON Publication.

**Semester: IV** **Branch: Computer Science & Engineering**  
**Subject: Object-Oriented Analysis and Design** **Code: SOE-B-CSE402**

**Course Description:**

This course emphasizes on analyze and design an application, system, or business by applying object-oriented programming and virtual model.

**Course Objectives:**

- Understand fundamentals of object-oriented programming.
- Have the ability to analyze and design an application applying OOP concept and models.
- Be able to select suitable model for software development.

**Syllabus:**

**Unit-I: Introduction:**

Structure of complex system, Attributes, Object model: evaluation, application; Concept of class object, nature, classification, Properties of OOP, etc.

**Unit-II: Software development life Cycle:**

Introduction, Phases, Types of Models and their applications.

**Unit-III: Modelling:**

Modelling: Object, Dynamic, Functional etc. Structured vs. Object Oriented Analysis

**Unit-IV: UML:**

Diagrams: class, object, Use case, state, Activity etc. Rules, Notations

**Unit-V: Object-oriented design:**

Stages, System Design, Object-Oriented Decomposition, Concurrency, Pattern, etc.

**Course Outcomes:**

Successful completion of the course, the student will able to:

- Identify classes, objects, members of a class and the relationships among them needed for a specific problem.
- Get an understanding of the principles and practice of object oriented analysis and design in the construction of robust, maintainable programs which satisfy their requirements.
- Make use of members of classes found in the Java API.
- Use testing and debugging tools to automatically discover errors of Java programs as well as use versioning tools for collaborative programming/editing.
-

- Develop programs using the Java Collection API as well as the Java standard class library.

**Text books:**

- Brett D. Mc Laughlin, David West, Gary Pollice “Head First Object-Oriented Analysis and Design”.
- Head First Java: Kathy Sierra and Bert Bates.

**Reference books:**

- Balaguruswamy, Programming with JAVA, TMH.
- Programming with Java: Bhave &. Patekar, Pearson Education.

**Semester: IV** **Branch: Computer Science & Engineering**  
**Subject: Microprocessor and Microcontrollers** **Code: SOE-B-CSE403**

.....  
**Course Description:**

The purpose of this course is to teach students the fundamentals of microprocessor and microcontroller systems. The student will be able to incorporate these concepts into their electronic designs for other courses where control can be achieved via a microprocessor/controller implementation. Advanced microcontrollers are often much more powerful, comparable to the very advanced microprocessors. The AVR and ARM processors are of this category.

**Course Objectives:**

- Understand fundamental operating concepts behind microprocessors and microcontrollers.
- Appreciate the advantages in using RISC microprocessors / microcontrollers in engineering applications.
- Design microprocessor based solutions to problems.
- Understand Low-Level and Embedded C Programming.
- Apply this knowledge to more advanced structures.

**Syllabus:**

**Unit-I:**

Brief introduction to 8085 CPU Architecture, Pin configuration, Addressing Modes Registers, Memory Addressing Instructions Set.

**Unit-II:**

THE 8086 ARCHITECTURE: Pin diagram of 8086 and description of various signals. Architecture block diagram of 8086 & description of sub-blocks such as EU & BIU & of various registers; Description of address computations & memory segmentation; Program relocation; addressing modes; Instruction formats. Instruction set of 8086.

**Unit-III:**

Microcontrollers: Type, processor architecture memory type, hardware features, 8051 Processor architecture, Addressing modes, 8051 Instruction Set– Data movement Instruction, arithmetic instruction, Logic instruction, Branch group Instruction

**Unit-IV.**

8051 software and programming: Memory interfacing and address decoding, programming Input/Output port/timer/ADC/DAC, Serial data communication controller and interrupt controller for different application with respect to instrumentation & control.

### **Unit-V.**

ARM Processor Fundamentals: Registers, current Program Status Registers, Pipeline Exceptions, Interrupts and Vector Table. Architecture Revisions, ARM Processor families, ARM instruction set, Thumb Instruction Set-Exceptions Handling Interrupts, Interrupt Handling schemes, firmware, Embedded Operating systems. Caches-cache architecture, Cache policy.

