

**GUJARAT UNIVERSITY  
K. S. SCHOOL OF BUSINESS MANAGEMENT**

**MASTER OF SCIENCE  
COMPUTER APPLICATION & INFORMATION TECHNOLOGY  
(M.Sc. (CA&IT))  
[FIVE YEARS' FULL TIME INTEGRATED DEGREE COURSE]**

**Syllabus of ODD Semester (I/III/V/VII/IX)**

**Effective From Academic Year 2019-20 Onwards**

**M.Sc. (CA&IT) – ODD SEMESTER SUBJECT LIST**

**SEMESTER – I**

COURSE NO.	COURSE TYPE	Course / Subject	CREDIT
KS_C_EC-111	ELECTIVE	FUNDAMENTALS OF MANAGEMENT	2
KS_C_FC-112	FOUNDATION	FINANCIAL ACCOUNTING AND MANAGEMENT	2
KS_C_CC-113	CORE	FUNDAMENTALS OF PROGRAMMING	3
KS_C_CC-114	CORE	FUNDAMENTALS OF COMPUTER ORGANIZATION	3
KS_C_CC-115	CORE	MATHEMATICAL CONCEPTS	3
KS_C_CC-116	CORE	COMMUNICATION SKILLS	3
KS_C_CC-117	CORE	DATABASE MANAGEMENT SYSTEMS CONCEPTS	3
KS_C_CC-118	CORE	IMPLEMENTATION OF C PROGRAMMING (PRACTICAL ON CC-113)	3
KS_C_CC-119	CORE	IMPLEMENTATION OF OFFICE APPLICATIONS(PRACTICAL)	3
		<b>TOTAL CREDITS</b>	<b>25</b>

**SEMESTER – III**

COURSE NO.	COURSE TYPE	Course / Subject	CREDITS
KS_C_EC-231	ELECTIVE	FUNDAMENTALS OF ECONOMICS	2
KS_C_FC-232	FOUNDATION	SOFT SKILL DEVELOPMENT	2
KS_C_CC-233	CORE	COMPUTER ORIENTED STATISTICAL METHODS	3
KS_C_CC-234	CORE	CONCEPTS OF OPERATING SYSTEM	3
KS_C_CC-235	CORE	OBJECT ORIENTED PROGRAMMING WITH C++	3
KS_C_CC-236	CORE	DATA STRUCTURES	3
KS_C_CC-237	CORE	DISCRETE MATHEMATICS	3
KS_C_CC-238	CORE	IMPLEMENTATION OF C++ (PRACTICAL ON CC-235)	3
KS_C_CC-239	CORE	IMPLEMENTATION OF DATA STRUCTURE (PRACTICAL ON CC-236)	3
		<b>TOTAL CREDITS</b>	<b>25</b>

**SEMESTER – V**

COURSE NO.	COURSE TYPE	Course / Subject	CREDIT
KS_C_SE-351	ELECTIVE	CYBER LAW AND INTELLECTUAL PROPERTY	3
KS_C_FC-352	FOUNDATION	TECHNICAL COMMUNICATION	2
KS_C_CC-353	CORE	SOFTWARE ENGINEERING	3
KS_C_CC-354	CORE	COMPUTER GRAPHICS	3
KS_C_CC-355	CORE	OBJECT ORIENTED PROGRAMMING WITH JAVA	3
KS_C_CC-356	CORE	IMPLEMENTATION OF COMPUTER GRAPHICS (PRACTICAL CC-354)	3
KS_C_CC-357	CORE	IMPLEMENTATION OBJECT ORIENTED PROGRAMMING WITH JAVA (PRACTICAL ON CC-355)	3
KS_C_CC-358	CORE	SOFTWARE PROJECT DEVELOPMENT-I	5
		<b>TOTAL CREDITS</b>	<b>25</b>

**SEMESTER – VII**

COURSE NO.	COURSE TYPE	Course / Subject	CREDIT
KS_C_SE-471	ELECTIVE	ADVANCED DATABASE SYSTEMS	3
KS_C_FC-472	FOUNDATION	ENTERPREUNERSHIP SKILLS	2
KS_C_CC-473	CORE	OPERATIONS RESEARCH	3
KS_C_CC-474	CORE	ARTIFICIAL INTELLIGENCE	3
KS_C_CC-475	CORE	ADVANCED NETWORKING	3
KS_C_CC-476	CORE	SOFTWARE PROJECT MANAGEMENT & TESTING	3
KS_C_CC-477	CORE	ENTERPRISE RESOURCE PLANNING	3
KS_C_CC-478	CORE	PROJECT DEVELOPMENT ON KS_C_CC-474	5
		<b>TOTAL CREDITS</b>	<b>25</b>

**SEMESTER – IX**

COURSE NO.	COURSE TYPE	Course / Subject	CREDITS
KS_C_SE-591	ELECTIVE	IMAGE PROCESSING	3
KS_C_FC-592	FOUNDATION	NETWORK ADMINISTRATION	2
KS_C_CC-593	CORE	GEOGRAPHICAL INFORMATION SYSTEM	3
KS_C_CC-594	CORE	CLOUD COMPUTING	3
KS_C_CC-595	CORE	MOBILE APPLICATION DEVELOPMENT	3
KS_C_CC-596	CORE	DISTRIBUTED OPERATING SYSTEM	3
KS_C_CC-597	CORE	DATA COMPRESSION	3
KS_C_CC-598	CORE	PROJECT DEVELOPMENT ON KS_C_CC-595	5
		<b>TOTAL CREDITS</b>	<b>25</b>

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-1 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_EC-111**

**Subject Name: -Fundamentals of Management**

**Course Credit: - 2**

### **Objective:**

Practices in management in Indian context have been dealt with at both macro and micro levels. The objective of this course is to provide an understanding about basic management concepts and principles in simple and lucid style with their practical application. Moreover, it is designed to deal with management process and development of management thoughts essential for every working professional.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<p>Unit-1: <u>Nature and Scope of Management</u></p> <ul style="list-style-type: none"><li>• Definition and Meaning</li><li>• Roles of a Manager</li><li>• Levels of Management</li><li>• Managerial Skills</li><li>• Management – Science/ Arts/ Profession</li></ul> <p>Unit-2: <u>Management Process</u></p> <ul style="list-style-type: none"><li>• Functions/ Process of Management</li><li>• Management and Administration</li></ul>	(20%)
2	<p>Unit-1: <u>Planning</u></p> <ul style="list-style-type: none"><li>• Nature of Planning - Definition ,Meaning &amp; Overview</li><li>• Importance of Planning &amp; Limitations of Planning</li><li>• Forms of Planning (Distinction b/w Strategic &amp; Tactical Planning)</li><li>• Types of Plans (Single use plans &amp; Standing plans)</li><li>• Steps in Panning or Process of Planning</li><li>• Effective Planning</li></ul> <p>➤ Unit-2: <u>Forecasting</u></p> <ul style="list-style-type: none"><li>• Meaning &amp; Use of Business Forecasting</li><li>• Distinction b/w Planning and Forecasting</li><li>• Techniques of Forecasting – Qualitative &amp; Judgmental, Based on Past Results, Mathematical</li></ul>	(20%)

	<p>Models.</p> <ul style="list-style-type: none"> <li>➤ Unit-3: <u>Decision Making</u> <ul style="list-style-type: none"> <li>• Meaning of a Decision</li> <li>• Types of Decisions – Programmed &amp; Non-Programmed, Major &amp; Minor, Routine &amp; Strategic, Simplex &amp; Complex Decisions.</li> <li>• Decision Making Process (Steps + Basic Understanding – Not in Detail)</li> </ul> </li> </ul>	
3	<ul style="list-style-type: none"> <li>➤ Unit-1: <u>Organisation</u> <ul style="list-style-type: none"> <li>• Meaning &amp; Characteristics of Organisation</li> <li>• Process of Organising</li> <li>• Organisational Structures – Functional &amp; Matrix Structure</li> </ul> </li> <li>➤ Unit-2: <u>Authority &amp; Responsibility</u> <ul style="list-style-type: none"> <li>• Meaning , Sources of Formal Authority &amp; Use of Authority</li> <li>• Distinction b/w Authority and Power</li> <li>• Responsibility</li> <li>• Delegation of Authority – Meaning, Advantages &amp; Barriers to Effective Delegation</li> </ul> </li> <li>➤ Unit-3: <u>Centralisation &amp; Decentralisation</u> <ul style="list-style-type: none"> <li>• Distinction b/w Delegation and Decentralisation</li> <li>• Advantages of Centralisation and Decentralisation</li> <li>• How much Decentralisation? (Contingency View)</li> </ul> </li> </ul>	(20%)
4	<ul style="list-style-type: none"> <li>➤ Unit-1: <u>Staffing</u> <ul style="list-style-type: none"> <li>• Meaning &amp; Sub-functions of Staffing</li> <li>• Importance &amp; Need for Proper Staffing</li> <li>• Manpower Planning – Concept, Short-term &amp; Long-term Manpower Planning</li> <li>• Induction (Orientation)</li> </ul> </li> <li>➤ Unit-2: <u>Training &amp; Development</u> <ul style="list-style-type: none"> <li>• Meaning &amp; Need of Training &amp; Development</li> <li>• Types of Training Programs</li> <li>• Advantages of Training Programs</li> <li>• Distinction b/w Training and Development</li> <li>• MBO – Concept</li> </ul> </li> </ul>	(20%)

5	<ul style="list-style-type: none"> <li>➤ Unit-1: <u>Direction and Motivation</u> <ul style="list-style-type: none"> <li>• Meaning of Direction</li> <li>• Requirement/Importance of Effective Direction</li> <li>• Motivation – Concept, Determinants of Motivation</li> <li>• Theories of Motivation –           <ul style="list-style-type: none"> <li>a) Maslow's Need Hierarchy</li> <li>b) McClelland's Need for Achievement Theory</li> <li>c) Adam's Equity Theory</li> </ul> </li> </ul> </li> <li>➤ Unit-2: <u>Leadership</u> <ul style="list-style-type: none"> <li>• Meaning and Importance</li> <li>• Functions of Leaders</li> <li>• Leadership Styles</li> </ul> </li> </ul>	(20%)
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**Recommended Lecture Scheme:** Approximately 30 to 35 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Minimum five assignments should be given.

**Main Reference Books:**

1. Principles of Management by P C Tripathi and P N Reddy

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-1 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_FC-112**

**Subject Name: - Financial Accounting and Management**

**Course Credit: - 2**

### **Objective:**

Every business needs a person to manage finance and it is a diverse field. The course covers a wide variety of topics, starting from fundamentals of accountancy till the preparation of final accounts, to very advanced level topics like cost accounting. This course will help the students from different backgrounds to create a base of understanding of finance and accounts on the same platform.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	Financial Accounting:-Accounting as an information system, Accounting Principles, Concepts and Conventions, Accounting rule of debit and credit, Accounting Mechanics – Journal, ledger and Trial Balance, Branches of Accounting	(20%)
2	Preparation of financial accounts of non-corporate entities Format of Corporate Financial Statements	(20%)
3	Introduction to Cost Accounting: meaning purpose, classification of cost, methods of costing, techniques of costing (Theory only) Single output costing	(20%)
4	Introduction to Management Accounting: meaning, purpose Cash flow statement, Ratio Analysis (Simple sums only)	(20%)
5	Introduction to Financial Management, Time value of money, Capital Budgeting	(20%)

**Recommended Lecture Scheme:** Approximately 30 to 35 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Minimum five assignments should be given.

**Main Reference Books:**

1. Financial Accounting and Management for the First year BCA  
By B.S.Shah Prakashan
2. Management Accounting M.Com Part -II

**Reference Books:**

1. Accounting and Financial Management  
By D.R.Patel (Atul Prakashan)
2. Management Accounting  
By Khan and Jain
3. Management Accounting  
By I.M.Pandey
4. Financial Management  
By Khan and Jain
5. Financial Management  
By I.M.Pandey
6. Cost accounting  
By Saxena and Vasishth

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**K. S. SCHOOL OF BUSINESS MANAGEMENT**

**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-1 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-113**

**Subject Name: - Fundamentals of Programming**

**Course Credit: - 3**

### **Objective:**

It can be said that 'C' language is the base for all other programming languages. This course will demonstrate problem-solving skills by developing algorithms/flow-chart to solve problems, know the basic skills needed in programming, understand the basic principles and concepts of structured programming, to be able to write, compile, debug and run programs in C language.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	Problem solving – algorithm/flow charts. Fundamentals of the C programming language, data types, variables, operators, expressions	(20%)
2	Managing input output operations, control structures, Decision making, switch case	(20%)
3	Loops and their examples	(20%)
	Searching-Linear, Binary	
	Sorting- Selection, Bubble, Insertion	
	Arrays (One dimensional and Two dimensional)	
4	Operation on array	(20%)
5	String handling and different operations on strings	(20%)

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** in KS\_C\_CC-118

**Assignment:** Five assignments should be given.

### **Main Reference Books:**

1. Programming ANSI C

By E Balagurusamy, Tata McGraw-Hill publication and GCC manuals available on UNIX/LINUX

**Reference Books:**

1. Programming in c  
By PradipDey and Manas Ghosh (Oxford higher education)
2. C Complete Reference  
By Herbert Scheildt, 4th edition, Tata McGraw-Hill Publication
3. GCC Complete Reference  
By A. Griffith, Tata McGraw-Hill
4. Schaum's outline – Programming in C  
By Gottfreid, Tata McGraw-Hill Publication
5. Programming with ANSI and Turbo C By  
A.N. Kamthane, Pearson Education
6. Programming in C  
By M. T. Savalia, Atul Prakashan

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**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-1 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-114**

**Subject Name: - Fundamentals of Computer Organization**

**Course Credit: - 3**

### **Objective:**

Computer architecture is concerned with the structure & behavior of the various functional modules of computer & how they interact. Computer organization is concerned with the way the hardware components are connected together to form a computer system. The objective of the course is to introduce basic ideas and principles used in all digital computers, explain how arithmetic is performed in computers and how ALU is organized, coverage of Buses, Interfaces, Memory Organization and Input Output Devices.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>Number System</b> :- Binary, octal, Hexadecimal number system, Conversion from one system to another <b>Computer Arithmetic</b> : - Binary addition, subtraction, Multiplication & Division, Complements and its use for representing negative numbers & subtraction, floating point representation. <b>Codes for character representation</b> :- Hexadecimal, BCD, Excess-3, Gray code, ASCII Error detection codes (parity)	(20%)
2	<b>Boolean Algebra</b> :- Fundamental concepts of Boolean algebra, Basic laws of Boolean algebra, Simplification of expressions, De Morgan's theorems, Duality, Sum of product & product of sums <b>Logic gates</b> : - AND, OR, NOT. Other gates like NAND, NOR, EX-OR, EX-NOR. Their truth tables, symbols and equation, Simple logic circuits using gates, Building all basic gates using NAND, NOR gates, Design using NAND ,NOR gates	(20%)
3	<b>ALU</b> :- Construction of ALU, Binary Half Adder, Full Adder, Parallel Binary Adder, Binary Adder-Subtract, Addition in 1's and 2's complement system <b>Digital components</b> :- Integrated circuits, decoders and its expansion, Encoders, Multiplexers and its expansion, Memory unit	(20%)

4	Address, Data & Control bus <b>Input/output devices:-</b> Input/output devices: Key Board, Mouse, Display Unit, Printer (types), Scanner, OCR, OMR, MICR, Input/output interface, Asynchronous data transfer, and modes of data transfer. Concepts of programmed I/O, DMA. <b>Memory:-</b> Memory Hierarchy, primary Memory – RAM, SRAM, DRAM, ROM, Types of ROM, Secondary Memory(Magnetic Disk, Magnetic Tape), Optical Memory (CDROM), Concept of Virtual Memory, Concept of Cache and their need.	<b>(20%)</b>
5	<b>Flip-Flops</b> (SR, JK, D, T) its truth tables, Transfer circuit, Clocks, 3-4 bit registers, Shift register, Synchronous/Asynchronous binary counters <b>CPU:</b> - Functions of CPU, register classification and organization, instruction cycle, instruction formats, addressing modes. Simplification of Expressions using 2, 3, 4 variable k-Maps	<b>(20%)</b>

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Minimum five assignments should be given.

#### **Main Reference Books:**

1. Computer System Architecture  
By M. Morris Mano – PHI/Pearson Education
2. Digital Computer Fundamentals  
By Thomas C. Bartee – Tata McGraw Hill

#### **Reference Books:**

1. Fundamentals of Digital circuits  
By PHI/Pearson Education – A, Anand Kumar

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**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-1 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-115**

**Subject Name: -Mathematical Concepts**

**Course Credit: - 3**

### **Objective:**

The topics taught in this syllabus (course) are prerequisite for the courses like Discrete Mathematics, computer graphics, Image Processing, GIS etc. It is expected that the student has basic knowledge of sets, operation on sets, Venn diagram, Cartesian product of sets, functions and graphs of special functions like  $e^x$ ,  $\log x$ ,  $|x|$ ,  $\lfloor x \rfloor$ ,  $x - \lfloor x \rfloor$  to understand this course better.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>Two dimensional coordinate Geometry:</b> Distance formula – section formula – area of triangle – concurrent lines: centroid, in center and circumcenter of a triangle - Line and its equation – angle between two lines – condition for the set of lines to be parallel, perpendicular, overlapping or intersecting. <b>(**For extra activity only) three dimensional coordinate Geometry:</b> Distance formula – dot product, cross product, triple scalar product and triple vector product – equation of line in space – condition for the set of lines in space to be parallel, perpendicular, overlapping or intersecting	(20%)
2	<b>Trigonometry:-</b> Definition of trigonometric functions – identities – range ,domain and graphs of trigonometric functions – addition and factor formulae – multiple and sub-multiple forms of trigonometric functions(without proof) – solution of trigonometric equations <b>Applications:</b> - problems on Heights and distances etc...	(20%)
3	<b>Limits and continuity</b> of real valued function of one variable, standard Formulae of limits (without derivation), improper limits <b>Differentiation:</b> - first principle of differentiation – standard rules and formulae of derivatives – differentiation of all type of function: algebraic function, trigonometric function, exponential and logarithmic function, composite function – higher order derivatives	(20%)
4	<b>Indefinite integration:</b> - anti-derivative – method of substitution (including trigonometric substitution) – method of integration by	(20%)

	parts – method of integration by partial fractions and integrations of type $\int \sin^m x \cos^n x dx$ , $\int \frac{(Ax + B)dx}{ax^2 + bx + c}$ , $\int \frac{(Ax + B)dx}{\sqrt{ax^2 + bx + c}}$ etc...	
5	<b>Maclaurin's series</b> expansion of $e^x$ , $\sin x$ , $\cos x$ , $\log(1+x)$ <b>Definite Integration:</b> - some standard results – area of a bounded region – solution of first order linear differential equation by the method of variable separable and solution of homogeneous differential equations.	(20%)

**Note:**All theorems are without proof. In some cases, a discussion of how & why is essential.

**\*\*Extra activity:** It includes written assignment, viva-voce, class presentation etc...Not to be asked in the internal or external examinations.

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Minimum five assignments should be given.

#### **Main Reference Books:**

1. XI<sup>th</sup> and XII<sup>th</sup> standard, science stream mathematics textbooks (Gujarat board)
2. Analytic geometry of two and three dimensions  
By Hema vasavada

#### **Reference Books:**

1. Calculus and Analytical Geometry  
By G.B.Thomas & R.L.Finney, Pearson education Indian reprint
2. Calculus, brooks / Cole pub. Company  
By Stewart J
3. A problem book in mathematical analysis  
By G.N.Berman, Mir publishers MOSCOW and CBS publishers & distributors, INDIA
4. Calculus, 3rd edition  
By M.Spivak, publishes or perishes inc. Houston 1994
5. Differential calculus & Integral Calculus  
By Shantinarayan

### **Chapter wise coverage From Textbook:**

#### **Unit – 1:**

Chapter – 8 (Standard 10 textbook Gujarat Board)

Chapter – 6 (Standard 11 semester-1 Gujarat Board textbook)

#### **Unit-2:**

Chapter – 4 (Standard 11 semester 1 Gujarat Board textbook)

Chapter – 5 (Standard 11 semester 1 Gujarat Board textbook)

Chapter – 4 (Standard 11 semester 2 Gujarat Board textbook)

Chapter – 5 (Standard 11 semester 2 Gujarat Board textbook)

Chapter – 6 (Section 6.1 of Standard 11 semester 2 Gujarat Board textbook)

Chapter – 2 (Till section 2.15 of Standard 12 semester 3 Gujarat Board textbook)

#### **Unit-3**

Chapter – 10 (Standard 11 semester 2 Gujarat Board textbook)

Chapter – 11 (Standard 11 semester 2 Gujarat Board textbook)

Chapter – 5 (Standard 12 semester 3 Gujarat Board textbook)

#### **Unit-4**

Chapter – 6 (Standard 12 semester 4 Gujarat Board textbook)

Chapter – 2 (Standard 12 semester 4 Gujarat Board textbook)

#### **Unit-5**

Chapter – 3 (Standard 12 semester 4 Gujarat Board textbook)

Chapter – 4 (Till section 4.2 of Standard 12 semester 4 Gujarat Board textbook)

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**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-1 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-116**

**Subject Name: - Communication Skills**

**Course Credit: - 3**

### **Objective:**

Communication skills play a vital role to differentiate oneself in today's challenging & competitive world. It is imperative for students to get acquainted with various modes of English namely speaking, reading, writing & listening. This course curriculum will enable the students to develop basics of communication including verbal and non-verbal communication. Simultaneously the grammar is very essential, be it any mode of English. On the whole, this will enhance their communication potential.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
<b>1</b>	Definition of Communication Importance of Communication Process of Communication Objectives of Communication Barriers to effective Communication	<b>(20%)</b>
<b>2</b>	Verbal: Written, Oral Non-Verbal: Kinesics, Paralanguage, Proxemics	<b>(20%)</b>
<b>3</b>	Direction of Communication: Downward, Upward, Lateral or Horizontal, Diagonal	<b>(20%)</b>
<b>4</b>	Grammar: Articles, Preposition, Verbs, Tenses, Part of speech, Auxiliary, Vocabulary Words	<b>(20%)</b>
<b>5</b>	Short Stories (Subject to change every year)	<b>(20%)</b>

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

### **Assignment:**

1. Writing :- Non-verbal Communication, Visit to Institute
2. Reading

**Main References Books:**

1. Business Communication By Urmila Rai and S.M.Rai ,  
Himalaya Publishing House
2. Business Communication By Meenakshi Raman & Prakash Singh  
Oxford, ,2<sup>nd</sup> edition.

**References Books:**

1. Business Communication  
By V.K.Jain & Omprakash Biyani
2. Business Communication  
By Rajendra pal & korlahally
3. Business Communication  
By Urmila rai & S.M.Rai
4. Modern commercial correspondence  
By R.S.N. Pillai & Bagavathi
5. Murphy's English Grammar  
By Raymond Murphy

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**K. S. SCHOOL OF BUSINESS MANAGEMENT  
[Five Years' (Full-time) Integrated Degree  
Course]**

## **Semester-1 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-117**

**Subject Name: - Database Management Systems Concepts**

**Course Credit: - 3**

### **Objective:**

Database is one of the crucial components of every software application; hence the understanding of database management system becomes very important. The objective of this course is to understand the concept, role and importance of Database, know the basic skills required in managing a Database System, to recognize the elements of Database for real applications, to identify the key relationship between the Database components, to comprehend the type of relational model to apply according to the scenery of applications, demonstrate Database management skills by designing and developing databases.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>DBMS Concepts:-</b> Database approach- Characteristics, & Application, Advantages of DBMS, Database Architecture - Data Models, Schemas, and Instances, Data Independence, Classification of DBMS –Network & Hierarchical Model - Overview, Data Modeling, Levels of abstraction, file organization, index structures for files.	(20%)
2	<b>Entity Relationship Model:</b> - Features of E-R Model, Basic modeling concepts: degree of data abstraction, the E-R Model (with example): Entities, Attributes and Entity Sets, Relation and Relationships sets, cardinality, Extended ER Features: Generalization & Specialization - overview. Aggregation. <b>The Relational Database Model:-</b> Relational model concepts & constraints, Enforcing Data Integrity, Integrity Constraints, Relational Data, Logical Data Base Design, E-R to Relational. <b>Relational Algebra:-</b> Operations on Relational Algebra.	(20%)

<b>3</b>	<b>Normalization Of Database Tables:-</b> CODD RULE, Introduction to Schema, Refinement, Functional Dependencies, Database tables, normalization and database design (with example) ,Normal Forms-First, Second, Third, Boyce code Normal Form and Multi-valued Dependencies.	<b>(20%)</b>
<b>4</b>	<b>DBMS Package(Access):-</b> Access DBMS concepts, Creating a new Database, tables, fields & its properties, data-types, Concept of Primary key, adding/editing data, navigating, sorting, indexing, filtering, designing queries, using forms, report generation facilities, relationships, joins. <b>Transaction Management:</b> - Transaction Concepts, properties, states, implementations of Atomicity and Durability, Concurrent Executions, Serializability, and Recoverability	<b>(20%)</b>
<b>5</b>	<b>Concurrency Control:-</b> Overview, Lock based protocol, Timestamp based protocol, Concurrency control problems, concurrency control with time stamping methods <b>Deadlock:</b> - Deadlock & Deadlock Handling, Locks, Failures, Types of Failures and Database Recovery Methods.	<b>(20%)</b>

**Recommended Lecture Scheme :** 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not applicable

**Assignment:** Minimum five assignments should be given.

#### **Main Reference Books:**

1. Database System Concept  
By Silberschatz, Korth, Sudarshan, McGraw Hill,Fifth Edition
2. Database Management System  
By G. K. Gupta Tata McGraw Hill publication

#### **Reference Books:**

1. Database Systems- Design, Implementation and Management  
By Rob & Coronel (Course Technology-Thomson Learning)4thEdition
2. Fundamentals of Database Systems  
By Elmsasri, Navathe, Pearson Education, Fifth Edition (2008)
3. An Introduction to Database Systems  
By C.J.Date, a Kannan, S Swaminathan, Pearson Education, Eighth Edition (2006) (Equivalent Reading)

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-1 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-118**

**Subject Name: - Implementation of C (Practical on CC-113)**

**Course Credit: - 3**

### **Objective:**

Practical implementation of theory is necessary. It will enhance the basic skills needed in programming, understand the basic principles and concepts of structured programming, to be able to write, compile, debug and run programs in C

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
<b>1</b>	Basic programs of C using various data types, operators and mathematical built in functions	<b>(20%)</b>
<b>2</b>	Managing Input-output operations, control structures, Decision Making, Switch Case.	<b>(20%)</b>
<b>3</b>	Programs based on for loop, while loop and do while loop. Searching Programs: Sequential and binary search, Sorting Programs: Bubble sort, selection sort, insertion sort.	<b>(20%)</b>
<b>4</b>	Programs based on one dimensional array and Programs using two dimensional arrays and various operations on matrices. Arrays - (One dimensional and Two dimensional)	<b>(20%)</b>
<b>5</b>	Programs for doing different operations on strings	<b>(20%)</b>

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** 3 hours of supervised lab per week.