### **Course Outcomes:**

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

- Understand the evolution of processor architectures.
- Write simple programs in assembly language of Pentium processor.
- Interface peripheral devices and memory with microcontrollers.
- Program an ARM processor for various Applications.

### **Text books:**

- Brey, The Intel Microprocessors 8086- Pentium processor, PHI.
- A.K. Ray and K.M. Bhurchandi, “Advanced Microprocessors and Peripherals”, Tata McGrawHill,2000.
- Badri Ram, Advanced Microprocessors and Interfacing, TMH.
- Triekel & Singh, The 8088 & 8086 Microprocessors- Programming, Interfacing, Hardware & Applications: PHI.
- D.B. Hall, Microprocessor and Interfacing, McGraw Hill.
- Andrew N. Sloss, Dominic Symes, Chris Wright and John Rayfield, “ARM System Developer's Guide, Designing and Optimizing System Software”, Elsevier, 2004.

### **Reference books:**

- Yu-Chang Liu & Glenn, A Gibson, Microcomputer systems: the 8086/8088 Family: architecture, Programming & Design, PHI.
- Microsoft MASM Reference Manual- Published by Microsoft Corporation (Softcopy of Document available with MASM Software).
- Assembler Inside & Out; Harley Hahn Pub. Osborn McGrawHill, Burkley USA.



**Semester: IV** **Branch: Computer Science & Engineering**  
**Subject: Database Management System** **Code: SOE-B-CSE404**

.....  
**Course Description:**

This course offers lecture, laboratory, and online interaction to provide a foundation in data management concepts and database systems. It includes representing information with the relational database model, manipulating data with an interactive query language (SQL). It also includes database applications, security, and integrity and privacy issues.

**Course Objectives:**

The objective of this course is to enable the students to:

- Learn and practice data modeling using the entity-relationship and developing database designs.
- Understand and use of Structured Query Language (SQL).
- Apply normalization techniques to normalize the database.
- Develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency.

**Syllabus:**

**Unit-I: DBMS concepts and architecture:**

Database approach v/s Traditional file system, Advantages, Data models, Schemas and instances, Data independence, Data Base Language and interfaces, Database Structure, Functions of DBA and designer, ER data model: Entities and attributes, Entity types, Concept of Generalization, Aggregation and Specialization. transforming ER diagram into the tables. Various Data Model.

**Unit-II: Relational Data Models:**

Introduction to the Relational Model, Integrity Constraints, Querying on relational database, Logical database Design, Introduction to Views, Relational Algebra, and Relational calculus. SQL Queries, Nested subqueries, Aggregate functions, NULL values, Set operations, Logical connectivity's, Joins, SQL Triggers and Active Data bases.

**Unit-III: Database Design:**

Introduction to normalization, Normal forms, Functional dependency, Decomposition, Dependency preservation and lossless join, problems with null valued and dangling tuples, multivalued dependencies. Query Optimization: Introduction, steps of optimization, various algorithms to implement select, project and join operations of relational algebra, optimization methods: heuristic based, cost estimation based.

**Unit-IV: Transaction management and Concurrency control:**

Transaction management: ACID properties, Serializability and concurrency control, Lock based concurrency control (2PL, Deadlocks), Time stamping methods, optimistic methods, database recovery management.

**Unit-V: File indexing techniques and current trends in Database:**

File Organization and Indexing, Clusters, Indexes, Hashing and Tree Base Indexing. Database Security, current trends in Databases: Parallel databases, spatial databases, Distributed Databases, Introduction to DWDM.

**Course Outcomes:**

At the end of this course, the student will be able to:

- Design the relational database for various applications.
- Perform CRUD operations on database. (Create, Retrieve, Update, Delete).
- Understand & Implement the principles of transaction management, database recovery, security etc.
- Understand the concurrency control mechanism for database.
- Analyze multidimensional data with data cube.