**Assignment:** Minimum five assignments should be given.

### **Main Reference Books:**

1. Programming ANSI C  
By E Balagurusamy, Tata McGraw-Hill publication and GCC manuals available on UNIX/LINUX

**Reference Books:**

1. Programming in c  
By Pradip Dey and Manas Ghosh (Oxford higher education)
2. C Complete Reference  
By Herbert Scheildt, 4th edition, Tata McGraw-Hill Publication
3. GCC Complete Reference  
By A. Griffith, Tata McGraw-Hill
4. Schaum's outline – Programming in C  
By Gottfreid, Tata McGraw-Hill Publication
5. Programming with ANSI and Turbo C  
By A.N. Kamthane, Pearson Education
6. Programming in C  
By M. T. Savalia, Atul Prakashan

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-1 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-119**

**Subject Name: - Implementation Of Office Applications (Practical)**

**Course Credit: - 3**

### **Objective:**

The focus of this course lies on understanding of computers, computer operating system and application of relevant software in managerial decision-making, understanding the basic networking technology, introduction to internet technology and designing of static web page.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	Word Processing Concepts: Saving, Closing, Opening and exiting document, Selecting text, Editing text, Finding and Replacing text, Printing documents, Creating and Printing Merge documents, Character and Paragraph Formatting Page Design and layout Editing and proofing tools: Creating Tables, checking and correcting spelling, Handling Graphics, Charts, Mailings, References, Macros. Doc basic command & batch file.	(20%)
2	Document Templates & Wizards Multiple worksheets & operation on theme, charts, pictures, file operations, printing worksheets, macros, templates, interface with other software packages Creating database in worksheet and there operations. Spreadsheet Concepts:- navigation worksheet, entering & editing data into cells, formulas & operators, range of cells, moving – coping –transposing data, absolute and relative cell reference, spell checking, insert-delete-hide-show rows & columns, change-column width & row height ,Formatting data, sorting data, Searching & Replacing data.	(20%)
3	Pivot tables :- Creating Table, Filtering Table Data, Analyze Data . Lookup, Vlookup, Hlookup. Creating, opening and saving presentations, Adding & formatting text, paragraphs, checking spelling & correcting typing mistakes, Drawing and working with objects, adding clip-art & other pictures, designing slide shows.	(20%)

<b>4</b>	Access DBMS Concepts, Creating a new Database, Creating tables, Creating Queries, Creating Forms, and Creating Reports, macros.	<b>(20%)</b>
<b>5</b>	Creating web page with HTML- using language header, document formatting, hypertext links, graphics, images, forms, tables, frames, Overview and features HTML 5	<b>(20%)</b>

**Recommended Practical Scheme:** 3 hours of supervised lab per week

**Assignment:** Minimum 5 Assignments should be given.

**Main References Books:**

1. PC Software Made Simple for window 98  
By R.K. Taxali, MC Millan Publication, New Delhi
2. Internet and Web Design  
By Rohit Khurana, Mac Millan Publication, New Delhi
3. HTML 5, Black Book, dreamtech Press

**References Books:**

1. Microsoft office, Professional for windows 95,  
By Dienes, Sheila S, Instant Reference; BPB Publication, Delhi
2. Fundamentals of the internet and the Worldwide web  
By Raymand Greenlaw, Ellen Hepp, TMH
3. The Compact Guide to Microsoft Office  
By Mansfield, Ron, BPB Publication, Delhi
4. Understanding Networking and Internet, Dryden Press.  
By Charles S. Parker

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-3 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_EC-231**

**Subject Name: - Fundamentals of Economics**

**Course Credit: - 2**

### **Objective:**

Economics is a social science concerned with the proper uses and allocation of resources with a view to achieving & maintaining growth with stability. Moreover it is not only the price theory but also the study of the economy as a whole. The course aims to acquaint the students with the subject of economics and various economic concepts that affects our daily work of life.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	Definitions (Adam Smith, Marshall and Robbins) Subject matter of economics Scope of economics	(20%)
2	Meaning of demand, Kinds of demand Law of demand Meaning of supply & stock Law of supply Extension & contraction & increase & decrease of supply curve	(20%)
3	Definition & classification of markets Market forms <ul style="list-style-type: none"><li>1. Pure competition</li><li>2. Perfect competition</li><li>3. Imperfect competition<ul style="list-style-type: none"><li>a. Monopolistic</li><li>b. Duopoly</li><li>c. Oligopoly</li></ul></li><li>4. Monopoly</li></ul>	(20%)
4	Goods, utility, value – income, saving and investment Land, labour, capital & entrepreneur Rent, wages, interest & profit	(20%)
5	Capitalism – Meaning & features Socialism - Meaning & features Mixed economy - Meaning & feature	(20%)

**Recommended Lecture Scheme:** Approximately 30 to 35 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Minimum five assignments should be given.

**Main Reference Book:-**

1. Elementary Economic Theory  
By K.K Dewett & J.D.Verma

**Reference Book:-**

1. Fundamentals of Economics- Sudhir Prakashan
2. Principles Of Microeconomics-H.L Ahuja
3. Micro economics-M.L Jhingan

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-3 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_FC-232**

**Subject Name: - Soft Skill Development**

**Course Credit: -2**

### **Objective:**

It is said that the things can be said; but what is more important is “how it is said”. Therefore, this course will enable the students to develop their inner skills and be soft in manifestation of their thoughts. It will help the students to imbibe the soft skill traits which will help them in practical world.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	Introduction to soft skills Meaning, Antiquity, Classification Communication & Networking Consistency & Predictability Soft Skills as a competitive weapon Making formal presentation	(20%)
2	Time Management Attitude Ethics, Integrity, Value and Trust Empathy and listening skills Self Confidence and courage Problem solving Leadership, Teamwork & Interpersonal Skill	(20%)
3	Understanding the role of teams in organizations Defining types of groups and teams Ensuring team success Becoming a high performing team Difference between teams and groups	(20%)
4	Work ethic and commitment Maintaining a professional workspace Managing time and Managing stress Taking advantage of professional opportunities	(20%)
5	Understanding the system and identifying powerful people Developing diplomacy skills and cultivating allies Dealing with negative politics Developing power and influence	(20%)

**Recommended Lecture Scheme:** Approximately 30 to 35 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Minimum five assignments should be given.

**Reference Books:**

1. Soft Skills for everyone  
By Jeff Butterfield, Cenage Learning
2. Personality Development and soft Skills –  
By Barun Mitra, Oxford

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**K. S. SCHOOL OF BUSINESS MANAGEMENT**

**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-3 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-233**

**Subject Name: - Computer Oriented Statistical Methods**

**Course Credit: - 3**

### **Objective:**

Any scientific, business or economic activity requires planning, formulation of policies and their implementation. In relation to this, statistical data and advanced techniques of statistical analysis are immensely useful in the solution of a variety of problems. The volume of data one has to deal with makes the use of computer oriented statistical methods indispensable for analysis. The objective of this course is to gain knowledge in comprehending, condensing, analyzing and interpreting data. It is expected that the student has knowledge of collection, classification and tabulation of data, diagrammatic and graphic representation of data, basic concepts of set theory, permutation and combination.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<ul style="list-style-type: none"><li>• Classical, Empirical and Axiomatic Probability – Addition and Multiplication rules of Probability – Pair-wise and Mutual Independence</li><li>• Theoretical Distributions: Binomial, Poisson and Normal Distribution</li></ul>	(20%)
2	Point Estimation, Sampling Distribution of a Statistic, Interval Estimation, Testing of Hypothesis, Large Sample Tests:- Test of Significance for – Single Proportion, Difference of Proportions, Single Mean, Difference of Means and Difference of Standard Deviation	(20%)
3	Student's t - distribution, t - test for – Single Mean, Difference of Means and Observed Sample Correlation Coefficient, Fisher's z- transformation	(20%)

4	<ul style="list-style-type: none"> <li>• Chi-Square Distribution, - test for – Goodness of fit, Independence of Attributes, Several Proportions and Population Variance</li> <li>• F- Distribution, F-test for – Equality of Population Variance and Equality of Several Population Means i.e. Analysis of Variance:-One-way Classification and Two way Classification</li> </ul>	<b>(20%)</b>
5	<p>Types of Correlation, Correlation and Causation – Methods of Studying Correlation – Scatter Diagram Method – Karl Pearson's Coefficient of Correlation of Correlation</p> <p>—</p> <p>Meaning of Linear Regression, Lines of Regression, Coefficients of Regression</p> <p>Time series, components of time series, trend analysis through least square and moving average method, estimation of seasonal index through moving average method.</p>	<b>(20%)</b>

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Minimum 5 assignments should be given.

**Text Book:**

1. Fundamentals of statistics, By S.C.Gupta, Himalaya Publishing House, 7<sup>th</sup> Edition
2. Fundamentals of Business statistics, By J.K. Sharma,Pearson

**Reference Books:**

1. Statistics for Management, By T N Srivastava, Shailaja Rego, Tata McGraw Hill (TMH)
2. Business statistics in Practice, By Bruce L.Bowerman, Richard T.O'Connell, Emily S.Murphree
3. Business statistics,By Naval Bajpai, Pearson
4. Statistics for Management, By Richard I.Levin, David S.Rubin, Prentice-Hall India, 7<sup>th</sup> Edition
5. Introduction to probability Models,By Sheldon M.Ross, 9<sup>th</sup> Edition, Academic Press, Elsevier

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-3 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-234**

**Subject Name: - Concept of Operating System**

**Course Credit: - 3**

### **Objective:**

The operating system is a vital component of the system software in a computer system. Application programs require an operating system to function. The objective of this course is to provide an understanding of the basic concept of evolving OS, describe the role and purpose of OS; study the concept of management of memory, disk & file. Students can understand the efficient use of primary & secondary storage of their application.

<b>UNIT NO.</b>	<b>COURSE CONTENT</b>	<b>WEIGHTAGE (%)</b>
1	<b>Operating System Overview:</b> Basic Elements, Processor Register, Instruction execution, Interrupts Memory hierarchy, Cache, I/O communications, Operating system functions, Evolution of OS-Serial, Batch, Multiprogramming, and Time-sharing Systems <b>Process Description and Control:</b> Process States, Transitions, Description, Process Control	20%
2	<b>Concurrency:</b> Principles of Concurrency, Mutual Exclusion-Hardware Support, Semaphores, Monitors, Message Passing, Reader/Writer Problem. <b>Deadlock and Starvation:</b> Principles of Deadlock, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, an Integrated Deadlock Strategy, Dining Philosophers Problem.	20%
3	<b>Memory Management:</b> Memory Management Requirements, Memory Partitioning, Paging, Segmentation. Virtual Memory management	20%
4	<b>Processor Scheduling:</b> Types of Scheduling, Scheduling Algorithms <b>Threads:</b> Processes and Threads.	20%

5	<b>I/O Management:</b> I/O Devices, I/O Function, OS Design Issues, I/O Buffering, Disk Scheduling, RAID, Disk cache. <b>File Management:</b> Overview, File Organization, B-Trees, File Directories, File Sharing, Record Blocking, Secondary Storage Management.	20%
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**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Minimum five assignments should be given.

**Note:** A case study on Windows Operating System can be given as 1 of the assignments.

**Main Reference Books:**

1. Operating systems internals and design principles  
By William Stallings, PHI, 8<sup>th</sup> Edition

**Reference Books:**

1. Operating System Principles  
By Silberschatz, A., Peter B. Galvin and Greg Gagne, Wiley-Indian
2. Operating Systems concepts and Design  
By Milan Milankovic, McGraw hill
3. Operating systems  
By Achyut S.Godbole, Tata Mcgraw hill
4. Operating systems Design & implementation  
By Andrew Tanenbaum, PHI

# **GUJARAT UNIVERSITY**

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**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-3 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-235**

**Subject Name: - Object Oriented Programming with C++**

**Course Credit: - 3**

### **Objective:**

C++ has become the language of choice for most professional programmers. Knowing how things work in C++ is important. Knowing why things work that way is what would separate you from the crowd. The course aims at making the students understand the difference between procedures oriented and object oriented programming. Students must understand basic principles and benefits of object oriented programming.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>Principles of Object Oriented Programming and Benefits of OOP language, Application</b> <b>Introduction to C++:-</b> Structure of C++ program, Classes in C++, Tokens, Keywords and Identifiers, Data types, Symbolic constants, variables and their declarations, Reference variables, Operators, operator precedence , Control structures. <b>Functions:-</b> Function prototyping, Call by value and call by reference, Return by Reference, Inline Functions, Default arguments, Constant Arguments, Function Overloading <b>Classes and Objects:-</b> Structures ,Nesting of member functions , Private member functions , Arrays within class, Static data members , Static member functions , Memory Allocation for objects ,Arrays of Objects , Passing of Objects in the functions , Returning objects from functions , Friendly functions ,Constant Member Functions, Pointers to Members	(20%)
2	<b>Constructors and Destructors:-</b> Constructors, Default Constructors, Multiple Constructors, Copy Constructors,, Dynamic Constructors, Destructors <b>Operator overloading and type Conversions:-</b> Overloading Unary Operators, Overloading Binary Operators, Overloading Using Friend Functions, Manipulation of Strings using Operators, Type Conversions	(20%)
3	<b>Inheritance: - Base class,</b> Derived Class, Single Inheritance, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Inheritance of private, public and protected members, Constructor in inheritance, Abstract	(20%)

	Class, Virtual base Class <b>Pointers, Virtual functions and polymorphism:</b> - Pointers to Objects, “this” pointer, Pointer to derived class, Virtual functions, Pure Virtual Functions.	
4	<b>Input/output Operations:</b> - C++ Input/Output Streams, C++ stream classes, Unformatted and Formatted Input/Output Operations. <b>File Operation:</b> - Classes for File Stream Operations, File Operations, Modes of File Operations, File Pointer and their Manipulators, Sequential Input and Output Operations, Read and write operation on object, Random Access, Error Handling, Command Line Arguments.	(20%)
5	<b>Templates:</b> - Class Templates, Class Templates with multiple parameters, Function templates, Function templates with multiple parameters, Overloading of Template functions, member function templates, Non-Type Template Arguments. <b>Exception Handling:</b> - Basics of Exception Handling, Exception Handling Mechanism, Throwing Mechanism, Catching Mechanism, Ret rowing an Exception, Specifying Exceptions. <b>Manipulating Strings</b> :-Initializing string using constructor and applications of string class function <b>New Features of ANSI C++ Standard</b> :- New data types, casting operators, mutable and explicit keywords, namespace	(20%)

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Covered in KS\_C\_CC-238

**Assignment:** Minimum 5 assignments should be given.

#### **Main Reference Books:**

1. Object Oriented Programming with C++  
By Balagurusamy, Tata McGraw-Hill Publication, Sixth Edition

#### **Reference Books:**

1. C++ Complete Reference  
By Herbert Schildt, TMH
2. Object Oriented Programming in Turbo C++  
By Robert Lafore, Galgotia Publication
3. Programming with ANSI C++  
By Bhushan Trivedi, Oxford University Press
4. Thinking in C++  
By Bruce Eckel, Pearson Education
5. Object Oriented Programming in ANSI Turbo C++  
By Ashok Kamthane

- 6.** Big C++  
By Cay Horstmann, Timothy Budd, Wiley Publication
- 7.** Let Us C++  
By Yashwant Kanetkar
- 8.** Object Oriented Programming - Fundamentals and Applications  
By Sengupta & Chaudhary, Prentice-Hall India, 1998.
- 9.** A Treatise on Object Oriented Programming using C++  
By Chandra, Narosa Publishing House, 1998
- 10.** Programming with C++  
By Saurav Sahay Oxford

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**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-3 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-236**

**Subject Name: - Data Structures**

**Course Credit: - 3**

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### **Objective:**

Computer science is primarily concerned with the study of data structures and their transformation by mechanical means. This course presents the data structures & algorithms that underpin much of today's computer programming. The course focuses on providing a good knowledge of primitive and non-primitive data structures and its applications, detailed study of internal and external sorting methods, basics of algorithm analysis and optimization.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>Array:</b> Mapping of array elements (1,2 and 3 dimensional) Triangular and Sparse arrays (Only Theory) <b>Stack:</b> Push and Pop algorithms <b>Applications of Stack:</b> Conversion of infix-postfix forms, Evaluation of postfix expression, Recursion.	(20%)
2	<b>Queue:</b> Implementation of Queue using static structure, Circular Queue, Priority Queues (Only Theory) <b>Linked list :</b> Single Linked list - Insert, Delete, Copy, Concatenate, Double linked list - Insert, Delete, Circular linked list - Insert, Delete	(20%)
3	<b>Trees:</b> <b>General Trees (Only Theory)</b> <b>Binary Trees (Only Theory):</b> Definitions, traversal in binary tree (Algorithms-Recursive + Iterative),Creation of Binary tree from prodder and in order, post order and in order <b>Threaded Binary tree (Only Theory):</b> Definition and concept, finding in order successor, in order predecessor <b>Binary Search Tree:</b> Insertion and deletion in a BST <b>Height Balanced tree/AVL tree (Only Theory):</b> Definition, Insertion and deletion in AVL trees	(20%)
4	<b>Graph:</b> Matrix Representation of graphs, Graph traversal DFS and BFS , Wars halls algorithm , Spanning trees, Kruskals algorithm , Prims algorithm	(20%)

5	<b>Sorting Algorithms:</b> Bubble Sort, Selection sort, Insertion sort, Quick sort, Merge sort, Radix sort <b>Searching algorithms:</b> Sequential search, Binary search	<b>(20%)</b>
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**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Covered in KS\_C\_CC-239

**Assignment:** Minimum five assignments should be given.

#### **Main Reference Books:**

1. Data Structures  
By Seymour Lipschutz
2. Data Structures and algorithm analysis in C  
By Mark Allen weiss, Second Edition
3. An introduction to data structures and applications  
By trembley and Sorenson Tata McGraw hill publication

#### **Reference Books:**

1. Classic Data Structures  
By Samantha PHI Publication
2. Data Structures and Program Design in C  
By Robert Kruse, Prentice- Hall India
3. Data Structures using C and C++,  
By Tenebaum, Prentice-Hall India, IIInd Edition, 1997.

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## **Semester-3 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-237**

**Subject Name: - Discrete Mathematics**

**Course Credit: - 3**

### **Objective:**

Discrete mathematics, sometimes called finite mathematics, is the study of mathematical structures that are fundamentally discrete in the sense of not supporting the notion of continuity. A study of discrete sets has become more and more necessary because of its application to Computer Science and various areas of engineering.

The objective of this course is to present the foundations of many basic computer related concepts that are widely used in many spheres of computational science. Also, this course will enhance the student's ability to think logically and mathematically. It is expected that the student have elementary knowledge of Set Theory, Functions and counting techniques to appreciate this course better.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>Elementary Logic:</b> Statements and connectives – well-formed formulas – order of precedence of connectives – Tautologies and Contradictions – equivalence of formulae – Principle of duality – functionally complete sets of connectives (exclusive OR). Normal Forms – Principal Disjunctive normal forms (PDNF) and Principal Conjunctive normal forms (PCNF) – Valid inferences using truth table and direct method of proof – Rules of inference (Rules P and T) – Consistency of premises and indirect method of proof	(20%)
2	<b>Predicate Calculus, Relations:</b> The Predicate Calculus – Introduction to Predicates, Statement functions, Variables and Quantifiers – Free & Bound Variables – the universe of discourse – Special Valid formulae involving Quantifiers – Theory of Inference for the Predicate Calculus. Introduction to sets – operations on sets and Venn diagrams – De Morgan's law - Relation – domain & range of a relation – total no. of distinct relation from a set A to set B – Graph of a relation – Matrix of a relation – types of relations in a set – Equivalence relation	(20%)

3	<b>Lattices:</b> Partitions & relation induced by a partition – Composition of relations – Closure of a relation - Partial order relation, POsets & Hasse diagram – totally ordered sets – bounds – well-ordered sets. Introduction of Lattice as POset, lattice as Algebraic system – Direct product of lattices – Chain, Complete lattice, Distributive lattice, complemented lattice.	<b>(20%)</b>
4	<b>Boolean algebra and Functions:</b> Introduction to Boolean algebra – Irreducible elements – atoms & antiatoms – Stone's representation theorem (without proof) – minterm & maxterm – canonical forms and free Boolean algebras – Boolean function – symmetric Boolean expression – minimizing circuits using Karnaugh map. Functions – composition of functions – binary & n-ary operations – Inverse of a function – Characteristic function	<b>(20%)</b>
5	<b>Introduction to Algebraic Structure:</b> Binary operation and its properties – binary operation table – Group and its examples – semigroup – subgroup – cyclic group – Abelian group – Permutation Groups: Product of permutations, inverse of a permutation, cyclic permutation, transpositions, even and odd permutation – Lagrange's theorem (without proof) – Group codes – Brief introduction to algebraic structures with 2 or more operations.	<b>(20%)</b>

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable.

**Assignment:** Minimum five assignments should be given.

#### **Main Reference Books:**

1. Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill Pub. Co. Ltd.  
By J.P. Tremblay and R. Manohar
2. Discrete Mathematics, Oxford University Press.  
By S.K. Chakraborty and B.K. Sarkar

#### **Reference Books:**

1. Discrete Mathematical Structures and its Application, 6<sup>th</sup> edition, TMH.  
By Kenneth Rosen
2. Essentials of Discrete Mathematics, Jones & Bartlett India Pvt. Ltd.  
By David J. Hunter

3. Discrete and Combinatorial Mathematics: An Applied introduction by Addison Wesley Pub. Company  
By Ralph P. Grimaldi
4. Introduction to Fuzzy Sets and Fuzzy Logic, PHI.  
By M. Ganesh
5. Boolean algebra & its applications, Addison Wesley Publishing Company.  
By J. Eldon Whitesitt
6. Contemporary Abstract Algebra, 4<sup>th</sup> edition, Narosa Publishing House, New Delhi.  
By Joseph A. Gallian:
7. A First Course in Abstract Algebra; Chapman & Hall / CRC, New York.  
By Marlow Anderson & Todd Feil.
8. Discrete mathematics, oxford university press by R.K Bisht & H.S. Dhami.

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## **Semester-3 [M.Sc. (CA & IT)]**

**Subject Code: - Ks\_C\_CC-238**

**Subject Name: - Implementation of C++ (Practical on CC-235)**

**Course Credit: - 3**

### **Objective:**

The goal of the course is to become proficient in solving problems using object oriented approach, become proficient in implementing solution using C++.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	Basic programs of C++ using various data types Simple Program for reference variable, scope-resolution operator Simple Program for the usage of manipulator endl and setw Program based on call by reference, return by reference Program for inline function Program based on default argument into function Program for function overloading A C++ program with class A C++ program with class with usage of static data member and static member function A C++ program for array of object and passing objects as function argument, returning object A C++ program based on friend function	(20%)
2	Program based on default constructor, copy constructor, multiple constructor and dynamic constructor Program for overloading binary as well as unary operator using member function as well as friend function Program based on type conversion from class to class, class to basic and basic to class type	(20%)
3	Program based on single, multiple, multilevel, hybrid inheritance Program based on pointer to objects, pointer to derived class	(20%)
4	Program based on file operation Program based on File pointer Program based on command line argument Program based on formatted & unformatted I/O operation	(20%)
5	Program based on class template and function template Program based on exception handling Program based on manipulation on String	(20%)

**Recommended Practical Scheme:** 3 hours of supervised lab per week

**Assignment:** Minimum five assignments should be given.

**Main Reference Books:**

1. Object Oriented Programming with C++  
By Balagurusamy, Tata McGraw-Hill Publication, Sixth Edition

**Reference Books:**

1. C++ Complete Reference  
By Herbert Schildt, TMH
2. Object Oriented Programming in Turbo C++  
By Robert Lafore, Galgotia Publication
3. Programming with ANSI C++  
By Bhushan Trivedi, Oxford University Press
4. Thinking in C++  
By Bruce Eckel, Pearson Education
5. Object Oriented Programming in ANSI Turbo C++  
By Ashok Kamthane
6. Big C++  
By Cay Horstmann, Timothy Budd, Wiley Publication
7. Let Us C++  
By Yashwant Kanetkar
8. Object Oriented Programming - Fundamentals and Applications  
By Sengupta & Chaudhary, Prentice-Hall India, 1998.
9. A Treatise on Object Oriented Programming using C++  
By Chandra, Narosa Publishing House, 1998
10. Programming with C++  
By Saurav Sahay Oxford

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## **Semester-3 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-239**

**Subject Name: -Implementation of Data Structure(Practical on CC-236)**

**Course Credit: - 3**

### **Objective:**

To gain the knowledge of various advanced data structure topics practically, to develop skills for effective use of the pointers and structures in programming. A sound knowledge of C/C++ is necessary for implementation of practical programs.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	Implementation of various operations of array. Implementation of various operations of stack. Implementation for infix to postfix conversion and evaluation of postfix expression.	(20%)
2	Implementation of various operations of queue. Implementation of various operations of circular queue. Implementation of various operations on singly linked list. Implementation of various operations on doubly linked list. Implementation of various operations on circular linked list.	(20%)
3	Implementation of binary search tree – insertion and deletion.	(20%)
4	Implementation of graphs.	(20%)
5	Implementation of all sorting and searching methods.	(20%)

**Recommended Practical Scheme:**3 Hours of supervised lab per week

**Assignment:** Minimum five assignments should be given.

### **Main Reference Books:**

1. Data Structures  
By Seymour Lipschutz
2. Data Structures and algorithm analysis in C  
By Mark Allen weiss, Second Edition
3. An introduction to data structures and applications  
By trembley and Sorenson Tata McGraw hill publication

**Reference Books:**

1. Classic Data Structures  
By Samantha PHI Publication
2. Data Structures and Program Design in C  
By Roert Kruse, Prentice- Hall India
3. Data Structures using C and C++,  
By Tenebaum, Prentice-Hall India, IIInd Edition, 1997.

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-5 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_EC-351**

**Subject Name: - Cyber Law and Intellectual Property**

**Course Credit: - 3**

### **Objective:**

The subject and the course content will help the student to understand, explore, and acquire a critical understanding of Cyber Law. Also develop competencies for dealing with frauds and deceptions and other cybercrimes that are taking place via the Internet; Make learner conversant with the social and intellectual property issues emerging from 'Cyberspace'; Explore the legal and policy developments in various countries to regulate Cyberspace; Develop the understanding of relationship between commerce and cyberspace; and Give learners in depth knowledge of Information Technology Act and legal frame work of Right to Privacy, Data Security and Data Protection.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>Introduction:</b> Indian Contract Law; definition and its essential Elements, Online Contracts, Introduction to Intellectual Property; Types; definitions and exemptions, Importance <b>Managing Intellectual Property:</b> Drivers of IP management, Framework of IP management and its protection	(20%)
2	<b>Introduction to cyber laws and policies:</b> Information Technology Act 2008, Cybercrimes Definition of Crime, Types of Internet Crimes, Cyber Crime and IPR <b>IPR issues in Cyber space:</b> IPR in Cyber Space; Patents in Digital Technology, Copy Rights in Digital Space, WIPO Internet Treaties, Trademark Online Introduction,	(20%)
3	<b>Internet and software related issues:</b> Protection of Software Copyright, Open Source, Reverse Engineering <b>Trademark Issues in Cyber Space:</b> Domain Name, the ICANN Uniform Domain Name Dispute Resolution Policy	(20%)
4	<b>Various IPR Laws:</b> Patents Act 2005, Trademarks Act 1999, Copyrights Act 1957, Trade Secrets, Integrated Circuit Designing, Geographical Indications	(20%)
5	<b>International Treaties</b> <b>Licensing Agreement:</b> Licensing of the Basic Intellectual Property, Advantages and Disadvantages of Licensing, Types of Licensing Agreements <b>Competition Law:</b> IPR and Competition policy	(20%)

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Minimum three Assignments should be given

**Reference Books:**

1. Managing Intellectual Property , The strategic Imperative by Vinod V. Sople
2. Cyber Laws and IT Protection by Harish Chander, PHI publication
3. Computer and Information Technology Law by Dr. Krishna pal Malik, Allahabad Law Agency Law publishers
4. Nandan Kamath, Law Relating to Computers Internet & E-Commerce, 2nd Edition, Universal Law Publishing Co. Pvt. Ltd.
5. David Lindsay, International Domain Name Law ICANN at the UDRP, (2007) Hart Publishing, Oxford and Portland, Oregon.
6. Business Laws by S. S. Gulshan and G. K. Kapoor
7. Intellectual Property Rights by P. Narayan
8. Law of Trademark & Geographical Indications by K.C.Kailasam
9. Cyber law & Cyber crimes by Adv. Prashant Mali; Snow White Publications.

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-5 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_FC-352**

**Subject Name: - Technical Communication**

**Course Credit: - 2**

### **Objective:**

The course syllabus is designed to acquaint the students with the basic technicality of communication. This will enable the student to get to know the difference between technical writing & general writing as well as it will enhance their communicational skills.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>Introduction to Technical Communication</b> :-Need for and importance of communication, Features of technical communication, Difference between technical writing & general writing, style, history & importance of technical communication(for business, for students)	(20%)
2	<b>Technical Writing Skills:</b> - Meaning& purpose of technical writing, importance & principles of effective writing, Types and techniques of writing, objectives &methods of improving writing skills	(20%)
3	<b>Listening Skills</b> :-Importance, meaning, process, types of listening, methods for improving listening skills <b>Speaking Skills:-</b> Meaning, importance & types of speaking skills, objective of improving speaking skills	(20%)
4	<b>Presentation &amp; Group Discussions:</b> - Planning, outlining & structuring of presentations, Nuances of delivery, use of visual aids & application of Ms power point, group discussions, Precise	(20%)
5	<b>Preparing Resume and Interviews:</b> Resume/CV/Covering letter <b>Interviews:</b> - preparing for types of interview questions, Types of interviews <b>Referencing and styling</b> in research papers	(20%)

**Recommended Lecture Scheme:** Approximately 30 to 35 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Minimum 5 Assignments should be given.

**Main Reference Books:**

1. Basic Technical Communication by Kavita Tyagi & Padma Mishra, PHI 2012

**Reference Books:**

1. Business Communication by Meenakshi Raman & Prakash singh, Oxford 2<sup>nd</sup> Edition.

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-5 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-353**

**Subject Name: - Software Engineering**

**Course Credit: - 3**

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### **Objective:**

Learning Development Process, Select and Apply Appropriate Metrics to Estimate Understand, Analyze and Model User's Requirements, Select Appropriate Process Model apply it to All Stages of Software Development Life Cycle, Select and Apply Appropriate Design Methodology, Decide the Feasibility of Using and Applying Agile Software Size, Effort, and Cost. Prepare Project Schedule, and Monitor the Project Progress, Systems Analysis and Design, Database Management System, Algorithm and Programming knowledge

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>Software and Software Engineering</b> :- Nature of Software , web applications, software engineering, Software Process , practice, Software Myths <b>Software Engineering Process Models</b> :- Prescriptive Process Models <b>Agile Development</b> :- Agile Process, Extreme Programming (XP), Brief Overview of Other Agile Process Models: Adaptive Software Development, Scrum	(20%)
2	<b>Requirements Modeling</b> :-Requirements Engineering, Groundwork for Understanding of Software Requirements, Negotiating Requirements, Validating Requirements, Requirement Analysis, <b>Design Concepts</b> :- Software Quality Guidelines and attributes, Design Concepts, Design Model <b>Architectural Design</b> :- Architectural Styles, Architectural Design	(20%)
3	<b>Component-Level Design</b> :- Three Views of Component, Designing Class-Based Components, <b>User Interface Design</b> :- Golden Rules of User Interface Design; WebApp Interface Design <b>WebApp Design</b> :- Design Pyramid for WebApp; WebApp	(20%)

	Interface Design; Aesthetic Design of WebApp; Content Design for WebApp; Architecture Design; Navigation Design; Component-Level Design	
4	<b>Quality Concepts :-</b> What is Quality, Software Quality, <b>Software Review :-</b> Overview of Review Techniques , Cost impact of Software Defect; Defect Amplification & Removal , Review Metrics , Informal Review, Formal Technical Review <b>Software Testing :-</b> A Strategic Approach to Software Testing, issues; Testing Strategies for conventional software, object oriented software and Webapp, Validation Testing, System Testing	(20%)
5	<b>Testing Conventional Application :-</b> Software Testing Fundamental , White-Box Testing, Basic Path Testing , Black Box Testing, <b>Product Metrics :-</b> Framework for Product Metrics: measures, metrics and Indicators, Function Based Metrics ;Metrics for source code, Metrics for Maintenances <b>Mobile App Design and Testing strategies :-</b> Technical consideration developing mobile app, mobility environment, Testing strategies, comparition with conventional approach, testing tool and environment	(20%)

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Minimum five assignments should be given.

#### **Main Reference Books:**

1. Roger S. Pressman, “Software Engineering – A Practitioner’s Approach”, TATA McGraw Hill Publications, 7th Edition.
2. \*Roger S. Pressman, “Software Engineering – A Practitioner’s Approach”, TATA McGraw Hill Publications, 8th Edition.

#### **Reference Books:**

1. Sommerville, “Software Engineering”, Pearson Education,8th Edition.
2. Waman S. Jawadekar, “Software Engineering – Principles and Practices”, TMGH Publication
3. Rajib Mall, Fundamentals of Software Engineering, Prentice-Hall, 2011.
4. Jibitesh Mishra and Ashok Mohanty, “Software Engineering”, PERSON
5. Subhajit Datta, “Software Engineering Concept and Application”, OXFORD
6. Pankaj Jalote, “Software Engineering – A Precise Approach”, Wiley India
7. Waman S. Jawadekar, “Software Engineering – A Primer”, TMGH Publication
8. Shari Lawrence Pfleeger and Joanne M. Atlee, “Software Engineering – Theory and Practice”, Pearson Education, 3rd Edition.

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-5 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-354**

**Subject Name: - Computer Graphics**

**Course Credit: - 3**

### **Objective:**

Understanding of 2D and 3D Graphics and graphics display devices, Understanding basic primitives their attributes and apply transformations on them, Knowledge of 2D and 3D geometry, matrices, basic trigonometry, basics of computer programming and data structures.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	Point, Lines, Line segments, Vectors, Pixels and frame buffers <b>Display devices:-</b> Refresh CRT, Raster scan and random scan displays, color CRT monitors, Direct view storage tubes, Flat panel displays <b>Line drawing algorithms:-</b> DDA and BRESENHAM	(20%)
2	<b>Introduction to random scan concepts:</b> - Attributes of line color, width, style, caps and joins. Character generation Primitive operations, Display file interpreter, Normalized device coordinates, Display file structure, Display File algorithms, Display control, Text.	(20%)
3	<b>Polygons:</b> - Types of Polygons, Polygon representation, Inside-Outside tests, Polygon Interfacing Algorithms, Polygon filling algorithm, filling with a pattern <b>2-D Geometric Transformation:</b> - Basic Transformations- translation, Rotation, Scaling, Homogeneous coordinate systems, Composite transformations, other transformations- Reflection, shear.	(20%)
4	<b>Viewing and Clipping:</b> - Viewing pipeline, viewing coordinate reference frame, window-to viewport coordinate transformation, Clipping- Point clipping, Line clipping algorithms-Cohen Sutherland, Liang Barsky. Polygon clipping algorithms-Sutherland Hodgeman, Weiler-Atherton, Curve clipping, text clipping, exterior clipping <b>Segments:</b> -Introduction, The segment table, Segment Creation, Closing a segment, deleting a segment, renaming a segment, Visibility Image transformation, saving and showing segments	(20%)

5	<b>Introduction to 3-D geometry:</b> -Depth cueing, visible line and surface identification, surface rendering, exploded cutaway views, stereoscopic views, Parallel Projection, Perspective projection, 3D transformations, Overview of 3D viewing and clipping	<b>(20%)</b>
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**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Covered in KS\_C\_CC\_356

**Assignment:** Minimum three assignments should be given.

#### **Main Reference Books:**

1. Computer Graphics 'C' Version  
By Donald Hearn, M. Pauline Baker, Pearson Education, Second Edition
2. Computer Graphics: A programming approach  
By Steven Harrington, McGraw -Hill, 1987, Second Edition

#### **Reference Books:**

1. Computer Graphics: Principles and Practice  
By J. Foley, A. van Dam, S. Feiner, and J. Hughes, Addison-Wesley, 1990.
2. Principles of Interactive Computer Graphics  
By W. Newman and R. Sproull, McGraw-Hill Second Edition.
3. Theory and Problems of Computer Graphics  
By R. Plastock and G. Kalley, McGraw-Hill International Edition, 1986.

#### **Chapter wise coverage From Textbook:**

- **Unit 1 :**  
Chapter -2(Textbook1),  
Chapter 1(Textbook2)
- **Unit 2 :**  
Chapter -3(Textbook1),  
Chapter 2(Textbook2)
- **Unit 3 :**  
Chapter -5(Textbook1),  
Chapter 3(Textbook2)
- **Unit 4 :**  
Chapter -6(Textbook1),  
Chapter 5(Textbook2)
- **Unit 5 :**  
Chapter-9(Textbook1),  
Chapter -11(Textbook1)  
Chapter -12(Textbook1)

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-5 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-355**

**Subject Name: - Object Oriented Programming with Java**

**Course Credit: - 3**

**Objective:**

Implement the basic principles and concepts of object oriented programming using core java. To be able to develop GUI based platform independent application

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<ul style="list-style-type: none"><li>• <b>Introduction to Object Oriented Environment :-</b> Class, Object, Inheritance, Encapsulation, Abstraction Polymorphism,</li><li>• <b>Introduction of java:</b> - The Byte-code, Features of Java, IDE for Java, Java Program Structure and Java's Class Library.</li><li>• <b>Data Types, Variables, and Operators :-</b> The Simple Data Types, Literals, Variables, Scope of Variable, Type Conversion and Casting, Automatic Type Promotion in expressions, Java Operators, Operator Precedence.</li><li>• <b>Control Statements:</b> - Selection Statements– if and switch, Iterative Statements –for, while, do.... While, Jump Statements-break, continue</li><li>• <b>Introduction to Classes:</b> - Definition of a Class, Definition of Methods, Constructors, Creating Objects of a Class.</li></ul>	(20%)
2	<ul style="list-style-type: none"><li>• <b>Classes and Method in Detail:</b> - Method overloading, Constructor Overloading, Assigning Object Reference Variables, Access Modifier. The Reference, Inner classes, Automatic Garbage Collection.</li><li>• <b>Arrays and Strings :</b>-Arrays, Arrays of Characters, String Handling Using String Class,</li></ul>	(20%)

	<p>Operations on String Handling Using String Buffer Class.</p> <p><b>Inheritance:-</b> Using Existing Classes, Class Inheritance, Choosing Base Class, Access Attributes, Polymorphism, Multiple Levels of Inheritance, Abstraction through Abstract Classes, Using Final Modifier, The Universal Super class -Object Class, Concept of Interface</p>	
3	<ul style="list-style-type: none"> <li><b>Packages and Interface:-</b> Understanding Packages, Defining a Package, Packaging up Your Classes, Adding Classes from a Package to Your Program, Understanding CLASSPATH, Standard Packages, Access Protection in Packages.</li> <li><b>Exception Handling:-</b> The Idea behind Exceptions, Types of Exceptions, Dealing with Exceptions, Exception Objects, Defining Your Own Exceptions</li> </ul> <p><b>Multithreading Programming:-</b> The Java Thread Model, Understanding Threads, The Main Thread, Creating a Thread, Creating Multiple Threads, Thread Priorities, Synchronization, Inter-thread communication, Deadlocks</p>	(20%)
4	<ul style="list-style-type: none"> <li><b>Enumerations, Autoboxing &amp; Annotations(Metadata):-</b> Enumeration Fundamentals, Type Wrappers, Autoboxing and method, Introduction of Annotations</li> <li><b>Input/output in Java :-</b> I/O Basic, The Stream Classes, The Byte Streams, The Character Streams, I/O Classes, Reading Console Input Writing Console Output, Reading and Writing on Files, Serialization, Stream Benefits.</li> <li><b>Generics:-</b> introduction of generics</li> <li>Collection Framework, Collection interface, list interface, map interface.</li> </ul>	(20%)
5	<ul style="list-style-type: none"> <li><b>Creating Applets in Java:</b> - Applet Basics, Applet Architecture, Applet Life Cycle, Simple Applet Display Methods, Requesting Repainting, Using the Status Window, The HTML APPLET Tag Passing Parameters to Applets.</li> <li><b>Handling Events in Java :-</b> Two Event Handling Mechanisms, The Delegation Event Model, The Event Handling Process, Event Classes, Sources of Events, Event Listener Interfaces, Using the Delegation Event Model, Adapter Classes</li> <li><b>Working with Windows, Graphics and Texts:</b> -</li> </ul>	(20%)

	<p>Working with Graphics, Working with Color, Setting the Paint Mode, Working With Fonts, Managing Text Output Using Font Metrics, Exploring Text and Graphics.</p> <p><b>Working with AWT Controls, Layout Managers and Menus</b> :- Control Fundamentals, Labels, Buttons, Check Boxes and Check, Box Groups, Choice Controls, Lists, Scroll Bars, Text Field and Text Area Controls, Understanding Layout Managers, Flow Layout Manager, Border Layout Manager, Grid Layout Manager, Using Insets Manager, Card Layout Manager, Menu Bars and Menus, Dialog Boxes, File Dialog</p>	
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**Recommended Lecture Scheme:** Approximately 45 hours of classroom teaching,

**Recommended Practical Scheme:** Applicable

**Assignment:** One assignment every month.

**Main Reference Books:**

1. Java The Complete Reference  
By Herbert Schildt, TMH Publication, 8th Edition

**Reference Books:**

1. Beginning Java 2 By Ivor Horton , Wiley Computer Publishing, 5 Edition (2007)
2. Teach Yourself JAVA  
By Josheph O'Neil & Herb Schildt, Tata McGrow Hill
3. Core Java: An Integrated Approach  
By Dr. R Nageswara Rao, dreamtechh press, 1<sup>st</sup> edition
4. Programming with JAVA: A printer  
By Balagurusamy, Tata McGrow Hill, 2nd Edition
5. Programming in java  
By sachin malhotra & saurabh choudhary, oxford press

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-5 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC\_356**

**Subject Name: - Implementation of Computer Graphics**  
**(Practical on KS\_C\_FC-354)**

**Course Credit: - 3**

**Objective:**

Implementing algorithms and programs for 2D graphics, Knowledge of 2D and 3D geometry, basics of computer programming and data structures

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	Make familiar with the inbuilt functions of graphics.h file. Implementation of line drawing using DDA algorithm. Implementation of line drawing using Brenham's algorithm Implementation of line drawing algorithms to draw different styles, colors and thickness of lines. Implementation of Mid-point circle drawing Algorithm	(20%)
2	Drawing characters using Bitmap and Stroke method. Using primitive operations drawing different objects. Using primitive operation for characters draw different styles of text.	(20%)
3	Draw polygons using absolute and relative commands. Solid filling of polygons using scan line method. Filling patterns inside polygon	(20%)
4	Implement the following transformation techniques Translation, Rotation, Scaling, Reflection, Shearing	(20%)
5	Implementation of line clipping by Cohen Sutherland algorithm and Liang Barsky algorithm Implementation of polygon clipping by Sutherland Hodgeman algorithm.	(20%)

**Recommended Practical Scheme:**3 hrs of supervised lab per week

**Assignment:** Minimum five assignments should be given.

**Main Reference Books:**

1. Computer Graphics 'C' Version  
By Donald Hearn, M. Pauline Baker, Pearson Education, Second Edition.
2. Computer Graphics: A programming approach  
By Steven Harrington, McGraw -Hill, 1987,Second Edition

**Reference Books:**

1. Computer Graphics: Principles and Practice  
By J. Foley, A.van Dam, S. Feiner, and J. Hughes, Addison-Wesley, 1990.
2. Principles of Interactive Computer Graphics  
By W. Newman and R. Sproull, McGraw-Hill Second Edition.
3. Theory and Problems of Computer Graphics  
By R. Plastock and G. Kalley, McGraw-Hill International Edition, 1986.

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**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-5 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-357**

**Subject Name: - Implementation Object Oriented Programming with JAVA  
(Practical on KS\_C\_CC-355)**

**Course Credit: - 3**

**Objective:**

The objective of this course is to understand the concept of Object oriented programming in core java. Establish Strong understating of object oriented programming approach using core java.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<ul style="list-style-type: none"><li>• Steps for setting up environment variable</li><li>• Implement Practical for Core java using various data types</li><li>• Simple Program for Core Java using Class and object</li><li>• Simple Program for core java using scope of variable and operator</li><li>• Implement practical for core java using Type Conversion and Casting</li><li>• Program for Automatic Type Promotion in expressions</li><li>• Program based on Operator Precedence</li><li>• Programs for Selection Statements such as if and switch. And looping such as do, do...while, while, for And Jump Statements-break, continue</li><li>• Programs for Methods and static Method and constructor.</li></ul>	(20%)
2	<ul style="list-style-type: none"><li>• Program based on default constructor, Parameterized constructor, multiple constructor and dynamic constructor</li><li>• Program for Method overloading, Constructor Overloading, Reference Variables, And Access Modifier.</li><li>• Program for Array Handling function</li><li>• Program for String Handling function</li><li>• Program based on String Handling Using String Buffer Class.</li><li>• Program for Class Inheritance (such as single Inheritance, multi level inheritance) .</li><li>• Program for Polymorphism, Abstraction through Abstract Classes using Final Modifier,</li><li>• Program for Concept of Interface and implementation of multiple Inheritance</li><li>• Program for Creating Packages, Adding Classes into Package</li></ul>	(20%)

3	<ul style="list-style-type: none"> <li>• Simple Practical with exception with try and catch block</li> <li>• More Practical for try, catch, throw, throws,</li> <li>• Demonstrate the concept of Multi Threading</li> <li>• Practical for Thread Priorities, Synchronization, Inter-thread communication</li> <li>• Practical for wrapper classes And Autoboxing\Unboxing</li> <li>• Demonstration for concept of Annotation</li> <li>• Practical programme for collection interface</li> </ul>	<b>(20%)</b>
4	<ul style="list-style-type: none"> <li>• Program based on I\O Basic</li> <li>• Program based on Reading Console Input</li> <li>• Program based on Reading file and working with file</li> <li>• Demonstrate the stream classes</li> <li>• Demonstrate Applet classes</li> <li>• Demonstration for simple applet practical display method</li> <li>• Practical for Applet and HTML with together</li> <li>• Practical for based on the generics.</li> </ul>	<b>(20%)</b>
5	<ul style="list-style-type: none"> <li>• Program based on Graphics and Text</li> <li>• Program for demonstration of color, paint method, font, Exploring Text and graphics</li> <li>• Program based Working with all controls such as Labels, Buttons, Check Boxes and Check, Box Groups, Choice Controls, Lists, Scroll Bars, Text Field and Text Area Controls</li> <li>• Program based on Different types of Layouts, Menu bar, Dialog Boxes and File Dialog</li> <li>• Program for event handling</li> </ul>	<b>(20%)</b>

**Recommended Practical Scheme:** 3 hrs of supervised lab per week

**Assignment:** Minimum 3 Assignment

#### **Main Reference Books:**

1. Java The Complete Reference  
By Herbert Schildt, TMH Publication, 8th Edition

#### **Reference Books:**

1. Teach Yourself JAVA  
By Josheph O'Neil & Herb Schildt, Tata McGrow Hill
2. Core Java: An Integrated Approach  
By Dr. R Nageswara Rao, 1<sup>st</sup> edition, dreamtechh press
3. Programming with JAVA: A printer  
By Balagurusamy, 2nd Edition, Tata McGrow Hill
4. Programming in java  
By sachin malhotra & saurabh choudhary, oxford press

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**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-5 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC -358**

**Subject Name: - Software Project Development - I**

**Course Credit: - 5**

### **Objective:**

To solve industrial (or society or research) problems, to plan, schedule, analyse and synthesize requirements, design the interface and monitor the software project development of a large project cohesively. Prepare documentation of the project.

### **Guidelines :**

1. The project definition should be finalized during 5th semester from industry clusters. Any 'good' internal definition having a high application potential will also be acceptable.
2. It is recommended that the team should be of 2-3 students.
3. Project plan along with the division of work amongst teammates should be prepared and get it approved within a maximum of 15 days from the start of the project.
4. Coding standards should be followed meticulously. At the minimum, the code should be self-documented, modular, and should use the meaningful naming convention.
5. It is advisable that object-oriented methodology is used with reusability of classes and code, etc.
6. The output reports must include MIS reports, if applicable.
7. The documentation should include a chapter on "Learning during Project Work", i.e. "Experience of Journey during Project Duration".
8. Data Dictionary is mandatory. At least executable code is mandatory. Student may be asked to write the code related to the project during evaluation.
9. If a student is compelled to follow certain instructions (by the external, i.e. organization's guide) which he/she does not agree to, such a student must prepare a supplementary report to document his/her version and present it to the examiners if such a need arises.
10. Group wise internal guides (i.e. the faculty members) devote the time to guide the students for the project.

**Accomplishments of the student after completing the course:**

1. Doing the project will enable the student to go through rich experience in developing large projects. Such an experience will include encountering various technical issues, finding sources to resolve the issues and finally finding the solution of all these issues satisfactorily.
2. Thinking analytically, analysing and synthesizing requirements and complicated information for getting a good comprehension of the solution methodology to be adopted.
3. Ability to document and write well.
4. Organizing the time effectively.
5. Working with teammates and generating substantial output of the efforts.
6. It will prepare the students for analysing and programming for industrial problem and large projects work in future.

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-7 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_EC-471**

**Subject Name: - Advanced Database Systems**

**Course Credit: - 3**

### **Objective:**

To introduce the basics of Database Administration To give a detailed understanding of how to maintain database quickly &accurately. The students will be able to design and manage the Database Server to solve the issues related to the Database Server.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>Getting Started with Database Architecture and Managing Data Storage:-</b> Introduction to Database, Database System Environment – an Example, Actors on the scene, Workers behind the scene, Data Models, Schema and Instances, Three Schema Architecture of Database, Database languages and interfaces, DBMS Component Modules, Database System Utilities, Centralized and client server architecture for DBMS, Memory Hierarchy and Storage Devices, Storage of Databases.	(20%)
2	<b>Database Tuning and Database Security</b> Physical Database Design in Relational Databases, Overview of Database Tuning and relational Systems, Database Security Issues, Discretionary access control based on Granting and Revoking Privileges, Role Based Access Control for Multilevel Security, Encryption and PKI.	(20%)
3	<b>Backup &amp; Recovery in Database and Database Indexing :-</b> Recovery Concepts, Recovery Techniques Based on Deferred Update and Immediate Update, Recovery in Distributed Database, Distributed Database in Oracle, Types of Single Level Ordered Indexes, Multilevel Index.	(20%)
4	<b>Managing Different Databases and Distributed Databases :-</b> Temporal Database Concepts, Multimedia Databases, Deductive Database, Distributed Database Concepts, Data Fragmentation, Replication and allocation Techniques for Distributed Database Design, Types of Distributed Database Systems.	(20%)

5	<b>Emerging Database Technologies and Object-Relational Databases</b> :- Overview of Object Relational Features, Evolution of Current Trends of Database Technology, Implementation and Relational Issues of Extended Type, Nested Relational Model, Mobile Databases, Multimedia Databases, Geographic Information Systems, Genome Database Systems	<b>(20%)</b>
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**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Minimum five assignments should be given.