**Text Books:**

- Data base System Concepts, By Silberschatz, Korth, McGraw Hill, 6th edition.
- Fundamentals of Database Systems, Elmasri Navathe, Pearson Education.

**Reference Books:**

- Advanced Database Management System, by Rini Chakrabarti, Shilbhadra Dasgupta, Wiley India Pvt. Limited.
- Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
- Data base Management Systems, By Raghurama Krishnan & Johannes Gehrke, TATA McGraw Hill, 3rd Edition.
- Principles of Distributed Database Systems, by M. Tamer Özsu, Patrick Valduriez Springer Science & Business Media, 24-Feb-2011.

**References:**

- IIT Mumbai Nature of Business Systems and Data Processing. Data Models, ER Model, ER Diagrams, UML Class Diagrams. Relational model and query languages (relational algebra and calculus, SQL). Integrity and Security. Database design and normalization. XML and XQuery. Storage structures. Indexing and Hashing Techniques. Query processing and optimization, transactions, concurrency control and recovery. Introduction to decision support and data analysis, data warehousing and data mining. Information Retrieval.

**Semester: IV** **Branch: Computer Science & Engineering**  
**Subject: Int. to Digital Marketing and E-commerce** **Code: SOE-B-CSE405**

.....

**Course Objectives:**

The course is designed to give a clear picture about the electronic business environment to the students. The most important point is to make the students understand and apply digitalization in business using electronic platform.

**Course Objectives:**

The purpose of this course is to cover all major digital platforms such as e-commerce, mobile, social media, and online search (both organic search and paid search). We also aim to introduce basic principles of Internet marketing, data on internet usage, online advertising, mobile marketing, email marketing, social network marketing, search engine marketing, user testing and other methods, web traffic analysis. The course further aims to illustrate the process to create and manage a paid search advertising campaign using Google Adwords, monitor the campaign performance using Google Analytics, and develop an effective e-commerce or m-commerce platform for sales and promotion.

**Syllabus:**

**Unit-I: Electronic Commerce**

Introduction, functions, advantages and disadvantages of electronic commerce, Electronic commerce V/s traditional commerce, progress of electronic commerce in India, electronic commerce model. Evolution of internet, components of internet world, internet infrastructure, internet service providers, World wide web. Building Website, Component of Website, Designing of Website, Types of Web Pages, Process of setting of Website. Types of SCM, benefits of SCM, functions of SCM, benefits of using the internet in SCM. Types of electronic payment, the traditional payment system, the step of electronic payment system, net banking, m-wallet.

**Unit-II: Digital Marketing**

Online shopping – Online purchasing, electronic market, three models of electronic market, electronic market dimension, market category, interactive marketing, one to one marketing, pull and push technology, B2B hubs, B2B market place, role of B2B market place. Introduction to CRM, marketing automation, components of CRM, CRM architecture, E-CRM. Introduction to Digital Marketing, Search engine optimization, email marketing, banner advertising, social media marketing

**Course Outcomes:**

On successful completion of this course, students are able to:

- recognize e-marketing concepts, theories, and context: e-business models, performance metrics, online advertising, and principles and practises of e-commerce and mcommerce, and its implication on marketing strategy.
- Acquire analytical skills to develop digital marketing strategy effectively.
- Evaluate how effective the firm's e-marketing operation is integrated to the firm's overall strategic objective.
- Use new media such as mobile, online search, and social networking sites, and be able to apply measurement techniques to evaluate digital marketing efforts.
- Demonstrate the ability to recognize the ongoing trends in global e-commerce markets and technology given the dynamic and rapidly changing digital landscape.

**Text Books:**

- E-Commerce by C.V.R. Murthy, Himalaya Publication
- E-Commerce Fundamental and Application by Chan, Lee, Dillon, Chang, Wiley

**Reference Books:**

- The Art of Digital Marketing by Ian Dodson, Wiley
- E-Commerce – A Managerial Prospective by P.T. Joseph, PHI