#### **Main Reference Books:**

1. Ramesh Elmasari, Shamkant B. Navathe, "Fundamentals of Database Systems", Pearson Education, 5<sup>th</sup> Edition

#### **Reference Books:**

1. Sam R. Alapati, "Expert Oracle9i Database Administration", Apress,
2. S. K. Singh, "Database Systems Concepts, Design & Applications", Pearson Education

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**

**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-7 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_FC-472**

**Subject Name: - Entrepreneurship Skills**

**Course Credit: - 2**

### **Objective:**

The objective is to familiarize the M.Sc. (CA&IT) students the opportunities available for new entrepreneurial ventures in the current technology dominant business arena.

The course content enables them to understand the business environment, opportunities therein, entrepreneurial development process and the challenges entrepreneurs face.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
<b>1</b>	Entrepreneur - definition, evolution of entrepreneurship, characteristic, skills, functions and types. Importance of entrepreneur.	<b>(20%)</b>
<b>2</b>	a) Entrepreneurial development process – identification of opportunities, planning and management of resources. Challenges in entrepreneurial development  b) Creating business ideas- sources of ideas, methods of idea generation.  c) Intrapreneurship	<b>(20%)</b>
<b>3</b>	Legal considerations in the formation of new business. Potential lenders and investors Government policies, incentives, subsidies Drafting a business plan	<b>(20%)</b>
<b>4</b>	Market analysis and planning – market segment, consumer behavior, competitor analysis, distribution channel analysis Financial analysis and planning – long term and short term capital requirement,	<b>(20%)</b>
<b>5</b>	Managing initial problems and growth New venture areas for entrepreneurs.	<b>(20%)</b>

**Recommended Lecture Scheme:** Approximately 30 to 35 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Minimum five assignments should be given.

**Reference Books:**

1. Entrepreneurship  
By R.V. Badi & N.V. Badi, Vrunda publisher
2. Entrepreneurship Development  
By Dipesh D. like, Himalaya Publishing House
3. Entrepreneurship  
By Dr. Achut. P.Pednekar, Himalaya publishing house

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-7 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-473**

**Subject Name: - Operations Research**

**Course Credit: - 3**

### **Objective:**

The Objective of this course is to impart knowledge of scientific technique for solving complex of decision making problem. The objective is threefold – to impart the rigor of theory, to develop skills in analyzing problems and to inculcate the attitude of implementing well thought out solutions to decision problems.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	Formulation of Linear Programming Problem. Solution through graphical method, Simplex method, Big M method with special cases. Duality, Dual simplex method.	(20%)
2	Transportation Problem: Formulation of Transportation problem as Linear programming model, Initial solutions, MODI method, Special cases, Transshipment problem.	(20%)
3	Assignment problem: Formulation of Assignment problem as Linear programming model, Hungarian Method, Special cases, Crew assignment.	(20%)
4	<b>Network Models:-</b> Introduction to network models: Shortest-Path Model, Minimum Spanning Tree Problem, Maximal Flow Problem <b>Problem solving</b> solve shortest path problem using Dijkstra's algorithm solve minimum spanning tree problem using Kruskal's algorithm and PRIM's algorithm formulation of flow problem as linear programming model solve flow problem using MFP(maximum flow problem) algorithm.	(20%)
5	PERT and CPM:-PERT/CPM Networks: Scheduling the Activities, Redundancy removal in Precedence Relationships, Rules for constructing PERT and CPM Network , Determination of Early Start and Latest completion Times, Determination of the Critical Path, Project completion time, Determination of the Float: Total, Interfering, Free and Independent, Determination of the Critical Path in PERT network and project completion time.	(20%)

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Minimum five assignments should be given.

**Main Reference Books:**

1. Quantitative Techniques in Management By N. D. Vohra
2. Operation Research By J. K. Sharma
3. Operation Research By R. Panneerselvam

**Reference Books:**

1. Quantitative Methods for Beginners By Anderson, Sweeney Williams
2. Operations Research Principles & Practice By Pradeep Prabhakar Pai

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-7 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-474**

**Subject Name: - Artificial Intelligence**

**Course Credit: - 3**

### **Objective:**

To introduce the necessary understanding of human intelligence and to explore the mechanisms that enables the intelligent thought and action. To Understand and learn effective ways for representing knowledge, applying intelligent problem solving techniques & searching techniques.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>Introduction to AI and Problems, problem spaces and searches:-</b> What is A1? AI problems, AI techniques to solve the problems, Application areas of AI, Criteria for success, Turing test. Defining the problem as a state space search, solving AI problem and defining it formally, production system, production system and its characteristics, problem characteristics, Introduction to heuristic search, heuristic function and its use, classifying various problems according to problem characteristics, issues in the design of search programs	(20%)
2	<b>Heuristic search Techniques:</b> -Basic search strategies - Breadth First search and depth first search, Heuristic search Techniques - Generate and test, Hill climbing, Best first search, Types of hill climbing - Simple and steepest ascent hill climbing, Problems with Hill climbing and methods to deal with it, local and global heuristics, OR Graph, A* Algorithm, issues in A* Algorithm, Problem reduction, AND-OR Graphs.	(20%)
3	<b>Representation of knowledge, Knowledge Representation Using rules And Expert System Development:</b> -Approach to knowledge representation, types of knowledge, Attributes of knowledge representation. Procedural/Declarative knowledge, representation in PROLOG, Forward/Backward reasoning. Introduction to expert system, Method of creating an Expert system, Types of Expert system, Process of developing an expert system, characteristic of an Expert system, problems facing	(20%)

	current expert system.	
4	<b>Knowledge Representation Using predicate logic:-</b> Representing facts using predicate logic and propositional logic, Computable functions and predicates.	(20%)
5	<b>Structured Representation of knowledge And Game Playing :-</b> Weak slot and filler structure, semantic Nets, support for inheritance, intersection search, partitioned semantic Nets, Frames. Minimax search procedure, Adding alpha cutoff, Beta cutoff, Adding refinements.	(20%)

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Project Development On KS\_C\_CC-478

**Assignment:** Minimum five assignments should be given.

#### **Main Reference Books:**

1. Artificial Intelligence by Rich & Knight

#### **Reference Books:**

1. Introduction to Artificial Intelligence & Expert Systems, Dan W. Patterson, Prentice-Hall India, 1998.
2. Artificial Intelligence, 2 Edition, Eliane Rich & Kelvin Knight, Tata McGraw-Hill, 1991
3. Artificial Intelligence & design of expert systems, Lager, Benjamin/Cummings.
4. Artificial Intelligence - An Engineering Approach, Schalkoff R. J., McGraw-Hill.
5. Expert Systems: Theory & Practice, Jean-Louis Ermine, Prentice-Hall India, 1997.
6. Introduction to Expert Systems, Peter Jackson, Addison- Wesley, 1988.
7. Programming in Prolog, Clocksin & Mellish, Narosa Publishing,1989.
8. Turbo Prolog - Features for programmers, Sanjiva Nath, Galgotia, 1988.
9. Introduction to Turbo Prolog, Carl Townsend, BPB Publishers, 1987.
10. Expert system development process
11. "A First Course in Artificial Intelligence Paperback" by Deepak Khemani (Author)

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-7 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-475**

**Subject Name: - Advanced Networking**

**Course Credit: - 3**

**Objective:**

Develop a strong conceptual foundation of the TCP/IP protocol stack and services.

Depth understanding of protocols used in the TCP/IP protocol stack.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>Classful Internet Addresses, Mapping Internet Addresses to Physical Addresses Internet Protocol: Connectionless Datagram Delivery:</b> Introduction, Universal identifiers, IP addresses and network connections, original classful addressing scheme, special purpose IP addresses like directed broadcast and network broadcast, Limited broadcast, Loopback address, Subnet and Classless extensions, Weaknesses in Internet addressing, Dotted decimal notation, Network byte order, Special address conventions. Concept of physical address, Address resolution problem, Relationship between network address and physical address, Two types of physical addresses, Resolution through direct mapping, Resolution through dynamic binding, ARP cache Timeout, ARP refinements, Relationship with other protocols, ARP implementation, ARP Encapsulation and identification, ARP protocol format, Automatic ARP cache revalidationConcept and reason for connectionless and best effort delivery system at network layer, purpose of Internet protocol, IPv4 datagram format , interpretation and significance of each header fields, IP options.	(20%)
2	<b>Internet Protocol: Forwarding IP Datagrams, Error And Control Messages , Classless And Subnet Address Extensions , User Datagram Protocol :</b> Introduction, Forwarding in the Internet, Indirect and Direct delivery, Table driven IP forwarding, Next hop forwarding, Default routes, Host specific routes, IP forwarding algorithm, Forwarding with IP addresses, Handling incoming datagrams, Establishing routing tables. Introduction of ICMP, Need for a controlling protocol, Error Reporting versus Error Correction, ICMP message delivery, ICMP message format, Ping, Formats of different type of messages like Echo(Request and Reply), Congestion , Unreachable Destinations, Source Quench, Router advertisement and Solicitation, etc. Introduction of CIDR, Minimizing Network Numbers, Proxy ARP, Subnet Addressing, Flexibility in subnetting, Variable length subnets, Subnet masks, Unified Forwarding Algorithm, Broadcasting to Subnets, Anonymous point to point networks, Classless Addressing and Supernetting, CIDR address blocks and Bit masks, Data Structures and Algorithms for classless lookup, Searching by mask length, Binary trie	(20%)

	structures, Longest match and mixture of route types, PATRICIA and level compressed tries. Introduction of UDP, Need for UDP, UDP message format, UDP Pseudo header, UDP encapsulation and protocol layering, Layering and UDP Checksum computation, UDP multiplexing, demultiplexing, and role of ports in multiplexing and demultiplexing, UDP applications, port numbers of well known UDP based applications	
3	<b>Reliable Stream Transport Service , Private Network Interconnection Bootstrap And Auto configuration :</b> Introduction, Need for stream delivery, Properties of reliable delivery service, Providing reliability, Concept of sliding windows, Ports, connections and endpoints, Active and Passive opens, Segments, Streams and sequence numbers, Variable window size and flow control, TCP segment format, Out of band data, TCP options, Acknowledgment, Retransmission and timeouts, Accurate measurement of RTT, Karn's algorithm and timer backoff, Explicit feedback mechanism, Congestion control, TCP connection establishment and termination, Dealing with silly window syndrome. Introduction to VPN, Private and hybrid networks, VPN addressing and routing, Extending VPN technology to individual hosts, VPN with private addresses, Introduction to NAT, NAT translation table creation, multi-address NAT, port mapped NAT, Interaction between NAT and ICMP, Interaction between NAT and Applications, NAT in presence of fragmentation, Conceptual address domains, Introduction to slirp and IPtables. Introduction to DHCP, History of bootstrapping, Using IP to find IP Address, DHCP Retransmission Policy, DHCP Message format, Need for dynamic configuration, DHCP Lease concept, Multiple addresses and Relays, Lease renewal States, Address acquisition states, Early lease termination, DHCP options and message type, Options overload, DHCP and DNS	(20%)
4	<b>The Domain Name System , Remote Login And Desktop , File Transfer And Access , Electronic Mail:</b> Need for DNS, Flat versus hierarchical namespace, Centralized versus distributed Names database, Delegation of authority for names, Subset authority, Internet domain Names, Top-level domains, Mapping domain names to addresses, Domain Name Resolution, Efficient translation, Caching, DNS message format, Compression, Inverse mappings, Pointer queries, DNS resource records, Dynamic DNS, DNSSec. Introduction, Remote interactive computing, Telnet protocol, Accommodating Heterogeneity, Client side and server side control commands, Telnet options and Options negotiation, SSH. Different ways of sharing a file, Features, Process model, TCP Port numbers, Data connection and control connection, User's view of FTP, Anonymous FTP, Secure FTP, TFTP, NFS, RPC, XDR. Introduction to E-mail protocols., Mailboxes, Names and Aliases, Alias expansion and mail forwarding, SMTP, POP, IMAP, MIME Extensions for non ASCII data, MIME Multipart messages.	(20%)
5	<b>World Wide Web , Internet Security And Firewall Design:</b> Importance of Web, Architectural components, URL, HTTP, HTTP methods, HTTP error messages, Connection types, Significance of different HTTP header fields, Negotiation, Conditional requests, Proxy servers, Caching, HTTP security and E- Commerce. Introduction to IPsec and SSL, Need for Security, IPsec, AH, SA, ESP, Authentication and mutable header fields, Tunneling, Required security algorithms, SSL and TLS, Firewalls, Firewall implementation issues, Packet filtering, Stateful firewalls, proxy servers, Monitoring and logging	(20%)

**Recommended Lecture Scheme:** Approximately 40 To 45 lectures

**Recommended Practical Scheme:**

**Assignment:** Minimum 3 assignments

**Main Reference Books:**

1. Internetworking with TCP/IP - (Vol. 1.) Principles, Protocols, and Architecture  
By Douglas E. Comer, Prentice Hall of India (PHI), Sixth Edition

**Reference Books:**

1. TCP/IP protocol suite By Behrouz A. Forouzan published by Tata McGraw-Hill (TMH).
2. TCP/IP- Illustrated, Vol. 1 (The Protocols) By W. Richard Stevens published by Pearson Education Asia Publishers.
3. Inside TCP/IP By Karanjit S. Siyan published by Techmedia Publishers.
4. Java Network Programming By Elliot Rusty Harold published by O'Reilly Publishers.
5. Java Threads By Scott Oaks & Henry Wong published by O'Reilly Publishers.

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-7 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-476**

**Subject Name: - Software Project Management & Testing**

**Course Credit: - 3**

### **Objective:**

The course is aimed to help the students understand and appreciate the importance of Software Project Management in the software development life cycle and understand how to manage a Software Project.

To understand the concept, process and importance of software project management.  
To gain knowledge of some of the CASE tools useful in project management.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
<b>1</b>	Process based approach for Project Execution, Capability Maturity Model for Software, Project Initiation, Proposals and Contracts, Requirement Specification and Management	<b>(20%)</b>
<b>2</b>	Process Definition and Tailoring, Process Database and Process Capability Baseline, Effort Estimation and Scheduling , COCOMO model, Quality Planning and Defect Estimation	<b>(20%)</b>
<b>3</b>	Risk Management, Project Management Plan, Configuration Management, Life Cycle Execution	<b>(20%)</b>
<b>4</b>	Peer Review, Project Monitoring and Control, Project Audits, Project Closure	<b>(20%)</b>
<b>5</b>	Introduction to CASE Tools :- MS Project, Visual Source Safe, MS Visio (UML Diagrams) and Mercury, Suite of Testing Tools, (selenium )	<b>(20%)</b>

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme** Not Applicable

**Assignment:** Minimum five assignments should be given.

**Main Reference Books:**

1. Pankaj Jalote , "CMM in Practice ", Pearson Education.

**Reference Books:**

1. Software Engineering Roger S. Pressman, "Software Engineering – A Practitioner's Approach", 7th Edition, McGraw Hill Publications
2. Teresa Stover, "MS Office Project 2007 Inside Out", PHI.
3. Mark Walker, "MS Office Visio 2007 Inside Out", PHI.

**Suggested Additional Reading:**

1. Walker Royce, "Software Project Management A Unified Framework", Pearson Education, First Impression.
2. Kathy Schwalbe, "Project Management in IT", Cengage Learning, 2007. Second Indian Reprint, 2009

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**

**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-7 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-477**

**Subject Name: - Enterprise Resource Planning**

**Course Credit: - 3**

**Objective:**

To know the basics of ERP To understand the key implementation issues of ERP  
To know the business modules of ERP To be aware of some popular products in the area of ERP

To appreciate the current and future trends in ERP

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
<b>1</b>	ERP Introduction, Origin, Evolution of ERP, Benefits Introduction of Business Process Reengineering, Data Warehousing.	<b>(20%)</b>
<b>2</b>	Knowledge of the terms: Data Mining, Online Analytic Processing (OLAP) SCM(Supply Chain Management), CRM (Customer Relationship Management) Vendors and Consultants	<b>(20%)</b>
<b>3</b>	ERP Implementation approaches and strategies Brief introduction to ERP Modules: Quality Management, Marketing, HR	<b>(20%)</b>
<b>4</b>	Brief Knowledge of Modules of ERP: Manufacturing, Sales and Distribution	<b>(20%)</b>
<b>5</b>	ERP Market Place: SAP AG, Oracle and Microsoft Dynamics. Case Study	<b>(20%)</b>

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme** Not Applicable

**Assignment:** Minimum five assignments should be given.

**Main Reference Books:**

ERP Demystified By Alexis Leon

Chapter No:-1, 2, 4, 7, 15 (SCM Evolution), 16,20, 28, 42,43,46,47,48,50 (till business benefits and SAP for SMEs), 51

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**

**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-7 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-478**

**Subject Name: - Project Development on KS\_C\_CC-474**

**Course Credit: - 5**

### **Objective:**

The goal of this subject is to introduce students with the upcoming technology which can be implemented using the high-level computer programming language called – Python. Students can implement algorithms which are already covered in the core subject AI as theory and they can come-up with their own project after learning the basics and libraries of python.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>Introduction of NumPy Library:</b> Data object sequence, Data object set, data object mapping, NumPy introduction, High-Dimensional Array and creating NumPy Array, Indexing, NumPy Operations, Broadcasting, File Handling with NumPy, basic Statistics with NumPy, Rules of Statistics with NumPy, Case Study based on NumPy	(20%)
2	<b>Introduction of Pandas Library</b> Introduction to Pandas, Creating Series Object, iLoc & Loc, Operations in Pandas, DataFrame Object, Creating Mean Row, Dropping Null Values, Querying from DataFrame, Applying Function on DataFrame, Use groupby Method, Filter, Split, Apply, Aggregate, Case Study based on Pandas	(20%)
3	<b>Introduction of Matplotlib and Seaborn – Data Visualization</b> What Is data Visualisation, Styling Tabulation, Distribution of data (Histogram), Distribution of categorical variable, Joint distribution of two variable, Box Plot, Boxen Plot, Swarm Plot, Violin Plot, Faceted Plot, Pair Plot, Pie Chart, Donut Chart, Stacked Bar Plot, Relative Stacked Bar Plot, Scatter Plot, Bar Plot, Line Plot, Heat Map.	(20%)
4	<b>Implementation of AI Algorithm</b> Implementation of BFS, Implementation of DFS, Implementation of single player game, Implementation A* Algorithm, Implementation Travelling salesman problem, Implementation of tic-tak-toe game, Program to solve N-Queens Problem, program to solve 8-puzzle problem.	(20%)

5	<p><b>Project Implementation:</b></p> <ul style="list-style-type: none"> <li>▪ Develop a mini project (small application) on a problem using an Artificial Intelligence approach and to learn the concept of intelligent application development through the implementation.</li> <li>▪ Examples: Games like tic-tac toe, 8-puzzle, and application based in heuristic.</li> <li>▪ It is recommended that the team should be of 2-3 students.</li> <li>▪ Coding standards should be followed meticulously.</li> </ul>	<b>(20%)</b>
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**Recommended Practical Scheme:** Approximately 45 hours of Lab demonstration with coding Practice.

**Assignment:** Minimum five assignments should be given.

**Main Reference Books:**

1. Python CookBook, 3<sup>rd</sup> Edition  
By David Beazley, Brian K. Jones: Publisher(s): O'Reilly Media, Inc.
2. Hands-on Data analysis with NumPy and Pandas  
By Curtis Miller: Publisher(s): Packt Publishing Ltd.
3. Pandas for Everyone – 1<sup>st</sup> Edition  
By Daniel Y. Chen: Publisher(s): Addison-Wesley Professional
4. NumPy Essintials  
By Leo Chin, Tanmay Dutta: Publisher(s): Packt Publishing Ltd.
5. Matplotlib 3.0 cookbook  
By Srinivasa Rao Poladi Publisher(s): Packt Publishing Ltd.
6. Data Visualisation with Python for Beginners  
Publisher(s): AI Publishing LLC.

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-9 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_EC - 591**

**Subject Name: - Image Processing**

**Course Credit: - 3**

### **Objective:**

Give the students a general understanding of the fundamentals of digital image processing, understanding the different types of images, converting into digital form, and performing various operations for enhancement and restoration.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	Introduction to digital image processing, electromagnetic spectrum, fields using Digital Image Processing, Fundamental Steps in Digital Image Processing, Components of an Image Processing System Structure of Human Eye, Image Formation in Eye, Light and Electromagnetic Spectrum, Image Sensing and Acquisition , Image Sampling and Quantization, Basic Relationship between pixels, Linear and Non-linear operations	(20%)
2	Background of transformation functions, some basic gray level transformation functions, Histogram Processing, Enhancement using Arithmetic/Logic Operations, Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters	(20%)
3	Introduction to Fourier Transform and Frequency Domain, Properties of Frequency domain, Smoothing Frequency Domain Filters, Sharpening Frequency Domain Filters Application areas of Digital Image Processing, Different File Formats.	(20%)
4	Image Degradation/Restoration Model, Noise Models, Restoration in the presence of Noise only-Spatial Filtering, Periodic Noise reduction by Frequency Domain Filtering, Estimating the Degradation Function, Inverse Filtering, Minimum mean square Error (Weiner) Filtering,	(20%)
5	Color Fundamentals, Color Models, Pseudocolor Image Processing, Basics of Full Color Image Processing, Color Transformations, Smoothing and Sharpening Fundamentals of image compression, types of redundancies, Image Compression Models	(20%)

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Minimum five assignments should be given.

**Main Reference Books:**

1. Digital Image Processing  
R C Gonzalez and R E Woods  
Second Edition, Pearson Education

**Reference Books:**

1. Fundamentals of Digital Image Processing  
Anil K Jain, Prentice Hall India
2. Digital Image Processing and Analysis  
B Chanda and D Dutta Majumdar Prentice Hall India

Chapter -wise coverage of syllabus from Text book:

Unit 1: Chapter 1 & 2

Unit 2: Chapter 3

Unit 3: Chapter 4

Unit 4: Chapter 5

Unit 5: Chapter 6 & 8

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-9 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_FC-592**

**Subject Name: - Network Administration**

**Course Credit: - 2**

### **Objective:**

This Subject explicit IT network design, implementation and optimization. It exists a wide variety of software and hardware products that help to administrators manage a network.

Establish a strong conceptual foundation of the TCP/IP protocol stack, services and related tools/technologies .Give in-depth understanding of all the commonly used protocols used in the TCP/IP protocol stack. Strong conceptual foundation for TCP/IP which can be leveraged for studying advanced topics in TCP/IP, dissertation, System Development Project and further studies.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
<b>1</b>	Overview of Linux Distros, Installation and Package Management, File System Management, Boot Sequence, Run levels, Configuring Environment Setting.	<b>(20%)</b>
<b>2</b>	Network Interfaces, Network Management Configuration, Configuration DHCP, Configuration DNS, FTP Services.	<b>(20%)</b>
<b>3</b>	HTTP Services, Mail Services, Proxy Server, Open SSH, Authentication Configuration.	<b>(20%)</b>
<b>4</b>	Process Management, Automated tasks, Archiving Network Access. Introduction of Window Server, Installation Overview of Active Directory Infrastructure, Configuring ADDS	<b>(20%)</b>
<b>5</b>	Configuring Remote Desktop Services Configuring Addressing & Services Configuring Name Resolution Monitoring & Management	<b>(20%)</b>

**Recommended Lecture Scheme:** Approximately 30 to 35 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Minimum five assignments should be given.

**Main Reference Book:**

Silas D et al “ Red Hat Enterprise Linux 6 Deployment Guide”  
Linux Complete Reference – 6<sup>th</sup> Edition  
Microsoft Server 2012(70-411)

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-9 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC - 593**

**Subject Name: - GEOGRAPHIC INFORMATION SYSTEM**

**Course Credit: - 3**

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	A. Theoretical concepts of GIS Basic concepts: Definition and history , Components of GIS, Hardware & Software requirements ; Representation of Geographical data in computer, Data structure and formats ; Spatial data-maps and its characteristics ; Map Projection.	(20%)
2	Spatial data models – Raster and Vector Data ; Attribute data management- database and data model ; Data input and editing- methods, editing,integration ; Geometric rectification ; Digitization, error identification, Errors: Types, sources, Correction ; Editing and topology building.	(20%)
3	Vector over raster analysis ; Data analysis- measurements, queries, reclassification , buffering, map ,overlay, map manipulation ; Raster data analysis ; interpolation ; analysis of surfaces, network analysis,Path analysis.	(20%)
4	Mapping Concept – Map Elements, Map scales and representations, Output from GIS -maps, non-cartographic output, spatial multimedia, decision support . Web-GIS applications : WMS, WFS and other OGC standards Issues in GIS -data quality, human and organizational issues .	(20%)
5	<b>B. Practical aspects of GIS</b> Study of the GIS related tools and packages such as QGIS, for data storage and analysis and display. Development of a typical application of GIS with suitable database engine.Development of web map service using Geoserver.	(20%)

**Main Reference Books / References:**

1. Burrough, P. A. and McDonnell, R. A. (2000): Principles of Geographical Information Systems, Oxford University Press, New York
2. Chang, K. T. (2008): Introduction to Geographic Information Systems, Avenue of the Americas, McGrawHill, New York Longley.
3. Heywood, I., Cornelisus, S., Carver, S. (2011): An Introduction to Geographical Information Systems, Pearson Education, New Delhi
4. Korte, G. B. (2001): The GIS Book, Onward Press, Bangalore
5. Lo, C. P., Yeung, A. W. (2002): Concepts Techniques of Geographical Information Systems, Prentice-Hall of India, New Delhi
6. ArcGIS Developer's Guide for Visual Basic Applications, Razvi, Onword Press,2002
7. Developing GIS Solutions with MapObjects and Visual Basic, Bruce Ralston, Onwors Press,2002.
8. Geoserver Beginner's Guide, Brian Youngblood and Stefano Lacovella

**Recommended Lecture Scheme:** Approximately 30 to 35 hours in a semester

**Recommended Practical Scheme:** QGIS (Open Source GIS) software demonstration as a part of Unit V and assignment can be given based on this.

**Assignment:** Minimum five assignments should be given.

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-9 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC - 594**

**Subject Name: Cloud Computing**

**Course Credit: - 3**

<b>UNIT NO.</b>	<b>CONTENTS</b>	<b>WEIGHTAGE (%)</b>
1	<b>Introduction to Cloud Computing</b> Overview, Roots of Cloud Computing, Layers and Types of Cloud, Desired Features of a Cloud, Benefits and Disadvantages of Cloud Computing, Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers, Challenges and Risks	20%
2	<b>Cloud Architecture, Services and Applications</b> Exploring the Cloud Computing Stack, Connecting to the Cloud, Infrastructure as a Service, Platform as a Service, Saas Vs. Paas, Using PaaS Application Frameworks, Software as a Service Cloud Deployment Models, Public vs Private Cloud, Cloud Solutions, Cloud ecosystem, Service management, Computing on demand, Identity as a Service, Compliance as a Service	20%
3	<b>Virtualization and Abstraction</b> Introduction to Virtualization Technologies, Load Balancing and Virtualization, Understanding Hyper visors, Understanding Machine Imaging, Porting Applications, Virtual Machines Provisioning and Manageability, Virtual Machine Migration Services, Virtual Machine Provisioning and Migration in Action, Provisioning in the Cloud Context, Virtualization of CPU, Memory, I/O Devices, Virtual Clusters and Resource Management, Virtualization for Data Center Automation	20%
4	<b>Cloud Infrastructure and Cloud Resource Management</b> Architectural Design of Compute and Storage Clouds, Layered Cloud Architecture Development, Design Challenges, Inter Cloud Resource Management, Resource Provisioning and Platform Deployment, Global Exchange of Cloud Resources. Administrating the Clouds, Cloud Management Products, Emerging Cloud Management Standards	20%

5	<b>Cloud Security:</b> Security Overview, Cloud Security Challenges and Risks, Software-as-a Service Security, Cloud computing security architecture: Architectural Considerations, General Issues Securing the Cloud, Securing Data, Data Security, Application Security, Virtual Machine Security, Identity and Presence, Identity Management and Access Control, Autonomic Security Establishing Trusted Cloud computing, Secure Execution Environments and Communications, Identity Management, Access control, Autonomic Security Storage Area Networks, Disaster Recovery in Clouds	20%
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**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Minimum five assignments should be given.

#### **Reference Books:**

1. Cloud Computing Principles and Paradigms by Rajkumar Buyya Wiley India Publication 1st Edition
2. Cloud Computing Bible by Barrie Sosinsky Wiley Publication\
3. Distributed and Cloud Computing - From Parallel Processing to the Internet of Things by Kai Hwang, Geoffrey C. Fox, Jack J. Dongarra Morgan Kaufman / Elsevier Publication
4. Cloud Computing - Implementation, Management, and Security by John W. Rittinghouse & James F. Ransome CRC Press
5. Cloud Security - A Comprehensive Guide to Secure Cloud Computing by Ronald L. Krutz & Russell Dean Vines, Wiley Publication
6. Mastering Cloud Computing by Rajkumar Buyya, C. Vecchiola& S. ThamaraiSelvi, TataMcgrawHill Publication / Elsevier Publication
7. Cloud Computing: A Practical Approach Anthony T. Velte Toby J. Velte, Ph.D. Robert Elsenpeter, Tata McgrawHill publication

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**

**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-9 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-595**

**Subject Name: - Mobile Application Development**

**Course Credit: - 3**

### **Objective:-**

Looking at the recent growth of M-Commerce and a shift from E- Commerce to M-Commerce, there is market demand for Mobile App developers. Focusing on the same an **open source platform like Android** would serve the purpose. The course assumes a prior knowledge of object-oriented concepts of Java Programming Language and a bit of XML. The course would aim at educating students with developing most of the different types of Android Applications

<b>.Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>Introduction to Android and Android fundamentals</b> History of Mobile Software Development, Platforms other than Android used for Mobile Application development, The Open Handset Alliance, The Android Platform, Understanding the Android Software Stack (Android Architecture), Android SD Building a sample Android application, Anatomy of Android Applications, Android terminologies (Activity life-cycle, Using Intent and Intent Filters, Receiving and broadcasting Intents)Managing Application resources in a hierarchy, Working with different types of resources Working with Services, Service life-cycle and types of Services	(20%)
2	<b>Android User Interface Design Essentials</b> User Interface Screen elements Designing User Interfaces with Layouts Drawing and Working with Graphics and Animation	(20%)
3	<b>Using Common Android APIs – Part I</b> Using Android Data and Storage APIs Managing data using SQLite Sharing Data between Applications with Content Providers	(20%)
4	<b>Using Common Android APIs – Part II</b> Using Android Networking APIs Using Android Web APIs-JSON Parsing Using Android Telephony and SMS APIs	(20%)

<b>5</b>	<b>Advance Android Application Development</b> Using Android Location-based Services APIs Using Android Multimedia APIs Using Android 3D Graphics APIs Working with Notifications	<b>(20%)</b>
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**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Project Development on KS\_C\_CC-598

**Assignment:** Minimum 5 assignments should be given..

**Main Reference Books:**

1. Android Wireless Application Development  
By Lauren Darcey and Shane Conder, Pearson Education, 2nd ed. (2011)

**Reference Books:**

1. Professional Android 2 Application Development  
By Reto Meier, Wiley India Pvt Ltd (2011)
2. Beginning Android  
By Mark L Murphy, Wiley India PvtLtd(2009)
3. Pro Android  
By Sayed Y Hashimi and Satya Komatineni, Wiley India Pvt. Ltd(2009)

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-9 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-596**

**Subject Name: - Distributed Operating System**

**Course Credit: - 3.**

### **Objective:**

Distributed computing system is the platform for the virtualization and provides fundamental concepts related to distributed working environment. Also, It aims to build base for cloud computing concept. Concepts like resource utilization, file sharing semantics and message passing communication are robust in current computing scenarios.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>Distributed Systems</b> :- Distributed systems-definition, evolution, system models, advantages, design issues, Distributed computing environment <b>Computer Networks</b> :- ATM Technology. <b>Message passing</b> :-Synchronization, buffering, multi-datagram messages, process addressing, failure handling, group communication.	(20%)
2	<b>Remote Procedure Calls</b> :- The RPC model - transparency, implementation, stub generation, server management, parameter passing, RPC protocols, client/server binding, exception handling, security, etc.	(20%)
3	<b>Distributed shared memory</b> :- Architecture, design issues, granularity, consistency, placement strategy, thrashing etc. <b>Synchronization</b> :- Clock synchronization, event ordering, mutual exclusion, deadlock, election algorithms	(20%)
4	<b>Resource Management</b> :- Features of global scheduling algorithms, Task assignment approach, load balancing approach, load sharing approach, <b>Process Management</b> :- Process migration, Threads.	(20%)

5	<p><b>Distributed File Systems</b>:-Desirable features of good distributed file system, file models, file accessing models, file sharing semantics, file caching schemes, file Replication, Fault tolerance, Atomic Transactions</p> <p><b>Naming</b>:- Desirable features of good naming system, human-oriented names, system-oriented names, object-locating mechanisms, name caches,</p>	<b>(20%)</b>
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**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Minimum five assignments should be given.

**Main Reference Book:**

1. Distributed Operating Systems: Concepts and Design, Pradeep Sinha, Prentice-Hall India,1997.

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**

**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-9 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-597**

**Subject Name: - Data Compression**

**Course Credit: - 3**

**Objective:** - To be able to perform compression using various algorithm and decompress the data. To be able to measure the loss of data if compression is lossy

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	Introduction to lossless and lossy compressions, measures of performance. Mathematical preliminaries for lossless compression. Introduction of information theory, models- physical, probability, Markov, Coding , uniquely Decodable codes, Prefix codes	(20%)
2	Huffman coding , minimum variance Huffman codes, non-binary Huffman codes, Adaptive Huffman coding, Golomb codes, Rice codes, Tunstall codes, applications of Huffman coding,	(20%)
3	Dictionary techniques, Static Dictionary, Adaptive Dictionary, Context Based Compression, Predictive coding with Partial Match (PPM-PPMA-PPMB-PPMC).	(20%)
4	Mathematical preliminaries for lossy coding, Distortion criteria, Models-probability, linear, physical. Speech compression Digital Audio Concepts, Fundamentals, Sampling Variables, PC-Based sound, Lossless Compression of Sound, Problems and Results, Lossy compression, Silence Compression, Other Techniques	(20%)
5	Scalar quantization, Quantization Problem, Uniform Quantization, non-uniform Quantization, Vector Quantization, Differential coding schemes, Arithmetic coding	(20%)

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Minimum five assignments should be given.

**Main Reference Books:** Introduction to Data Compression, 4<sup>th</sup> edition, Khalid Sayood, Harcourt India, 2012.

**Reference Books:-** The Data Compression book , 2<sup>nd</sup> Edition, by Mark Nelson, Jean-Loup Gailly, 2005.  
Elements of Data Compression, Adam Drozdek, Thomson LEarning,

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester - 9 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC - 598**

**Subject Name: - Project Development on KS\_C\_CC-595**

**Course Credit: - 5**

### **Objective:**

To develop a mini project (small application) on Mobile Application Development using Android

### **Guidelines**

1. The project definition should be finalized during 9th semester using the striking features of Android within 15 days of the start of the semester or the subject. Examples of features to include are as below:

- Using Location based APIs including Google Maps
- Using GPS (Global Positioning System)
- Using SQLite Database
- Using 3D Graphics Support
- Using Speech to Text APIs
- Using Multi-touch
- Using Motion Sensors
- Creating Android Background Services
- Making a Client-Service Application
- Calling a Web-Service
- Using Local File Storage
- Accessing data of other applications
- Creating Widgets
- Using Camera
- Using Blue-tooth
- Using Wifi
- Using Internet
- Using Telephony or SMS APIs
- Using Multimedia APIs
- Scanning the QR Code
- Web API in PHP

- Insert update delete select
  - Plus JSON encoding and decoding
2. It is recommended that the team should be of 2-3 students.
  3. Technical SRS, along with database design (if any) needs to be submitted with the next week of Project definition submission.
  4. Coding standards should be followed meticulously.
  5. Live definitions are more preferred as the students get the same exposure even in their resumes.
  6. Internal guide (i.e. the faculty member) will devote the time to guide the students for the project.
  7. Students are supposed to be present in lab hours allotted to them for the subject.

**Accomplishments of the student after completing the course:**

1. Developing the project will enable the student to understand the basic building blocks of Android Applications.
2. Students will be able to understand environment for developing applications for Small-computing devices like Cell-phones.
3. Students will also learn how to optimize Applications due to the in-built limitations of limited memory, limited battery and wireless connection in Mobile devices.
4. Organizing the time effectively.
5. Working with teammates and generating substantial output of the efforts.
6. It will prepare the students for analysing and programming for industrial problem and large project work in future.

**GUJARAT UNIVERSITY  
K. S. SCHOOL OF BUSINESS MANAGEMENT**

**MASTER OF SCIENCE  
COMPUTER APPLICATION & INFORMATION TECHNOLOGY  
(M.Sc. (CA&IT))  
[FIVE YEARS' FULL TIME INTEGRATED DEGREE COURSE]**

**Syllabus of EVEN Semester (II/IV/VI/VIII/X)**

**Effective from Academic Year 2019-20 Onwards**

**M.Sc. (CA&IT) – EVEN SEMESTER SUBJECT LIST**

**SEMESTER – II**

COURSE NO.	COURSE TYPE	Course / Subject	CREDIT
KS_C_EC-121	ELECTIVE	ENVIRONMENTAL STUDIES	2
KS_C_FC-122	FOUNDATION	TAXATION LAWS	2
KS_C_CC-123	CORE	MATRIX ALGEBRA AND GRAPH THEORY	3
KS_C_CC-124	CORE	DATABASE MANAGEMENT SYSTEMS USING SQL /PLSQL	3
KS_C_CC-125	CORE	COMMERCIAL COMMUNICATION	3
KS_C_CC-126	CORE	ADVANCE C PROGRAMMING	3
KS_C_CC-127	CORE	IMPLEMENTATION OF SQL/PLSQL (PRACTICAL ON CC-124)	3
KS_C_CC-128	CORE	IMPLEMENTATION OF C PROGRAMMING (PRACTICAL ON CC-126)	3
KS_C_CC-129	CORE	WEB TECHNOLOGY - I (PRACTICAL)	3
		<b>TOTAL CREDITS</b>	<b>25</b>

**SEMESTER – IV**

COURSE NO.	COURSE TYPE	Course / Subject	CREDITS
KS_C_EC-241	ELECTIVE	INTRODUCTION TO HUMANITIES	2
KS_C_FC-242	FOUNDATION	BUSINESS COMMUNICATION	2
KS_C_CC-243	CORE	COMPUTER ORIENTED NUMERICAL METHODS	3
KS_C_CC-244	CORE	OPEN SOURCE TECHNOLOGY	3
KS_C_CC-245	CORE	SYSTEM ANALYSIS , DESIGN AND MODELING	3
KS_C_CC-246	CORE	CLIENT SERVER ARCHITECTURE	3
KS_C_CC-247	CORE	IMPLEMENTATION OF OPEN SOURCE TECHNOLOGY (PRACTICAL ON CC- 244)	3
KS_C_CC-248	CORE	WEB TECHNOLOGY – II (PRACTICAL)	3
KS_C_CC-249	CORE	IMPLEMENTATION OF CLIENT SERVER ARCHITECTURE (PRACTICAL ON CC-246)	3
		<b>TOTAL CREDITS</b>	<b>25</b>

**SEMESTER – VI**

COURSE NO.	COURSE TYPE	Course / Subject	CREDIT
KS_C_EC-361	ELECTIVE	A.JAVA/PHP/ASP.NET	3
KS_C_FC-362	FOUNDATION	RESEARCH METHODOLOGY	2
KS_C_CC-363	CORE	DATA COMMUNICATION AND NETWORKING	3
KS_C_CC-364	CORE	SYSTEM SOFTWARE	3
KS_C_CC-365	CORE	E-COMMERCE AND E-GOVERNANCE	3
KS_C_CC-366	CORE	IMPLEMENTATION OF DATA COMMUNICATION AND NETWORKING (PRACTICAL ON CC-363)	3
KS_C_CC-367	CORE	IMPLEMENTATION OF SYSTEM SOFTWARE (PRACTICAL ON CC -364 )	3
KS_C_CC-368	CORE	SOFTWARE DEVELOPMENT - 2	5
		<b>TOTAL CREDITS</b>	<b>25</b>

**SEMESTER – VIII**

COURSE NO.	COURSE TYPE	Course / Subject	CREDITS
KS_C_SE-481	ELECTIVE	INFORMATION SECURITY	3
KS_C_FC-482	FOUNDATION	DIGITAL MARKETING	2
KS_C_CC-483	CORE	QUANTITATIVE TECHNIQUES	3
KS_C_CC-484	CORE	MOBILE COMPUTING	3
KS_C_CC-485	CORE	DATA MINING AND DATA ANALYTICS (THEORY)	3
KS_C_CC-486	CORE	DESIGN AND ANALYSIS OF ALGORITHM	3
KS_C_CC-487	CORE	DATA MINING AND DATA ANALYTICS (PRACTICAL)	3
KS_C_CC-488	CORE	PROJECT - EMERGING TECHNOLOGIES	5
		<b>TOTAL CREDITS</b>	<b>25</b>

**SEMESTER – X**

COURSE NO.	COURSE TYPE	Course / Subject	CREDITS
KS_C_SE-5101	CORE	GRAND PROJECT (6 MONTHS)	25

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**K. S. SCHOOL OF BUSINESS MANAGEMENT**

**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-2 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_EC-121**

**Subject Name: - Environmental Studies**

**Course Credit: - 2**

### **Objective:**

It is important for this generation to realize the importance of environment and natural resources. The course focuses on understanding the relation between human population and environment, supported by practical assignments. It would also deal with environment related problems ecosystems and natural resources.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	The multidisciplinary nature of environmental studies & Human Population and the environment: Definition, scope and importance, need for public awareness, □□Population growth, Population explosion, 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.	(20%)
2	Renewable and non-renewable resources:(a)Forest resources, (b) Water resources, (c) Mineral resources, (d) Food resources,(e) Energy resources, (f) Land resources & Natural	(20%)
3	Concept of an ecosystem,-Structure and function of an ecosystem,□□ Producers, consumers anddecomposers□□ Energy flow in the ecosystem, -Ecological succession, -Food chains,-food webs and ecological pyramids, -Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem, b. Grassland ecosystem, c. Desert ecosystem, d. Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)	(20%)
4	Definition,-Causes, effects and control measures of: Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear pollution, Solid	(20%)

	waste management: Causes, effects and control measures of urban and industrial wastes, Role of an individual in prevention of pollution	
5	Resources and associated problems, causes and case studies, Role of an individual in conservation of natural resources, equitable use of resources for sustainable lifestyles Disaster management: floods, earthquake, cyclone and landslides	(20%)

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:**

**Assignment:** Five assignments should be given.

**Main Reference Book:**

1. Environmental studies  
By Erach Bharucha

# **GUJARAT UNIVERSITY**

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**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-2 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_FC-122**

**Subject Name: - Taxation Laws**

**Course Credit: - 2**

### **Objective:**

Taxation being a major policy decision in the economic scenario, it requires in-depth understanding of its effect on individuals and organizations. The aim of the course is to make students aware about various provisions of direct tax laws and details regarding five heads of income and its practical implications.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	Direct And Indirect Tax (Income Tax, Wealth Tax, VAT, Excise Duty) Definition (Assesses, Person, Income, Assessment Year, Previous Year, Casual Income) Income Tax Authorities (Executive Authorities, Appellate Authorities) Residential Status	(20%)
2	Salary Basic, Bonus, Commission, Gratuity, Pension, Employers Contribution to recognized provident fund & interest thereon Allowance: DA, HRA, CCA, EA, Children Education allowance, hostel allowance, other special allowance. Perquisites Rent free accommodation furnished / unfurnished All other taxable perquisites in the hands of specified and non specified employees Sec 16 deductions from salaries. Provident funds and its difference	(20%)
3	Income under the head 'House Property' Introduction – Computation of taxable income from house property self – occupied and let out.	(20%)

<b>4</b>	Income under the head 'Capital gains' Define capital Asset Long term asset & gain Short term capital gains. [long / short] Exemptions u/s 54, u/s 54B, 54D, 54EC, 54ED, 54F, 54G, 54GA	<b>(20%)</b>
<b>5</b>	Income under the head 'Income from other resources' 1. Dividend income, interest on securities – grossing up. Casual incomes (Rates of tax deducted at source to be given) 2. Computation of income from other sources and deductions allowed while computing the income. Income under the head 'Profit and gains of Business Profession' 1. Meaning of business and profession – incomes included under this head.	<b>(20%)</b>

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Five assignments should be given.

**Main Reference Books:**

1. S.Y.B.Com taxation  
By Sudhir Prakashan

**Reference Books:**

1. Systematic approach to Income Tax and Central Sales  
By Girish Ahuja & RaviGupta
2. Students Approach to Income Tax  
By Vinod Singhania

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-2 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-123**

**Subject Name: - Matrix Algebra and Graph Theory**

**Course Credit: - 3**

### **Objective:**

A study of Matrix algebra and Graph theory has become necessary because of its applications to Computer Science and various areas of engineering. The objective of this course is to develop a basic understanding of Matrices and Graph Theory which are both very useful modeling tools for computer programming. It is expected that the student has knowledge of Set Theory, Binary operations, functions, basic arithmetic and algebra to appreciate this course better.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>Introduction to Graphs :</b> Graph Isomorphism – The Fundamental theorem of graph theory- bipartite graph, regular graph, sub graph, path, cycle, connected graph, complement of a graph, join of graphs, square of a graph, edge contraction – matrix of a graph. <b>Binary tree</b> – left subtree and right subtree – rooted tree – the concept of parent, child, siblings, ancestors, descendants, leaf, internal vertices and balanced tree of height $h$ – full binary tree & perfect ternary tree	(20%)
2	<b>Trees and Searching Algorithm:</b> Tree, cut-edge, spanning tree – Cayley's Theorem (without proof) – weighted graph –Krushal's algorithm and Prim's algorithm for finding minimal spanning tree – Breadth First Search algorithm and Dijkstra's algorithm for finding shortest path <b>Directed Graph</b> (or a digraph) – matrix of a digraph – underlying simple graph – directed path – concept of reach ability – strongly connected graph, weakly connected graph, strong component of a graph – in-degree and out-degree of a vertex – The First Theorem of Digraph Theory.	(20%)
3	<b>Euler Tours, Hamiltonian Cycles, Planar Graphs &amp; Digraphs:</b> Konigsberg Bridge Problem – Euler graph – Hamiltonian graph – closure of a graph – planar graph – Jordon curve – critical planar graph –Euler's formula for planar graphs – crossing number of a graph. <b>Matrix and its types</b> – operations on matrices – determinant – properties of determinant – Inverse of a matrix	(20%)

4	<b>Linear Algebra- I:</b> Rank of matrix - Elementary row operations and row reduced echelon (RRE) form – Gauss Jordan method of finding inverse of a matrix – solution of system of linear equations by matrix method – Characteristic values, Characteristic vectors and characteristic equation of a matrix – Cayley Hamilton theorem (without proof). <b>Vector:</b> Vector spaces – subspaces – basis - Linear combination – Linear Transformation	<b>(20%)</b>
5	<b>Linear Algebra- II:</b> Rank and nullity of a linear map – matrix of a linear map <b>Multiplication and addition rules of counting</b> – Permutations (Rearrangements) and Combinations (selection) with and without Repetitions – Circular permutations – Binomial Coefficients – Pigeon Hole principle – Inclusion and Exclusion principle – Probability <b>(**For extra activity only)</b> Computer Applications: An error-correcting code, orientation in space, Robotics, the Scrambler Transformation	<b>(20%)</b>

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Five assignments should be given.

#### **Main Reference Books:**

1. A First Look at Graph Theory  
By John Clark & Derek Allan Holton, Allied Publishers Ltd
2. Discrete Mathematics  
By S.K.Charabarty and B.K.Sarkar, Oxford University press
3. An Introduction to Linear Algebra, Ane Books Pvt. Ltd, New Delhi  
By Inder K. Rana

#### **Reference Books:**

1. Discrete Mathematical Structures and its Application,  
By Kenneth Rosen, 6th edition, TMH
2. Linear Algebra and its Application, 3<sup>rd</sup> edition, Pearson Education, Inc  
By David C. Lay
3. Linear Algebra (Theory and Applications), Jones & Bartlett, India Pvt. Ltd.  
By Ward Cheney and David Kincaid
4. Probability, An introduction; Jones & Bartlett, India Pvt. Ltd.  
By David A. Santos
5. Introduction to Graph Theory, 2nd edition, PHI.  
By Douglas B. West
6. Algebraic Graph Theory, Springer.  
By Chris Godsil and Gordon Royle
7. An Introduction to Linear Algebra, East West Press Pvt. Ltd. (EWP), New Delhi.  
By V. Krishnamurthy, V. P. Mainra and J. L. Arora
8. Schaum's Outlines Discrete Mathematics, Third Edition By Seymour Lipschutz and Marc Lipson

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**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-2 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-124**

**Subject Name: - Database Management Systems Using SQL/PLSQL**

**Course Credit: - 3**

### **Objective:**

DBMS aims at developing & appreciating the data resource and issues in managing of data. It also provides technical background on computer system management of data. The course aims to make the students understand the basic & advanced principles and concepts of SQL and PL/SQL, writing blocks using PL/SQL and to provide knowledge of Oracle 9i architecture.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	Introduction to SQL. Objectives and advantages of SQL. Introduction to DML, DCL, DDL and DQL. Data Types of Oracle Tables: Creating tables, Viewing table data using SELECT, Sorting table data Integrity Constraints.	(20%)
2	Data manipulation using DML SQL operators and built-in functions. Using SET operations (Union, Intersection and Minus) Group by Having Clause and Aggregate Functions. Joins, Sub Queries, Views and Sequences, INDEX DBMS Security Management ( GRANT and REVOKE )	(20%)
3	Introduction to PL/SQL Advantages of PL/SQL The Generic PL/SQL block Overview of PL/SQL execution environment PL/SQL data types, constants and variables	(20%)
4	Control Structures Cursors (in detail) <ul style="list-style-type: none"><li>• Types, attributes</li><li>• Implicit, Explicit</li><li>• Cursor FOR Loops</li></ul>	(20%)

	<ul style="list-style-type: none"> <li>• Parameterized cursors</li> </ul> <p>Database Objects.</p> <ul style="list-style-type: none"> <li>• Stored procedures</li> <li>• Functions</li> <li>• Packages</li> </ul>	
5	<p>Database Triggers with types (in detail)</p> <p>Error Handling</p> <ul style="list-style-type: none"> <li>• Utility of Exceptions</li> <li>• Types of Exceptions</li> <li>• Raising the Exception</li> </ul> <p>Overview of Query Optimization.</p> <p>Overview of Oracle 9i architecture</p> <ul style="list-style-type: none"> <li>• Components of database and their introduction</li> <li>• Physical, memory and logical structure of database</li> </ul>	(20%)

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Implementations of the concepts of RDBMS using oracle 9i programmatically

**Assignment:** Five assignments should be given.

**Main Reference Book:**

1. SQL, PL/SQL The programming language of Oracle By Ivan Bayross BPB Publication 3<sup>rd</sup> Revised Edition.

**Reference Books:**

1. SQL/PLSQL for Oracle 9i  
By P.S. Deshpande Dreamtech Press

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-2 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-125**

**Subject Name: - Commercial Communication**

**Course Credit: - 3**

### **Objective:**

The course is designed to make the students learn the practical use of English by understanding grammar rules. It is imperative for the students to get acquainted with the various modes of English namely practical and theoretical aspects of letters and exposure to text. This will enable the students to develop their personalities & making them confident.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
<b>1</b>	Written Communication Essentials of a business letter Parts and forms of business letter Types of business letter	<b>(20%)</b>
<b>2</b>	Enquiry and reply letter Quotation Order – placing, execution and cancellation Complain and adjustment letter	<b>(20%)</b>
<b>3</b>	Informal communication letters (Condolence, greeting, email) (5%) Vocabulary (Synonyms, Antonyms & part of speech)(15%)	<b>(20%)</b>
<b>4</b>	Phonetics Confusing words One word substitute Idioms & phrasal verbs	<b>(20%)</b>
<b>5</b>	Novel (Subject to change)	<b>(20%)</b>

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Five assignments should be given.

**Main Reference Book:**

**Reference Books:**

1. Business Communication  
By V.K.Jain and Omprakash Biyani
2. Business Communication  
By Rajendra pal and korlahally
3. Business Communication  
By Urmila Rai and S.M.Rai
4. Modern Commercial Correspondence  
By R.S.N. Pillai and Bagavathi
5. Murphy's English Grammar  
By Raymond Murphy
6. A Textbook of English phonetics for Indian students  
By T. Balasubramanian

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-2 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-126**

**Subject Name: - Advance C Programming**

**Course Credit: - 3**

### **Objective:**

Advance 'C' provides a platform to software developers to understand the framework of every program. The goal of the course is to demonstrate problem-solving skills by working with advanced features of C like structures, pointers, dynamic memory handling, files and so on.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	User defined Functions, Call by reference, call by value, Recursion etc.	(20%)
2	Structures, unions, enum type, typedef	(20%)
3	Pointers, application of pointers –String	(20%)
4	Dynamic memory allocation -creating and manipulating singly link lists.	(20%)
5	File I/O -handling, operations on files –text file, binary file, preprocessor, and command line argument Using open source compilers for C – GCC.	(20%)

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Implementations of the concept programmatically  
On function, file handling, pointer, etc.

**Assignment:** Five assignments should be given.

**THIS SUBJECT IS BASE FOR :** DATA STRUCUTRE, COMPUTER GRAPHICS,  
OBJECT ORIENTED PROGRAMMING AND ANY PROGRAMMING LANGUAGE

**Main Reference Book:**

1. Programming ANSI C  
By E Balagurusamy, Tata McGraw-Hill publication and GCC manuals available on UNIX/LINUX

**Reference Books:**

1. Programming in c
2. C Complete Reference  
By Herbert Scheildt, 4th edition, Tata McGraw-Hill Publication
3. GCC Complete Reference  
By A. Griffith, Tata McGraw-Hill
4. Schaum's outline – Programming in C  
By Gottfreid, Tata McGraw-Hill Publication
5. Programming with ANSI and Turbo C  
By A.N. Kamthane, Pearson Education
6. Programming in C  
By M. T. Savalia, Atul Prakashan

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**

**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-2 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-127**

**Subject Name: - Implementation of SQL/PLSQL (Practical on CC-124)**

**Course Credit: - 3**

### **Objective:**

Know the basic skills needed in programming; understand the basic principles and concepts of Structured Query Language as well as Procedural Language, to be able to write, compile and run SQL Queries & PL/SQL blocks.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<ul style="list-style-type: none"><li>• SQL concepts and tools</li><li>• The generic SQL Sentence Construct</li><li>• Create Table: The Create Table Command<ul style="list-style-type: none"><li>1. Creating a table from a table</li></ul></li><li>• Data Constraints<ul style="list-style-type: none"><li>1. Defining integrity constraints in the alter table command</li><li>2. Dropping integrity constraints in the alter table command</li><li>3. Default Value Concept</li></ul></li><li>• Insertion of Data into tables<ul style="list-style-type: none"><li>1. Inserting of data into a table</li><li>2. Inserting of data into a table from another table</li></ul></li><li>• Viewing data in the tables<ul style="list-style-type: none"><li>1. View all rows and columns</li><li>2. Selected columns and all rows</li><li>3. Select rows and all columns</li><li>4. Selected columns and selected rows</li></ul></li><li>• Elimination of duplicates from the select statement</li><li>• Sorting of data in a table</li><li>• Delete Operations<ul style="list-style-type: none"><li>1. Removing all rows</li><li>2. Removal of a specified row(s)</li></ul></li><li>• Update Operations</li></ul>	(20%)

	<ul style="list-style-type: none"> <li>1. Updating of all rows</li> <li>2. Updating records conditionally</li> <li>• Modifying the structure of tables           <ul style="list-style-type: none"> <li>1. Adding new columns</li> <li>2. Modifying existing columns</li> </ul> </li> <li>• Renaming Tables</li> <li>• Destroying Tables</li> </ul>	
<b>2</b>	<ul style="list-style-type: none"> <li>• Operators (Arithmetic &amp; Logical Operators)</li> <li>• Range Searching</li> <li>• Pattern Matching</li> <li>• Column Alias</li> <li>• Built-In Functions (Aggregate, Scalar, Date and Date Conversion)</li> <li>• Grouping Data from tables           <ul style="list-style-type: none"> <li>1. Using the WHERE clause with grouped data</li> <li>2. Using the HAVING clause with grouped data</li> </ul> </li> <li>• Comparison of WHERE and HAVING</li> <li>• Subqueries</li> <li>• Joins           <ul style="list-style-type: none"> <li>1. Inner Join, Equi Joins, Self Join, Outer Joins</li> </ul> </li> <li>• Union, Intersect and Minus Clause</li> <li>• View</li> <li>• Sequence</li> </ul>	<b>(20%)</b>
<b>3</b>	<ul style="list-style-type: none"> <li>• The Generic PL/SQL Block</li> <li>• PL/SQL           <ul style="list-style-type: none"> <li>1. Character Set</li> <li>2. Literals</li> <li>3. Data Types</li> <li>4. Constant</li> </ul> </li> <li>• Branching and Loop statements</li> <li>• Operators</li> <li>• Comments</li> <li>• Displaying user messages on the screen</li> </ul>	<b>(20%)</b>
<b>4</b>	<ul style="list-style-type: none"> <li>• Cursor           <ul style="list-style-type: none"> <li>1. Implicit Cursor</li> <li>2. Explicit Cursor</li> <li>3. Cursor For Loops</li> <li>4. Parameterized Cursors</li> <li>5. Select for Update Cursors</li> <li>6. Cursor Variables</li> </ul> </li> </ul>	<b>(20%)</b>
<b>5</b>	<ul style="list-style-type: none"> <li>• Error Handling           <ul style="list-style-type: none"> <li>1. User-Named Exception Handlers</li> <li>2. User –Defined Exception Handlers (for I/O validations)</li> <li>3. User–Defined Exception Handlers (for Business</li> </ul> </li> </ul>	<b>(20%)</b>

	Rule validations) <ul style="list-style-type: none"> <li>• Procedures</li> <li>• Functions</li> <li>• Packages</li> <li>• Triggers (in detail)</li> </ul>	
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**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:**

**Assignment:** Five assignments should be given.

**Text Book:**

1. SQL, PL/SQL The programming language of Oracle  
By Ivan Bayross, BPB Publication 3<sup>rd</sup> Revised Edition.
2. SQL/PLSQL for Oracle 9i  
By P.S. Deshpande, Dreamtech Press

**Reference Books:**

**Chapter wise coverage From Textbook:**

**Unit 1 -**

**Unit-2 -**

**Unit 3 -**

**Unit 4 -**

**Unit -5 -**

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-2 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-128**

**Subject Name: - Implementation of C Programming (Practical on CC-126)**

**Course Credit: - 3**

### **Objective:**

Know the basic skills needed in programming; understand the basic principles and concepts of structured Programming, to be able to write, compile, debug and run programs in C.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	Programs using User defined function (with and without recursion), Programs based on call by reference, call by value, Programs on Recursion, Programs for handling multiple functions in a program	(20%)
2	Programs of Structure, Programs of one dimensional array, two dimensional array, string	(20%)
3	Programs based on Dynamic Memory allocation, Programs of linked list	(20%)
4	Programs for performing various operations using file handling functions, Command line argument programs, Programs based on Pre-processor directives	(20%)
5	Programs of Function and structure using pointer	(20%)

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

### **Recommended Practical Scheme:**

**Assignment:** Five assignments should be given.

### **Main Reference Book:**

1. Programming ANSI C

By E Balagurusamy, Tata McGraw-Hill publication and GCC manuals available on UNIX/LINUX

**Reference Books:**

1. Programming in c  
By Pradip Dey and Manas Ghosh (Oxford higher education)
2. C Complete Reference  
By Herbert Scheildt, 4th edition, Tata McGraw-Hill Publication
3. GCC Complete Reference  
By A. Griffith, Tata McGraw-Hill
4. Schaum's outline – Programming in C  
By Gottfreid, Tata McGraw-Hill Publication
5. Programming with ANSI and Turbo C  
By A.N. Kamthane, Pearson Education
6. Programming in C  
By M. T. Savalia, Atul Prakashan

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester- 2 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-129**

**Subject Name: - Web Technology I (Practical)**

**Course Credit: - 3**

### **Objective:**

The goal of this subject is to provide basic knowledge of web and internet, upgrading their designing standards with optimized coding of front-end, Learn mark up and CSS best practices and deliver optimum client side experience.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>Internet Basic, Email Concepts, Google Services and Photoshop</b> Browser and its important add-ones, Creating e-mail address, using various e-mail functionality, E-mail Protocols, E-mail security & Settings, Google Books, Blogger, Google Calendar, Google Class-room, Google Drive and Docs, QR Code Generation <b>Photo Shop and Web Template Elements:</b> Work Space in Photoshop, Basic Tools, Brushes in PS, Layer Management, and Canvas dimensions, Basics of Logo creation, Navigation, header, footer, product /service blocks, testimonials, full web template creation	(20%)
2	<b>Advance HTML :</b> <b>HTML Editor :</b> Macromedia Dream viewer 8, environment, tools, setting-up a local website <b>HTML:</b> Classes, ID, Blocks, Iframes, file path, head elements, HTML Entities, Symbols, Char-set, Forms, HTML5 new elements, semantic elements, Migration from HTML4 to HTML5, HTML5 Style Guide, HTML Graphics, HTML Media, HTML APIs	(20%)
3	<b>Cascading Style Sheet CSS:</b> Syntax, Selectors, Backgrounds, Borders, Margin, Padding, Height/Width, Box Model, Outline, Text, Font and Google API for fonts, Icons (Font-Awesome Icons integration) Links, Max-width, Position, overflow, Float,	(20%)

	Opacity, Combinators, Pseudo Class and elements, Navigation Bars, Dropdown, Image Gallery, Website Layout, CSS Units, Specificity CSS Advance Styling, CSS Responsive, CSS Grids, Animate CSS	
4	<b>Java Script: Core learning and concepts</b> JS Basics, JS core features Data Types, Functions, Objects, Events, Strings, Arrays, GET Method, SET Method, Math, Random, Booleans, Loop Structures, JS Versions, JS Forms. <b>Fundamental Client-side JavaScript:</b> JS object model, the standard document object model and event handling	<b>(20%)</b>
5	<b>Java Script: Advance Learning</b> <b>Using JavaScript:</b> Controlling windows and frames, Handling Documents, Form Handling, Dynamic effects – rollovers, positioning and animation, navigation and site visit improvements, browser and capabilities detection. <b>Advance Topics:</b> JavaScript and Embedded Objects and Remote JavaScript	<b>(20%)</b>

**Recommended Practical Scheme:** Approximately 45 hours of Lab demonstration (including Internet) with coding practice.

#### Main Reference Books:

1. The Complete Reference – HTML5 and CSS3 – Fifth Edition Thomas A. Powell – TATA McGRAW HILL Publication
2. Java Script – The Complete Reference - Second Edition Thomas A. Powell and Fritz Schneider – TATA McGRAW HILL Publication

#### Reference Books:

1. Google Docs for everyone – Create and share your work online - Steven Holzner & Nancy Holzner – QUE Publication
2. Java Script – The Good Parts Douglas Crockford – O'REILLY
3. Internet: The Complete Reference – Millennium Edition Margaret Levine Young, Doug Mude, Dave Kay, Kathy Warfel and Alison Barrows.
4. HTML & CSS – Design and Build Websites Jon Duckett - Wrox Publishers
5. Mastering HTML, CSS and JavaScript web publishing Laura Lemay , Rafe Colburn and Jennifer Kyrnin – BPB Publications

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-4 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_EC-241**

**Subject Name: - Introduction to Humanities**

**Course Credit: - 2**

### **Objective:**

The students of IT may not be aware of business culture and the occurrence of events there in. Therefore this course curriculum will enable them to develop an insight about social responsibility & business ethics as well. Moreover it will help the students to understand the relevance of political science and sociology, psychology and acquaint them with basics of humanities as a subject.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
<b>1</b>	Definition and nature of sociology Subject matter of sociology Uses of sociology	<b>(20%)</b>
<b>2</b>	Nature and Scope of Political Science Three Branches of Government 1. The Legislature – Meaning and Functions 2. The Executive – Meaning and Functions 3. The Judiciary – its importance, functions and the role of how(Judicial Review)	<b>(20%)</b>
<b>3</b>	Definition and Meaning of Personality Personality Types and traits. Factors in Personality Development Measurement of Personality	<b>(20%)</b>
<b>4</b>	Nature, Sources, Importance of Business Ethics Ethical Dilemmas Managing Ethics, corporate culture and Ethical climate Improving Ethical Decision Making	<b>(20%)</b>
<b>5</b>	Nature Arguments for and against Barriers, Strategies and Implementation Limits and common characteristics Evolving Idea of social Responsibility	<b>(20%)</b>

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Five assignments should be given.

**Reference Books:**

1. Economic Environment of Business  
By Ashwaltrapa; Himalaya publishing house
2. Sociology  
By C. N. Shankar Rao; Publisher- S. Chand
3. Political Science  
By A.C. Kapur; Publisher –S. Chand
4. A Textbook Of Educational Psychology  
By Hans Raj Bhatia; Publisher- Mac Millan

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-4 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_FC-242**

**Subject Name: - Business Communication**

**Course Credit: - 2**

### **Objective:**

Business and communication walk hand in hand. A concise and clear comprehension is very important in it. Therefore, this course curriculum is so designed that it will imbibe a great sense of technicality in handling the business communication with effective understanding. Moreover it imparts the students with the basic communication skills which help them in maintaining business relations.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	Functions of communication Role of manager Communication basics and networks Tips for effective internal communication and strategies for improving organizational communication	(20%)
2	Technology – based communication tools Positive impact of technology – enabled communication Negative impact of technology – enabled communication Tips for effectiveness in technology – based communication	(20%)
3	Concept of cross-cultural communication Ethnocentrism Cultural variables and communication sensitivity Cross-cultural communication strategies (Especially in the context of India, US, UK, UAE and Japan)	(20%)
4	Types of conversation Essentials of Business conversation and non-verbal uses in conversations Written Instructions Graphics and format in Instruction Oral and Product Instructions	(20%)

<b>5</b>	Meetings – Planning, Process and Evaluating meetings and minutes Conference – Planning, video conferencing and web conferencing Team briefing – Concept	<b>(20%)</b>
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**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Five assignments should be given.

**Reference Books:**

1. Business communication  
By Meenaleshi Raman & Prakash Singh; Publisher – Oxford (Higher education)
2. Business communication  
By V.K.Jain & Omprakash Biyani; Publisher – S.Chand

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**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-4 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-243**

**Subject Name: - Computer Oriented Numerical Methods**

**Course Credit: - 3**

### **Objective:**

With the current trend in computer science and technology, it is very important to develop time efficient and accurate algorithms for solving problems in various sectors like science, engineering, banking etc. The objective of this course is to enable students to gain a working understanding of Numerical Methods for the basic problems of Numerical Analysis. They would also be able to appreciate the problems due to rounding errors and convergence. It is expected that the student have knowledge of computer representation of numbers in memory, functions, graphs along with basics of matrices and calculus.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>Computer Arithmetic:</b> Representation of Numbers in Memory – Number System: rational, irrational, algebraic and transcendental numbers – Conversions and Complements (self study) <b>Solving System of Simultaneous Linear equations:</b> Gauss Elimination with partial pivoting, Gauss Jacobi Method, Gauss Seidel Method; Ill conditioned system of equations	(20%)
2	<b>Storage of Integer &amp; Real Numbers:</b> 1-byte and 2-byte representation of integers, 32 bit representation of a number – Floating point Arithmetic – Error and its types – Descarte's Rule of Sign <b>Curve Fitting:</b> Method of Least Square and Straight line fitting; Geometric Curve fitting, Exponential Curve fitting, Hyperbolic Curve fitting, Quadratic Curve fitting	(20%)
3	<b>Methods for solving Non-linear Equations :</b> Bisection Method, False Position Method, Secant Method, Newton Raphson Method; Geometric Interpretation of Bisection, Regula Falsi and Newton Raphson Method; (**For extra activity only) Derivation of Order of	(20%)

	Convergence of all methods <b>Numerical Differentiation:</b> Differentiating a function tabulated at equal intervals, differentiating a function tabulated at unequal intervals	
4	<b>Interpolation:</b> Operators and relation among operators, Lagrange's Interpolation, Newton's forward and Backward Interpolation, Newton's Divided Difference Interpolation, Error Propagation in Difference Tables Geometric Interpretation and deriving formula of all the above methods	(20%)
5	<b>Numerical Integration:</b> Trapezoidal Rule, Simpson's 1/3 <sup>rd</sup> rule and Simpson's 3/8 <sup>th</sup> rule; 2 point Gauss Quadrature method Numerical solution of Ordinary Differential Equations: Euler's Method, Modified Euler's Method, Runge Kutta's 2 <sup>nd</sup> order and 4 <sup>th</sup> order Methods (**For extra activity only) Predictor Corrector Method: Milne-Simpson's Method, Adam-Bashforth's Method, Adam-Moulton's Method	(20%)

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Five assignments should be given.

#### **Main Reference Books:**

1. Numerical Methods for Engineering and Science, Oxford Higher Education.  
By Saumyen Guha and Rajesh Srivastava
2. Numerical Methods for Engineers, 5<sup>th</sup> edition, Tata McGraw Hill Publications.  
By Steven C Chapra and Raymond P Canale
3. Numerical Methods with C++ Programming, PHI New Delhi.  
By Nita H. Shah

#### **Reference Books:**

1. Computer Oriented Numerical Methods, 3<sup>rd</sup> edition, PHI.  
By V. Rajaraman
2. Computer Oriented Numerical Methods, Vikas Publications.  
By N. Datta
3. Applied Numerical Analysis, 7<sup>th</sup> edition, Pearson Education Asia, New Delhi.  
By C.F. Gerald and P.O. Wheatley
4. Numerical Methods, Vikas Publications  
By Dr. V.N. Vedamurthy & Dr. N.Ch.S.N Iyenger
5. Numerical Methods with C++ Programming, Prentice Hall India Pvt. Ltd.  
By RM Somasundaram & RM Chandrasekaran
6. Numerical Methods using MATLAB, 4<sup>th</sup> edition, Pearson Education.  
By John H. Mathews and Kurtis D. Fink

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**K. S. SCHOOL OF BUSINESS MANAGEMENT**

**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-4 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-244**

**Subject Name: - Open Source Technologies**

**Credit: - 3**

**Objective:**

Open source software is very often developed in a public, collaborative manner. Under the open source license, it permits users to study, change, improve & at times also to distribute the software. The aim of the course is to understand open source software & licensing of the same, open source operating systems. This course covers the basics of Python programming to harness its potential for modern computing requirements.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weightage (%)</b>
1	<ul style="list-style-type: none"><li>History and Emergence of Open Source Software: The philosophy of OSS, The Cathedral and the Bazaar (CatB), commercial software vs OSS, free software vs freeware. Open source development models. Application Programming Interface (API). GNU Project, Free Software Foundation. Importance of Communities in Open Source Movement</li><li>Open Licenses: GNU General Public License (GPL) version 2, 3, GNU Lesser General Public License (LGPL) version 2.1,3, GNU Affero General Public License (AGPL) version3, Apache License, Version 2.0, Artistic License 2.0, and Creative Commons</li></ul>	(20%)
2	<ul style="list-style-type: none"><li>Linux Operating System: Overview of Linux distributions, Installation &amp; Package Management, File System Management, Environment Variables, Linux Editors (VIM).</li></ul>	(20%)
3	<ul style="list-style-type: none"><li>Introduction to Python, Running Python Programs, Writing Python Code, Data Types and Variables, Using Numeric Variables, Using String Variables, Printing with Parameters , Getting Input from a User, String Formatting, Logical Expressions, The "if" Statement, Logical Operators, Looping, Control Statements, The Math Library, Character Data, String functions.</li></ul>	(20%)
4	<ul style="list-style-type: none"><li>Difference between a Function and a Method, Defining a Function, Calling a Function, Returning Results from a Function, Returning Multiple Values from a Function, Scoping, Modules, Functions are First Class Objects, Pass by Object Reference, Formal and Actual Arguments,</li></ul>	(20%)

	Positional Arguments, Keyword Arguments, Default Arguments, Variable Length Arguments, Local and Global Variables, The Global Keyword, Passing a Group of Elements to a Function, Recursive Functions, Anonymous Functions or Lambdas.	
5	<ul style="list-style-type: none"> <li>Lists and Tuples, List Functions, Mutability, Dictionary, File handling in python, Exceptions: Errors in a Python Program (Compile-Time Errors, Runtime Errors, Logical Errors), Exceptions, Exception Handling, Types of Exceptions, The Except Block, The assert Statement, User-Defined Exceptions, Logging the Exceptions, Python classes and objects, Inheritance.</li> </ul>	(20%)

**Recommended Lecture Scheme:** Approximately 40 to 45 Lectures

**Assignment:** Minimum 3 Assignments

**Main Reference Books:**

1. Free Software,Free Society selected Essays By Richard M. Stallman
2. Open Source and Free Software Licensing(O'Reilly) By Andrew M.St.Laurent
3. Unix Concepts and Applications", Tata McgrawHill By Sumitabha Das
4. Introduction to Unix & Shell Programming", Pearson Education By Venkateshmurthy M.G
5. Python Programming Using Problem Solving Approach By Reema Thareja, Oxford Higher Education

**Reference books:**

1. Mastering Unix Shell Scripting", Wiley Publication By Randal Michael
2. Beginning Shell Scripting", Wrox Publication By Foster E., Anderson M. et al
3. Shell Scripting CookBook", PACKT Publishing By Sarath Lakshman
4. John V Guttag. "Introduction to Computation and Programming Using Python", Prentice Hall of India

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

**Semester-4 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-245**

**Subject Name: - System Analysis, Design and Modeling**

**Course Credit: - 3**

## **Objective:**

System development in MIS application is a structured and object oriented approach. The type of structure and object oriented model to be applied depends upon the type of application being developed. The course focuses on enabling the students to understand the concepts, role & importance of structured & object oriented approach, the different phases of system development life cycle for real life applications and student will aware about how to develop the diagrams for any given system.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>Information Systems Development :</b> Overview of System Analysis And Design, Role of system analyst, What are users, categories of business systems – TPS, MIS, DSS, Systems Development Strategies – Classical system development life cycle (SDLC); Preliminary investigation – scope of project, Feasibility study, project requests and approval , Requirement determination –process, data used, information produced , Design of system, development of software, System testing , Implementation and Evaluation. Project selection and review – committee methods.	(20)
2	<b>System requirement Analysis and specification :</b> Fact finding techniques, Tools for specifications – Decision concepts, Decision Trees, Decision Tables, Types of table entries, Structured English; Structured Analysis – Physical and Logical Dataflow diagrams, Process charts, Data Dictionaries; CASE Tools – Functionality, benefits and weakness. <b>Application Prototyping:-</b> Rationale, candidate applications, uses, steps in prototype method	(20)

3	<b>Analysis-to-Design Transition:-</b> Objectives in system design, Components to be designed – output, files, input, database, controls, procedures, codes, program specifications, Management of design process for institutional application <b>Systems Design:</b> output needs, output objectives, types of output design, input design , coding methods, input validation, User training, Conversion from old system to new system, Estimation of development time, Hardware/Software selection – selection criteria, benchmarking, purchase/rent/lease options.	<b>(20)</b>
4	<b>Management Information System</b> Management system introduction, Role of MIS, Development and implementation of MIS, MIS development process model, group decision support system, knowledge management system Decision Support System(DSS): Concept and Philosophy	<b>(20)</b>
5	<b>UML Diagrams:</b> Use-case diagram – Scope, benefits, elements, guideline for drawing use-case diagram, information system analyst can retrieve from use-case diagram. Class Diagram- introduction to class diagram, elements of class diagram, guideline for drawing class diagram Sequence Diagram- introduction to sequence diagram, elements of sequence diagram, guideline for drawing sequence diagram, information system analyst can retrieve from sequence diagram. Activity Diagram- introduction to activity diagram, elements of activity diagram, guideline for drawing activity diagram, information system analyst can retrieve from activity diagram. Deployment Diagrams- introduction to Deployment diagram, elements of Deployment diagram, guideline for drawing Deployment diagram, information system analyst can retrieve from Deployment diagram.	<b>(20)</b>

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Five assignments should be given.

**Main Reference Books:**

1. System Analysis and Design By james A. senn
2. MIS by Jawedkar 4<sup>th</sup> Edition
3. Magnifying Object Oriented Analysis and Design By Arpita Gopal and Netra Patil.

**Reference Books:**

1. System Analysis and Design By kendlle & kendlle.

# **GUJARAT UNIVERSITY**

## **K. S. SCHOOL OF BUSINESS MANAGEMENT [Five Years' (Full-time) Integrated Degree Course]**

### **Semester-4 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-246**

**Subject Name: - Client Server Architecture - Theory**

**Credit: - 3**

#### **Objective:**

It is important for the students to deal with visual interface while acquiring important programming skills since visual interface plays a vital role in software development. The objective of the course is to acquaint the students with the fundamentals of Microsoft Visual Basic .NET programming language, deal with basic but important controls & their properties.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weightage (%)</b>
1	Introduction to Visual Studio: .Net Framework, .NET Framework Version Compatibility, Components of .Net Framework – Common Language Runtime(CLR),Microsoft Intermediate Language(MSIL), Just-In Time(JIT), Assemblies, Benefits of .Net Framework, Visual Studio IDE, Components of IDE – Start Page, Command Bars, Server Explorer, Solution Explorer, Property window, ToolBox, OutPut Window, ErrorList, Code Designer, Graphical Designer, Intellisense	(20%)
2	Data Types in C# , Variables, Constants, Scope of a Variables, Operators, Arrays, Structures, If Statement- Simple if, if-else, Nested if-else, Loops- for loop, for each ,while loop. Do loop, Switch-Case Statement, Methods , Forms - Loading and showing forms, setting the Startup form , events and properties.	(20%)
3	Windows Control- Button, Label,Textbox, Radiobutton, Checkbox, Picturebox, Listbox, Timer, Progressbar, ScrollBar, ImageList, NumericUpDown, Tab Control, Combobox, Groupbox, Listview, Tab Control, LinkLabel Control, Richtextbox, OpenFileDialog, SaveFileDialog, FontDialog, ColorDialog, Creating menus and submenus, ContextMenuStrip, Directory and File Class, String Class	(20%)
4	Object Oriented Programming- Defining a Class, Adding variables and methods, creating objects, constructors, Encapsulation, Inheritance-Single, multi-level, multiple, hierarchical, Interfaces, polymorphism-compile-time and run-time.	(20%)
5	Error Handling and Debugging:- Types of Errors, Exception Handling, Database Application using ADO.NET:- ADO.NET Objects, Creating a DataSet, DataAdapter Object, Command Object and DataReader object, Deployment: - Deploying Application Using Windows Installer.	(20%)

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Assignment:** Five assignments should be given.

**Main Reference Books:**

- 1) C# 2005 Programming – Black Book By: Matt Telles and Kognet Solutions Inc, DreamTech Press.

**Reference Books:**

- 1) C# 2005 with .NET 3.0 Framework in simple Simple Steps. By DreamTech Press.
- 2) Introduction to C# Using .NET By: Robert J. Oberg, Pearson Education.

# **GUJARAT UNIVERSITY**

## **K. S. SCHOOL OF BUSINESS MANAGEMENT**

### **[Five Years' (Full-time) Integrated Degree Course]**

#### **Semester-4 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-247**

**Subject Name: - Implementation of Open Source Technologies  
(Practical On Cc-244)**

**Credit: - 3**

#### **Objective:**

To understand the Linux & UNIX Operating System, get acquainted with the Linux Commands and an Insight of Shell scripting for Administrative Tasks. This course covers the basics of Python programming to harness its potential for modern computing requirements.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weightage (%)</b>
1	<ul style="list-style-type: none"><li>• <b>General purpose utilities:</b> cal, date, echo, printf, bc, who, uname.</li><li>• <b>File system and file handling commands:</b> pwd, cd, mkdir, rmdir, ls, cat, cp, rm, mv, more, wc, cmp, comm, diff</li><li>• <b>File Attributes and permissions:</b> chmod, chown, chgrp, umask, ls –l</li><li>• <b>The Shell:</b> Input and Output redirection, Quoting and Escaping, command substitution, Pattern matching, wild-card characters.</li></ul>	<b>(20%)</b>
2	<ul style="list-style-type: none"><li>• <b>Simple Filters:</b> pr, head, tail, cut, paste, sort with various options, uniq, tr.</li><li>• <b>Filters using Regular Expressions:</b> grep, Basic Regular Expression (BRE), Extended Regular Expression (ERE), sed : Line and context Addressing, using multiple instructions, substitution.</li></ul>	<b>(20%)</b>
3	<ul style="list-style-type: none"><li>• <b>Shell Scripts:</b> read command, using command line arguments, exit and exit status of a command, if condition, using test and [] to evaluate expressions, the case conditional, expr, while loop, for loop, until loop, for looping with a list, Using positional parameters, set and shift.</li></ul>	<b>(20%)</b>
4	<ul style="list-style-type: none"><li>• <b>Python Programming:</b> Introduction to Python, Running Python Programs, Writing Python Code, Data Types and Variables, Using Numeric Variables, Using String Variables,</li></ul>	<b>(20%)</b>

	<p>Printing with Parameters , Getting Input from a User, String Formatting, Logical Expressions, The “if” Statement, Logical Operators, Looping, Control Statements, The Math Library, Character Data, String functions.</p> <ul style="list-style-type: none"> <li>Difference between a Function and a Method, Defining a Function, Calling a Function, Returning Results from a Function, Returning Multiple Values from a Function, Scoping, Modules, Functions are First Class Objects, Pass by Object Reference, Formal and Actual Arguments, Positional Arguments, Keyword Arguments, Default Arguments, Variable Length Arguments, Local and Global Variables, The Global Keyword, Passing a Group of Elements to a Function, Recursive Functions, Anonymous Functions or Lambdas.</li> </ul>	
5	<ul style="list-style-type: none"> <li>Lists and Tuples, List Functions, Mutability, Dictionary, File handling in python, Exceptions: Errors in a Python Program (Compile-Time Errors, Runtime Errors, Logical Errors),Exceptions, Exception Handling, Types of Exceptions, The Except Block, The assert Statement, User-Defined Exceptions, Logging the Exceptions, Python classes and objects, Inheritance.</li> </ul>	(20%)

**Assignment:** Minimum 5 Assignments

**Main Reference Books:**

1. Unix Concepts and Applications”, Tata McgrawHill By Sumitabha Das
2. Introduction to Unix & Shell Programming”, Pearson Education By Venkateshmurthy M.G
3. Python Programming Using Problem Solving Approach By Reema Thareja, Oxford Higher Education

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester- 4 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-248**

**Subject Name: - Web Technology – II (Practical)**

**Course Credit: - 3**

### **Objective:**

The course provides an overview of most useful global network, basic concepts of how to develop websites & be familiar with client-side and server-side scripting language as well, basic knowledge required of: HTML , CSS, JavaScript.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>jQuery :</b> - Introduction, Namespace, Syntax, jQuery Object, Selectors, Each function, Events (document ready, click, bind, blur, focus, select, change, submit, mouse events, key events, delegate), Attributes, jQuery effects (Hide/Show, Fade, Toggle, Slide, Animate, Stop(), Callback, Chaining, Delay()), jQuery HTML - DOM Manipulation (Get, Set, Add, Remove, CSS classes(add,remove, has etc.)), DOM Traversing (parent, parents, parentsUntil, children, find, closest, siblings, next, prev, filtering), Append, Prepend, Dimensions, Filters.	<b>(20%)</b>
2	<b>jQuery AJAX :-</b> (load, get/post, success, error, http response codes). <b>Angular JS :</b> - Introduction, Expressions, Modules, Component, Model, Data binding, Controllers, Scopes, Built-in Directives (ngIf, ngRepeat, ng-model-options, ng-init, ng-bind, ng-change, ngShow, ngHide, ngRequired, ngCopy, ngPaste, ngClick, ngList, ngOptions, ngModel, ngClass, ngHref, ngPattern, ngDisabled), Built-in Filters, Built-in Services, Events, Includes, Animations, Routing.	<b>(20%)</b>
3	Angular JS Custom Directives, Custom Filters, Service and Factory, Forms and Validation, Built-in Helper Function (equals, toJson, isString, isArray, isDate, isElement, isNumber, merge,isObject, forEach etc), Http, Tables, SQL, Angular MVC	<b>(20%)</b>

<b>4</b>	<b>Node.js</b> : - Introduction, Console, REPL, Global Objects, Timer, Buffers, Streams, File System, Crypto, Query String, ZLIB, Modules, HTTP Module, URL Module, NPM, Events, Upload File, Email.	<b>(20%)</b>
<b>5</b>	<b>Node.js MySQL</b> : - Create Database, Create Table, Insert, Select, Where, Order By, Delete, Drop Table, Update, Limit, Join	<b>(20%)</b>

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:**

**Assignment:** Five assignments should be given.

**Reference Books:**

1. Beginning jQuery - Jack Franklin, Russ Ferguson - Second Edition - Apress
2. Learning jQuery 1.3 - Jonathan Chaffer, Karl Swedberg - PACKT Publishing
3. Pro jQuery 2.0 - Adam Freeman - Second Edition - Apress
4. Pro Angular JS - Adam Freeman - Second Edition - Apress
5. Scaling your Node.js Apps - Fernando Doglio - Apress

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-4 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-249**

**Subject Name: - Implementation of Client Server Architecture  
(Practical on CC-246)**

**Course Credit: - 3**

### **Objective:**

It is important for the students to deal with visual interface while acquiring important programming skills since visual interface plays a vital role in software development. The objective of the course is to acquaint the students with the fundamentals of Microsoft Visual Basic .NET programming language, deal with basic but important controls & their properties.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weightage (%)</b>
<b>1</b>	Applications for creating simple forms	<b>(20%)</b>
<b>2</b>	Applications covering basics of vb.net (variables, constants, arrays, methods, control structures, Structures, ArrayList)	<b>(20%)</b>
<b>3</b>	Applications for all windows control, Dialog Control, Directory and file class.	<b>(20%)</b>
<b>4</b>	Applications for Object Oriented Programming using console application	<b>(20%)</b>
<b>5</b>	Applications for error handling and debugging Applications for database connectivity	<b>(20%)</b>

**Assignment:** Five assignments should be given.

### **Main Reference Books:**

- 1) C# 2005 Programming – Black Book By: Matt Telles and Kognet Solutions Inc, DreamTech Press.

### **Reference Books:**

- 1) C# 2005 with .NET 3.0 Framework in simple Simple Steps. By DreamTech Press.
- 2) Introduction to C# Using .NET By: Robert J. Oberg, Pearson Education.

# **GUJARAT UNIVERSITY**

## **K. S. SCHOOL OF BUSINESS MANAGEMENT**

**[Five Years' (Full-time) Integrated Degree Course]**

### **Semester-6 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_EC-361**

**Subject Name: - Advance Java**

**Course Credit: - 2**

#### **Objective:**

The subject and the course content will help the student to Understand the concepts of threading and thread-safe programming in Java, Write client-side Java applications using Swing, Work with XML in Java, Work with Java Web Services

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<p><b>Advanced Java Swing Programming:</b> - Introduction of Swing, AWT vs. Swing, features of Swing, Look and Feel for Swing Components</p> <p><b>Swing Components :-</b> JFrame, JApplet, JPanel, JCheckBox, JRadioButton, JToggleButton, JTree, JMenu, JFileChooser, JColorChooser, Layout Managers (BoxLayout, SpringLayout), JList, JScrollPane, JSplitPane, JTabbedPane, Dialog Box</p> <p><b>2D Graphics :-</b> 2DGraphics Class (Line Style, Fill Pattern)</p>	(20%)
2	<p><b>JavaBeans:</b> - The Software Component Assembly Model, Using Customize Class, Create setter and getter Methods. Create Simple Application Using JavaBean</p> <p><b>Database Programming:</b> - ODBC and JDBC Drivers, Connecting to Database with the java.sql Package, Using JDBC</p>	(20%)
3	<p><b>Servlets :-</b> Introduction to Servlets, Servlet Life Cycle, Servlet based Applications, Servlet and HTML</p> <p><b>JSP :-</b> Introduction to JSP, JSP implicit objects, JSP based Applications</p>	(20%)

<b>4</b>	<b>XML:</b> - Introduction to XML, XML Building Block, Displaying XML, XML Parser, Introduction to DTD  <b>RMI:</b> - The RMI Architecture, RMI exceptions, Developing Applications with RMI	<b>(20%)</b>
<b>5</b>	<b>J2EE:-</b> The J2EE Platform, The J2EE connector Architecture, J2EE Packaging and Deployment, WAR file  <b>Other Java Technologies :-</b> Introduction to Struct, MVC, struct based application, Java Message Service (JMS), Java in small memory space (PDA), Overview of Distributed Computing (CORBA, DCOM)	<b>(20%)</b>

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Five assignments should be given.

#### **Main Reference Books:**

1. Professional Java Server Programming (a Press)  
By Allamaraju
2. Developing Java Servlets (Techmedia – SAMS)  
By James Goodwill

#### **Reference Books:**

1. Using Java 1.2 Special Edition ( PHI )  
By Webber
2. Java 2 Unleashed (Techmedia – SAMS)  
By Jamie Jaworski

**GUJARAT UNIVERSITY**  
**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

**Semester-6 [M.Sc. (CA & IT)]**

**Subject Code:** - KS\_C\_SE -361

**Subject Name:** - Advance Web Technology (*PHP Programming*)

**Credit:** - 2

**Objective:**

The goal of this subject is to provide students with the knowledge and ability to write server-side scripting language commonly used on the web to interact with users. Provide knowledge about latest PHP Frameworks and hands on practice of PHP concepts. Apart from this the major motive is to provide detailed knowledge of Design, Debug and Deploy feature-rich web applications.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>Fundamental and basics of PHP</b> Introduction of PHP, Installation, NetBeans overview and installation, syntax, Variables, Data Types, strings, Numbers, constants, operators, loop structures, functions, arrays, Super-global	20%
2	<b>PHP Forms and Advance Techniques</b> Form Creation, Form Handling, Form Validation, Form URL, Form Examples, PHP Date & Time, Include, File Handling, File Open/Read/create/write/upload, Cookies, Session, Filters, PHP JSON	20%
3	<b>PHP Object Oriented Programming Concepts</b> OOP Concepts in PHP, Classes/Objects, Constructor and destructor, Access Modifiers, Inheritance, Abstract Class, Traits, Static Methods, Static Properties	20%
4	<b>MY SQL Database</b> Introduction, ConnectDB, CreateDB, Create Table, Insert Data, Get Last ID, Operations on DB – Multiple Values, select data, fetch data, ordering, delete, upload, limit.	20%
5	<b>PHP XML and AJAX and MVC</b> XML Parsers, Simple XML Parser, Simple XML GET, XML Expat, XML DOM, AJAX introduction, AJAX in PHP, AJAX Database, AJAX Database, AJAX and XML, AJAX Live Search, AJAX Poll, <b>MVC Architecture:</b> Design pattern, Types of PHP MVC frame work, Database configuration, Creating model, Creating Views and Testing application.	20%

**Recommended Practical Scheme:** Approximately 45 hours of Lab demonstration with coding Practice.

**Main Reference Books:**

1. The Complete Reference – PHP  
Stvean Holzner – TATA McGRAW HILL Publication
2. Pro PHP MVC  
Christ pitt – Apress Publication

**Reference Books:**

1. PHP and MySQL for dynamic WebSites  
By Larry Ullman, Visual Quickpro Guide, Second Edition

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-6 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_FC -362**

**Subject Name: - Research Methodology**

**Course Credit: - 2**

### **Objective:**

To gain insights into how scientific research is conducted, to learn and understand the basic statistics involved in data presentation, to identify the influencing factor or determinants of research parameters, to test significance, validity and reliability of the research results, to help in documentation of research results

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>Fundamentals of Research:-</b> Meaning, Objectives and significance <b>Types of Research:</b> - Basic research, applied, Descriptive, Historical, Exploratory, Experimental, Ex-post-factor and Case Study Approach. <b>Approaches to Research:-</b> Quantitative Approach & Qualitative Approach	(20%)
2	<b>Sampling:</b> Meaning, Sample and Sampling, Essentials of good sample, Sample Size, <b>Methods of Sampling:</b> <ol style="list-style-type: none"><li>1. <b>Probability Sampling:</b> simple Random Sampling, Stratified Random Sampling, Cluster Sampling, Multi Stage Sampling.</li><li>2. <b>Non Probability Sampling:</b> Purposive Sampling, Quota Sampling, Convenience Sampling.</li></ol> <b>Sources and Methods of Data Collection:</b> <ol style="list-style-type: none"><li>1. <b>Primary Sources:</b> Observation, Interview, Questionnaire, Schedules</li><li>2. <b>Secondary Sources:</b> Data Collection and Tabulation.</li></ol>	(20%)

<b>3</b>	<b>Research Process:</b> - Selecting the topic, defining the research problem, objectives of research, literature survey, sample design, data collection, execution of project.	<b>(20%)</b>
<b>4</b>	Analysis of Data and Hypothesis Testing Generalization and Interpretation Preparation of Research Project.	<b>(20%)</b>
<b>5</b>	<b>Case Study:</b> F – Test, ANOVA, t – test, Chi – Square Test	<b>(20%)</b>

**Recommended Lecture Scheme:** Approximately 30 to 35 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Five assignments should be given.

**Main Reference Books:**

1. Research Methodology Methods and Techniques  
By C. R. Kothari, Vishwa Prakashan
2. Research Methods in Business  
By Sunita Pawar, Sheth Publishers Pvt. Ltd

**Reference Books:**

1. David Rubin, Statistics for Management  
By Richard Levin, Pearson Education
2. Pamela Schindler, Business Research Methods  
By Donald Cooper, Tata McGraw- Hill Co. Ltd
3. Introduction to Research Methodology  
By Dr Prashant Sarangi
4. Research Methodology Concepts & Cases  
By Dr Neena Sondhi & Dr Deepak Chawla, Vikas Publishing

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-6 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-363**

**Subject Name: - Data Communication and Networking**

**Course Credit: - 3**

**Objective:**

To understand Fundamental of networking & data communication .To understand network models functionality in depth.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<ul style="list-style-type: none"><li><b>Introduction:</b> Uses of computer network, Network hardware – LAN, MAN, WAN. Network software – protocol hierarchies, Design issues for layers, Connection oriented and connectionless services, OSI model, TCP/IP model, Comparison of OSI and TCP/IP model.</li><li><b>Physical Layer:</b> Data and Signals, Periodic Analog Signals, Digital Signals, Transmission Impairment. Data Rate Limits, Performance, Multiplexing, Spread Spectrum, Guided Media.</li></ul>	(20%)
2	<ul style="list-style-type: none"><li><b>Switching :</b> Circuit Switched Networks, Datagram Networks, Virtual circuit networks.</li><li><b>The Data Link Layer :</b> Introduction, Error Detection and Correction, Data link control services, Data Link Layer Protocols,</li></ul>	(20%)
3	<ul style="list-style-type: none"><li><b>The Medium Access Control (MAC):-</b>Random Access, Controlled Access, Channelization</li><li>Connecting Devices</li></ul>	(20%)
4	<ul style="list-style-type: none"><li><b>The Network Layer :</b> Introduction, Network Layer services, Packet switching, Network Layer performance,IPv4 Addressing, Forwarding of IP packet, introduction of Unicast routing, Unicast routing algorithms, introduction of Multicast routing.</li></ul>	(20%)
5	<ul style="list-style-type: none"><li><b>The Transport Layer :</b> The transport service - Services provided to the upper layers, Transport service primitives, Elements of transport protocol - addressing, Connection establishment, Connection release, Flow control, Multiplexing,</li><li><b>The Application layer:</b> Introduction of Electronic mail ,World Wide Web: Architectural , HTTP ,FTP,SMTP</li></ul>	(20%)

**Recommended Lecture Scheme:** Approximately 40 to 45 hours of classroom teaching.

**Recommended Practical Scheme:** Applicable

**Assignment:** Minimum 3 assignments.

**Main Reference Books:**

1. Data Communications and Networking By Behrouz A. Forouzan, Tata McGraw-Hill, Fifth Edition

**Reference Books:**

1. Computer Networks  
By Bhushan H Trivedi, Oxford University Press
2. Computer Networking  
By Andrew S. Tanenbaum, Prentice Hall, Fourth Edition

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-6 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC -364**

**Subject Name: - System Software**

**Course Credit: - 3**

### **Objective:**

Explain the concepts, structure and mechanisms of system software, Introduce design principles and implementation issues of System Software, Introduction of assembly language programming, Detailed study of Language processing, Compiler, Assembler, Parser, Scanner, Unix Device driver, Program compilation and Debugging.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>System Software</b> :- System Software, Goals of System Software, Overview of Language Processor, Fundamentals of language specification, Symbol Tables, Software Tools	(20%)
2	<b>Assemblers and Device Driver</b> :- Elements of Assembly Language Programming, A Simple Assembly Scheme, Pass Structure of Assemblers, Design of a Two Pass Assembler, Device Driver, Character Driver, Block Driver, Driver Installation	(20%)
3	<b>Macros and Macro Preprocessor and Interpreter</b> :- Macro Definition and Call, Macro Expansion, Nested Macro Calls, Advanced Macro Facilities, Activities and Data Structures Involved in Designing a Macro Processor, Interpreters: Use and Overview, Pure and Impure Interpreters	(20%)
4	<b>Scanning and Parsing and Compiler</b> :- Classification of Programming language, Introduction to Compilation, Scanning: Regular Expression, DFA, NFA, Parsing: Top Down , Top Down Without back tracking , Recursive Descent Parsing , First and Follow , LL(1), Bottom Up : Operator Precedence Grammar / Parser ,Language Processor development tools, Causes of a large semantic Gap, Binding and Binding Times, Data Structures used in Compilers, Scope Rules, Memory Allocation, Compilation of Expression and Control structure, Code Optimization	(20%)
5	<b>Linkers &amp; Loaders</b> :- Introduction to Linkers, Relocation and Linking Concepts, Design of a Linker, Self-Relocating Programs, Linking for Overlays, Introduction to Loaders, Programs in Memory, Different Loading Schemes, Types of Loaders, Linking Loaders, Overlay, Binder, Dynamic Loader	(20%)

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Applicable

**Assignment:** Five assignments should be given.

**Main Reference Books:**

1. System Programming  
By D.M. Dhamdhare, Tata McGraw Hill
2. Unix Device Driver  
By George Pajere
3. Systems Programming  
By Srimanta Pal, Oxford University Press

**Reference Books:**

1. Compilers  
By Aho , Sethi & Ulman
2. Compiler Construction Principles & Practice Principles and Practice  
By Kenneth Louden
3. System Software - An Introduction to Systems Programming  
By Leland L. Beck, Pearson Education Asia, 3rd Edition, 2000
4. System Software  
By Shantanu Chattopadhyay, Prentice-Hall India, 2007

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-6 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-365**

**Subject Name: - E-commerce and E-governance**

**Course Credit: - 3**

### **Objective:**

The subject provides the knowledge of E-commerce, the process of purchasing marketing and payment, brief knowledge of various models of E-governance

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<p><b>Chapter 1: Introduction to Electronic Commerce.</b></p> <ol style="list-style-type: none"><li>1. Introduction</li><li>2. Electronic Commerce:- Electronic Business, Categories of E – Commerce, Development and Growth of E - Commerce</li><li>3. Business Models, revenue Models and business Process:- Merchandising, Advantages and Disadvantages of E – Commerce</li><li>4. Economic forces and E – Commerce: Transaction cost, Markets and Hierarchies</li><li>5. Identifying E - Commerce opportunities: - Strategic unit value chains, Industry value chain.</li><li>6. International Nature of e-commerce. (Issues).</li></ol> <p><b>Chapter 6: Business to business strategies</b></p> <ol style="list-style-type: none"><li>1. Purchasing, Logistics and Support Activities:- Purchasing activities, direct vs indirect materials purchasing, logistics activities and support activities, Network Models of Economic Organization</li><li>2. EDI</li><li>3. Supply Chain Management using internet technologies</li></ol>	(20%)
2	<p><b>Chapter 5: Marketing on the web</b></p> <ol style="list-style-type: none"><li>1. Communicating with different market segments</li><li>2. Creating and Maintaining Brands on the web:- elements of branding, emotional vs rational branding, brand leveraging strategies, brand consolidation strategies, cost of branding, affiliate marketing, viral marketing</li><li>3. Search Engine</li></ol> <p><b>Chapter 4: Revenue Models</b></p>	(20%)

	<p>1. Revenue models:- web catalog revenue model, digital content revenue model, advertising supported revenue model, advertising subscription mixed revenue model, fee for transaction revenue model, fee for service revenue model</p> <p>2. Revenue models in transition</p> <p><b>Chapter 11: Payment System for E-commerce</b></p> <ol style="list-style-type: none"> <li>1. Online Payment Basics</li> <li>2. Payment Cards:- Advantages, Disadvantages, Acceptance and Processing</li> <li>3. Electronic Cash:- Micro payments and Small Payments, Privacy &amp; Security, Holding cash, Advantages &amp; Disadvantages, Working, Security, E-cash Systems</li> <li>4. Electronic Wallets</li> <li>5. Stored value cards</li> <li>6. Internet Technologies and Banking Industry:- cheque processing, Phishing attacks, Organized crime and identity theft</li> </ol>	
3	<p><b>Chapter 10: E - Commerce security</b></p> <ol style="list-style-type: none"> <li>1. Overview of Online Security issues:- Managing Risk, Computer Security Classification, Security Policy and Integrated Security</li> <li>2. Security for Client Computer:- cookies, web bugs, active content, java applets, java scripts, active X controls, graphics and plug-ins, viruses, worms and antivirus software, Digital Certificates, Steganography, Physical security for clients.</li> <li>3. Communication channel security:- Secrecy threats, integrity threats, necessity threats, threats to physical security of internet communication channels, threats to wireless networks, Encryption solutions, Ensuring Transaction Integrity with Hash Function and Digital Signatures, Guaranteeing Transaction Delivery.</li> <li>4. Security for server computers:- Web server threats, database threats, other programming threats, threats to physical security of web servers, access control and authentication, Firewalls,</li> <li>5. Organizations that promote computer security:- CERT., other organizations, computer forensics and ethical hacking</li> </ol>	(20%)
4	<ul style="list-style-type: none"> <li>• <b>Chapter 1: What is e-governance?</b> <ol style="list-style-type: none"> <li>1. introduction</li> <li>2. issues in e-governance</li> <li>3. evolution</li> <li>4. Difference between Government and Governance</li> <li>5. Difference between E-commerce and E-governance</li> </ol> </li> <li>• <b>Chapter 2: E-governance Models</b> <ol style="list-style-type: none"> <li>1. Models of digital governance:- Broadcasting/ Wider Dissemination model, Critical flow model, Comparative</li> </ol> </li> </ul>	(20%)

	analysis model, Mobilization lobbying model, Interactive Service model/ Government to citizen to government model 2. Evolution in e-governance and maturity models:- five maturity levels 3. Characteristics of maturity levels	
5	<ul style="list-style-type: none"> <li>• <b>Chapter 3: E-governance Infrastructure, stages in evolution and strategies for success</b> <ol style="list-style-type: none"> <li>1. E-readiness:- Data systems infrastructure, legal infrastructural preparedness, institutional infrastructural preparedness, Human infrastructural preparedness, Technological infrastructural preparedness</li> <li>2. Evolutionary stages in e- governance</li> <li>3. Real time applications of E-governance</li> </ol> </li> <li>• <b>Chapter 4 : Applications of data warehousing and data mining in government</b> <ol style="list-style-type: none"> <li>1. National data warehouses: - Census data, prices of essential commodities</li> <li>2. Other areas for data warehousing and data mining:- Agriculture, rural development, health, planning, education, commerce and trade and other sectors</li> </ol> </li> </ul>	(20%)

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Five assignments should be given.

**Main Reference Books:**

1. E-Commerce : Strategy, technology and implantation Cengage Learning  
By Gary P. Schneider
2. E-Governance, Concepts and case studies  
By C.S.R. Prabhu, PHI

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-6 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC -366**

**Subject Name: - Implementation of Data Communication and Networking (Practical on CC-363)**

**Course Credit: - 3**

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### **Objective:**

The objective of this course is to familiarize the students with the client server programming techniques. This course will help them understand TCP/IP and UDP/IP communication techniques. The students will be able to understand different network technologies and will be able to:

- Implement Framing Techniques as well as Error Detection and Correction Techniques.
- Perform development of All Data Link Layer Protocols
- Understand and implement Symmetric & Asymmetric key algorithms.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	Introduction to Client Server Programming (TCP sockets, UDP sockets (datagram sockets), Server programs that can handle one connection at a time and multiple connections (using multithreaded server), Implementation details- Client-Server Application.) Implementation of Framing Techniques (Multithreading, Bit Stuffing, Byte Stuffing, Character Count)	(20%)
2	Implementation of Error Detection and Correction Techniques (Single Bit Parity, Block Parity, Checksum, CRC Checksum, Hamming Code)	(20%)

<b>3</b>	Implementation of All Data Link Layer Protocols (Simplex Protocol, Stop & Wait Protocol, Stop & wait ARQ Protocol, Go & back ARQ Protocol, Selective Repeat ARQ Protocol)	<b>(20%)</b>
<b>4</b>	Implementation of Cryptography (using Java Security/Cryptography Packages ) (AES , DES , RSA, S-BOX and P-BOX)	<b>(20%)</b>
<b>5</b>	Implementation of Symmetric Block Ciphers (Caesar Cipher, Mono Alphabetic Cipher with Sequence and Random Key, Poly Alphabetic Cipher, Play Fair Cipher, Transposition Cipher)	<b>(20%)</b>

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Five assignments should be given.

**Text Book:**

1. Computer Networking  
By Andrew S. Tanenbaum, Prentice Hall, Fourth Edition
2. Computer Networks  
By Bhushan H Trivedi, Oxford University Press

**Reference Books:**

1. Java Network Programming, by Elliotte Rusty Harold (O'Reilly)
2. Advanced Java Networking, by Prashant Sridharan (Prentice-Hall)
3. Beginning Cryptography with Java  
By David Hook, Wrox/ Wiley-Dreamtech Publications, Special Indian Edition (2005)
4. Java Cryptography  
By Jonathan Knudsen, O'Reilly Publishers, First Edition (1998)

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**

**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-6 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC -367**

**Subject Name: - Implementation of System Software  
(Practical on CC-364)**

**Course Credit: - 3**

### **Objective:**

Practical implementation of theory to understand the concepts, structure and mechanisms of system software; Understanding design principles and implementation issues of System Software, Assembly language programming, Compiler, Parser, Scanner through C / C++ Programming Knowledge.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
<b>1</b>	Implementation of Structure and File Programs in C / C++	<b>(20%)</b>
<b>2</b>	Implementation of Assembler Pass – I ALGORITHM using C / C++  1. Data Structure Development 2. Intermediate Code Generation Program  Implementation of Assembler Pass-ii Algorithm using C / C++  3. Machine Code Generation Program  <b>Note:</b> The assembler should report appropriate errors whenever encountered with any form of syntax error	<b>(20%)</b>
<b>3</b>	Implementation of Algorithm for Processing of a Macro Definitions using C / C++  Implementation of Algorithm for Macro Expansion using C/ C++	<b>(20%)</b>
<b>4</b>	Implementation of Scanner  Implementation of LL1 parser	<b>(20%)</b>
<b>5</b>	Implementation of Recursive Descent Parser  Implementation of Operator Precedence Parser	<b>(20%)</b>

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Applicable

**Assignment:** Five assignments should be given.

**Main Reference Books:**

1. System Programming  
By D.M. Dhamdhare, Tata McGraw Hill
2. Unix Device Driver  
By George Pajere
3. Systems Programming  
By Srimanta Pal, Oxford University Press

**Reference Books:**

1. Compilers  
By Aho , Sethi & Ulman
2. Compiler Construction Principles & Practice  
By Kenneth Louden
3. System Software - An Introduction to Systems Programming  
By Leland L. Beck, Pearson Education Asia, 3rd Edition, 2000
4. System Software  
By Shantanu Chattopadhyay, Prentice-Hall India, 2007

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

**Sixth Semester M.Sc. (CA & IT)**

**Subject Code: - KS\_C\_CC -368**

**Subject Name: - Software Project Development - II**

**Course Credit: - 5**

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**Objective:**

To solve industrial (or society or research) problems, to plan, schedule, and monitor the software project development, coding, and testing of a large project cohesively. Prepare documentation of the project.

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**Course Contents:**

1. Include expert comment during 5<sup>th</sup> semester on System Design
2. Writing code for the project
3. Doing testing of the code

**Deliverables by the students:**

At the end of the semester, the student should be able to successfully develop the project and prepare the documentation (hard copy) as well as presentation of the project details.

**Documentation:**

- Students should submit latest work of SDP-I along with SDP of 6<sup>th</sup> semester in single hard copy.

A hard copy of the documentation should consist of the additional following details:

- Cover Page
- Company Certificate
- College Certificate
- Acknowledgement
- Index (with page nos.)
- Screen layouts
- Report layouts
- Sample coding (optional)
- Future Enhancements (optional)
- Conclusion
- Bibliography

**Presentation:**

- Presentations can be prepared through slides using Open Source / Power Point / Flash or any other multimedia tool, covering the work shown in the documentation.
- During viva exams, students will be expected to satisfactorily answer the questions pertaining to the tools used, the process, the reports /forms created and the results achieved.

**Guidelines**

1. The project definition should be finalized during 5th semester from industry clusters. Any 'good' internal definition having a high application potential will also be acceptable.
2. It is recommended that the team should be of 2-3 students.
3. Project plan along with the division of work amongst teammates should be prepared and get it approved within a maximum of 15 days from the start of the project.
4. Coding standards should be followed meticulously. At the minimum, the code should be self documented, modular, and should use the meaningful naming convention.
5. It is advisable that object-oriented methodology is used with reusability of classes and code, etc.
6. The output reports must include MIS reports, if applicable.
7. The documentation should include a chapter on "Learning during Project Work", i.e. "Experience of Journey during Project Duration".
8. Data Dictionary if required. At least executable code is mandatory. Student may be asked to write the code related to the project during evaluation.
9. If a student is compelled to follow certain instructions (by the external, i.e. organization's guide) which he/she does not agree to, such a student must prepare a supplementary report to document his/her version and present it to the examiners if such a need arises.
10. Group wise internal guides (i.e. the faculty members) devote the time to guide the students for the project.

**Accomplishments of the student after completing the course:**

1. Doing the project will enable the student to go through rich experience in developing large projects. Such an experience will include encountering various technical issues, finding sources to resolve the issues and finally finding the solution of all these issues satisfactorily.
2. Thinking analytically, analyzing and synthesizing requirements and complicated information for getting a good comprehension of the solution methodology to be adopted.
3. Ability to document and write well.
4. Organizing the time effectively.
5. Working with teammates and generating substantial output of the efforts.
6. It will prepare the students for analyzing and programming for industrial problem and large projects work in future.

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**

**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-8 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-481**

**Subject Name: - Information Security**

**Course Credit: - 3**

### **Objective:**

This course focuses on the fundamentals of information security that are used in protecting both the information present in computer storage as well as information traveling over computer networks. Depth understanding of information security policy and planning. Depth understanding of security of hardware, software, database, network and web application.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>Introduction to information security</b> <ul style="list-style-type: none"><li>• Introduction, History of Information Security, What is Security? , CNSS Security Model, Components of Information System.</li><li>• Information Systems Security: Distributed Systems Security, Distributed Computing Environment, System Vulnerability and Abuse, Management framework of security and control, E-Commerce Security.</li></ul>	(20%)
2	<b>Organizational Policies &amp; Security Infrastructure</b> <ul style="list-style-type: none"><li>• Organizational Policies: Security Policies, Standards and Guidelines, Information Policy, Security Policy, Physical Security, Social Engineering, Security Procedures, Building a Security Plan, Implementing a Security Policy.</li><li>• Security Infrastructure: Infrastructure Components, Goals of Security Infrastructure,</li><li>• Design Guidelines, Security Models.</li></ul>	(20%)

<b>3</b>	<b>Security Planning and Database Security</b> <ul style="list-style-type: none"> <li>Information security planning and governance, information security policy, standards and practices, the information security blueprint, Intrusion Detection and prevention system.</li> <li>Introduction to Databases, Characteristics of database approach, database security issues, database security, vendor-specific security, database backup and recovery, database warehouse control and security</li> </ul>	<b>(20%)</b>
<b>4</b>	<b>Network, Hardware &amp; Software Security</b> <ul style="list-style-type: none"> <li>Fundamental Concepts, Identification and Authentication, Access Control, Network security model, malicious software, Firewalls, Network Tools.</li> <li>Hardware Security, Smart card, Biometrics, VPNs, Operating Systems, Kerberos, Public Key Infrastructure, security protocols</li> <li>Software Security.</li> </ul>	<b>(20%)</b>
<b>5</b>	<b>Web Application, Security &amp; Defense</b> <ul style="list-style-type: none"> <li>Web Application (In)Security: Evolution of Web Applications, Web Application Security, Key Problem factors, The new Security Parameter, The Future if Web Application Security.</li> <li>Web Security: Client-Server Architecture, Security considerations and threats, Web traffic approaches, SSL/TLS for secure web services, secure-HTTP (S-HTTP), Secure Electronic Transaction (SET).</li> <li>Core Defense Mechanism: Handling User Access, Handling User Input, Handling Attackers, Managing the Application.</li> </ul>	<b>(20%)</b>

**Recommended Lecture Scheme:** Approximately 40 to 45 Lectures

**Assignment:** Three Assignments should be given

**Main Reference books:**

1. Network Security and Management  
by Brijendra Singh, 3<sup>rd</sup> Edition, PHI Publication.
2. Principles of Information Security by Michael E. Whitman and Herbert J. Mattord, 4<sup>th</sup> Edition, Cengage Learning
3. The Web Application Hackers Handbook - Finding & Exploiting Security Flaws, 2nd Edition, by Dafydd Stuttard & Marcus Pinto, Wiley India Pvt. Ltd.

# **GUJARAT UNIVERSITY**

## **K. S. SCHOOL OF BUSINESS MANAGEMENT**

### **[Five Years' (Full-time) Integrated Degree Course]**

#### **Semester-8 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-482**

**Subject Name: - Digital Marketing**

**Course Credit: - 2**

#### **Objective:**

To understand the basics of Digital Marketing in today's competitive world. Learn the difference between Traditional Marketing and Digital Marketing. Create digital strategy development and planning. To gain basic knowledge on how to use the Social Media for marketing your or company brand. Learn the concepts of SEO, Web Analytics, Influencers marketing & Content marketing. Brief overview on LinkedIn Marketing, Instagram Marketing, Facebook Marketing, Email Marketing & You Tube Marketing

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>Introduction of Marketing &amp; Digital Marketing:</b> - Understanding traditional marketing. Learn 5 Ps of marketing. TCEO Model (Think, Create, Engage & Optimise). Understanding of Digital Marketing.	(20%)
2	<b>Demystifying Digital Marketing &amp; Market Research:</b> - Collaborating traditional marketing with digital tools for digital marketing. Understanding market research and benefits of the research. Practical work on Google Forms for research understanding through digital means.	(20%)
3	<b>Digital Strategy Development &amp; Planning:</b> - Awareness. AIDA Model. What is REAN and What does it stand for? Types of Digital Marketing & Channels. Benefits and Advantages of Digital Marketing.	(20%)
4	<b>Social Media Marketing:</b> - Why Social Marketing over Traditional Marketing. Social Media vs Digital Media. Social Engagements. Social Media Marketing Apps – Facebook / Instagram / LinkedIn	(20%)
5	<b>Website Planning &amp; Process:</b> - Inbound and Importance of Website. Portal vs Website. Platform vs Page. Portal or a Website. SEO – Integrated Digital Marketing.	(20%)

**Recommended Lecture Scheme:** Approximately 30 to 35 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Main Reference Book:**

1. Digital Marketing – From Fundamentals to Future By Swaminathan T.N. / Karthik Kumar

**Reference Book:**

1. E-Marketing – The Essential Guide to Digital Marketing (5<sup>th</sup> Edition)  
By Rob Stokes and the Minds of Quirk

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**

**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-8 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-483**

**Subject Name: - Quantitative Techniques**

**Course Credit: - 3**

### **Objective:**

As mentioned in the earlier semester, the objective of this course is to impart knowledge of scientific technique for solving complex decision making problem. In this semester the study of mathematical models are extended to present more analytical tools to deal with complex problem.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>Decision Theory</b> <ul style="list-style-type: none"><li>• The framework of decision making,</li><li>• Decision making under Risk(Expected value criteria)</li><li>• Decision making under uncertainty<ul style="list-style-type: none"><li>◦ Maximin or Minimax criteria</li><li>◦ Laplace criteria</li><li>◦ Hurwicz criteria</li><li>◦ Savage criteria</li><li>◦ Expected Monetary Value (E.M.V.)</li><li>◦ Expected Profit with Perfect Information(E.V.P.I.)</li></ul></li></ul>	(20%)
2	<b>Inventory Control</b> <ul style="list-style-type: none"><li>• Introduction</li><li>• Models of Inventory: (without proof)<ul style="list-style-type: none"><li>◦ Purchase Model with Instantaneous Replenishment and without Shortages</li><li>◦ Manufacturing Model without Shortages</li><li>◦ Purchase Model with Instantaneous Replenishment and with Shortages (planned shortage only)</li><li>◦ Manufacturing Model with Shortages (planned shortage only)</li></ul></li><li>• Related examples</li></ul>	(20%)

<b>3</b>	<b>Queuing Theory</b> General Structure of Queuing System: Arrival Process, Service System, Queue Structure, Operating Characteristics of Queuing System, Terminologies of Queuing System, Deterministic Queuing Models, Probabilistic Queuing Models: $(M/M/1):(\infty/FIFO)$ Model (without proof), Related examples	<b>(20%)</b>
<b>4</b>	<b>Simulation</b> Process of Simulation, Monte Carlo Simulation, Simulation of an Inventory System, Simulation of Queuing System, Advantages and Disadvantages of Simulation, related examples	<b>(20%)</b>
<b>5</b>	<b>Forecasting:</b> Forecasting Based on Regression model (Linear and multiple regression) Forecasting Based on Time series with linear trend and second degree parabola	<b>(20%)</b>

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Five assignments should be given.

#### **Reference Books:**

1. Quantitative Techniques in Management By N. D. Vohra
2. Operation Research By J. K. Sharma
3. Operation Research By Hamdy A. Taha
4. Operation Research By R. Panneerselvam

# **GUJARAT UNIVERSITY**

## **K. S. SCHOOL OF BUSINESS MANAGEMENT**

### **[Five Years' (Full-time) Integrated Degree Course]**

### **Semester-8 [M.Sc. (CA & IT)]**

**Subject Code: KS\_C\_CC-484**

**Subject Name: Mobile Computing**

**Credit: 3**

**Objective:**

This course is introduction to wireless communication with focus on digital mobile communication system and digital data transfer from computer science point of view. It shows integration of services and applications from fixed networks into networks supporting mobility of end user and wireless access. It emphasizes both on technology and standards of mobile communication and shows merging of classical data transmission technologies and extension of today's Internet applications onto mobile and wireless devices.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weightage (%)</b>
1	<ul style="list-style-type: none"><li>• <b>What Wireless Communication? :-</b> Definition, types, applications and history of wireless communication Systems</li><li>• <b>Wireless Transmission:</b> - frequencies for radio transmission, signals, Antennas, signal propagation, multiplexing, modulation, spread spectrum, Introduction to cellular systems.</li><li>• <b>Medium Access Control:</b> - Motivation for specialized MAC: hidden and exposed terminals, near and far Terminals. SDMA, FDMA, TDMA: Fixed TDM, DAMA, PRMA, Reservation TDMA, MACA, Polling, ISMA. Introduction to CDMA systems, Spread spectrum in CDMA systems (DSSS and FHSS), coding methods in CDMA.</li></ul>	(20%)
2	<ul style="list-style-type: none"><li>• <b>Telecommunication systems:</b> - GSM: architecture, radio interface, protocols, localization and calling, handover, Security, GSM, GPRS Mobile services, system</li></ul>	(20%)
3	<ul style="list-style-type: none"><li>• <b>Types of wireless networks:-</b> WLAN, WMAN, WWAN, WPAN and assisting technologies.</li><li>• <b>Wireless LAN:-</b> Infrastructure vs Adhoc LAN- IEEE 802.11, HIPERLAN, Bluetooth.</li></ul>	(20%)

<b>4</b>	<ul style="list-style-type: none"> <li>• <b>Mobile network layer</b>:-Mobile IP, Dynamic host configuration protocol, mobile adhoc networks, Wireless sensor networks.</li> <li>• <b>Mobile Transport layer</b>:- Traditional TCP, Classical TCP improvements, TCP over 2.5/3G wireless Networks</li> </ul>	<b>(20%)</b>
<b>5</b>	<ul style="list-style-type: none"> <li>• <b>Mobile Internet connectivity</b>:- WAP1.1, Layers of WAP, WAE, WML and WML script, WTA, PUSH Architecture, PUSH/PULL services</li> <li>• <b>Phone gap [mobile development framework ]</b>:-History, Design and rationale, Supported platforms, Phone gap Applications.</li> </ul>	<b>(20%)</b>

**Recommended Lecture Scheme:** Approximately 35 To 40 lectures

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Minimum two assignments

**Reference Books:**

1. Mobile Communications, Addison Wesley..  
By J. Schiller
2. GSM System Engineering  
By A. Mehrotra
3. Mobile Computing, TMH  
By Asoke K Talukder, Roopa R Yavgal
4. Mobile and Personal Communication system and services" Prentice Hall By Rajpandya

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**

**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-8 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-485**

**Subject Name: - Data Mining and Data Analytics (Theory)**

**Course Credit: - 3**

### **Objective:**

To understand the need of Data Warehouses over Databases, differentiate between RDBMS schemas & Data Warehouse Schemas, to understand the concept of Analytical Processing (OLAP) and its similarities & differences with respect to Transaction Processing (OLTP), to understand the need for Data Mining, Data Analytics and advantages to the business world, to get a clear idea of various classes of Data Analytics techniques, their need, scenarios (situations) and scope of their applicability.

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>Data Warehousing and OLAP:</b> - Basic Concepts of Data Warehouse, Data Warehouse Modeling: Data Cube and OLAP, Data Warehouse Design and Usage, Data Warehouse Implementation, Data Generalization by Attribute-Oriented Induction	(20%)
2	<b>Data Preprocessing and Data Mining:</b> - An Overview of Data Preprocessing, Data Cleaning, Data Integration, Data Reduction, Introduction to Data Mining, Types of Data and Patterns that can be mined, Data Mining Applications	(20%)
3	<b>Mining Association Rules:</b> - Market Basket Analysis, Frequent and closed item sets, Association rules, Apriori Algorithm, Generating Association rules from frequent item sets, Pattern Evaluation Method	(20%)
4	<b>Classification and Regression:</b> - <b>Linear Correlation, Linear regression,</b> An Overview of Classification, Supervised vs. Unsupervised classification, Decision Tree Induction, Bayes Classification Methods, Rule-Based Classification, <b>Support vector machine, Nearest Neighbor Classifier,</b> multiple linear regression	(20%)
5	<b>Cluster Analysis and Outlier Detection:</b> - An Overview, Typical Requirement of Clustering in Data Mining, K-means clustering, Types of Data in Cluster Analysis: Interval-scaled Variables, Binary Variables, Nominal, Ordinal & Ratio-scale variables, Overview of Major Clustering Methods, An Overview of Outlier and Outlier Detection Methods.	(20%)

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Five assignments should be given.

**Main Reference Books:**

1. Data Mining: Concepts & Techniques ,Third Edition, Morgan Kaufmann Publishers  
By Jiawei Han & Micheline Kamber

**Reference Books:**

1. Introduction to Data Mining with Case Studies, PHI  
By G.K. Gupta
2. Data Warehousing Fundamentals: A Comprehensive Guide for IT Professionals, Wiley-India By Paulraj Ponniah
3. Data Mining Methods & Models, Wiley-India  
By Daniel T. Larose
4. Data Mining, Oxford University Press  
By Vikram Pudi & P. Radhakrishnan
5. Data Warehousing, Data Mining & OLAP, TataMcGraw-Hill Michael  
By Alex Berson & Stephen J. Smith
6. Data Mining Techniques, Wiley-India  
By J. A. Berry & Gordon S. Linoff

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-8 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-486**

**Subject Name: - Design and Analysis of Algorithm**

**Course Credit: - 3**

**Objective:**

The course introduces the basics of computational complexity analysis and various algorithm design paradigms. The goal is to provide students with solid foundations to deal with a wide variety of computational problems, and to provide a thorough knowledge of the most common algorithms and data structures. The student will:

- Learn & apply the algorithm analysis techniques.
- Become familiar with the different algorithm design techniques.
- To critically analyze the efficiency of alternative algorithmic solutions for the same problem
- Understand the limitations of Algorithm power

**Prerequisites:**

Basic knowledge of the following concepts is required:

- Any elementary Programming Language like C
- Data Structure
- Discrete Mathematics

<b>Unit No.</b>	<b>Content</b>	<b>Weightage (%)</b>
1	INTRODUCTION: Notion of an Algorithm – Performance of Programs: Space & Time Complexity; Classification of Algorithm, Fundamentals of the Analysis of Algorithms, Algorithm Efficiency: Best Case, Average Case & Worst Case; Analysis Framework – Asymptotic Notations & Analysis	20%
2	RECCURRENCES AND DIVIDE & CONQUER ALGORITHMS Recurrences: Introduction, Substitution Method, Recursion Tree, Master method Divide and conquer methodology: Introduction – Binary search – Quick sort – Heap & Heap Sort, Red-Black Trees: Properties, Rotation, Insertion, Deletion	20%
3	DYNAMIC PROGRAMMING ALGORITHM Introduction, Elements of Dynamic Programming, Binary Search Trees: Fundamental, Insertion & Deletion; Matrix -Chain Multiplication, Common sub-words & sub-sequences.	20%
4	GREEDY ALGORITHM Introduction, Activity-Selection problem, elements of greedy strategy, Huffman codes, Greedy Vs Dynamic Programming	20%

<b>5</b>	<b>NP COMPLETENESS AND THE P &amp; NP CLASSES</b> Introduction, Polynomial Time & Verification, NP-Completeness and Reducibility, NP Complete Problems: Vertex-Cover Problem, Travelling Salesman Problem <b>STRING-MATCHING ALGORITHM</b> Introduction, The naive string-matching algorithm, The Rabin-Karp algorithm	<b>20%</b>
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**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Minimum five assignments should be given.

**Reference Books:**

1. Fundamentals of Computer Algorithms, 2nd Edition, Ellis Horowitz, Sartaj Sahni and S. Rajasekharan, Universities Press.
2. Introduction to Algorithms by T.H. Cormen, C.E. Leiserson, R.L. Rivest, C. Stein, 3<sup>rd</sup> Edition
3. Introduction to Design and Analysis of Algorithms, Anany Levitin, Pearson
4. Design and Analysis of Algorithms, P. H. Dave, H. B. Dave, 2nd edition, Pearson Education

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**  
**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-8 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-487**

**Subject Name: - Data Mining and Data Analytics (Practical)**

**Credit: - 3**

<b>Unit No.</b>	<b>Course Content</b>	<b>Weight-age (%)</b>
1	<b>Data Preprocessing and Data Mining:-</b> Data Visualization, Implementation of Data Preprocessing, Data Cleaning Techniques, Data Integration techniques.	(20%)
2	<b>Mining Association Rules: -</b> Implementation of association rule mining for Market Basket Analysis, Implementation of Apriori Algorithm.	(20%)
3	<b>Classification and Regression:</b> - Implementation of Linear regression, Implementation of Decision Tree Induction, Implementation of Bayes Classification Methods,	(20%)
4	Support vector machine, Nearest Neighbor Classifier, Implementation of Multiple Linear Regression	(20%)
5	<b>Cluster Analysis:</b> - Implementation of clustering methods, Implementation of K-Means Clustering method	(20%)

**Recommended Lecture Scheme:** Approximately 40 to 45 hours in a semester

**Recommended Practical Scheme:** Not Applicable

**Assignment:** Five assignments should be given.

**Text Book:**

1. Data Mining: Concepts & Techniques ,Third Edition, Morgan Kaufmann Publishers By Jiawei Han & Micheline Kamber

**Reference Books:**

2. Introduction to Data Mining with Case Studies, PHI By G.K. Gupta
3. Data Warehousing Fundamentals: A Comprehensive Guide for IT Professionals, Wiley-India By Paulraj Ponniah
4. Data Mining Methods & Models, Wiley-India By Daniel T. Larose
5. Data Mining, Oxford University Press By Vikram Pudi & P. Radhakrishnan
6. Data Warehousing, Data Mining & OLAP, TataMcGraw-Hill Michael By Alex Berson & Stephen J. Smith
7. Data Mining Techniques,Wiley-India By J. A. Berry & Gordon S. Linoff

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**

**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-8 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-488**

**Subject Name: - Project – Emerging Technologies - Dissertation**

**Course Credit: - 3**

### **Objective:**

Dissertation aims to provide a real opportunity to the students to explore a subject of their interest from within or outside the course curriculum. As a part of dissertation, the student can

- Make an initial attempt to do some serious “research”
- Review of ongoing research work published in reputed journals or proceedings of conferences of repute
- Present results of some innovative experiments
- Study and analysis of Advanced Computer Science Topics

### **Guidelines**

1. Consult your Guide whenever necessary & report the work / work progress to the guide regularly & carried out changes suggested by your guide time to time.
2. Do take signatures of your guide on your progress report sheet.
3. Work regularly with commitment and ensure you are following Progress Report Activity Completion Schedule and avoid last minutes 'hustle'.

### **Philosophy:**

A group of students (2-3) shall either choose themselves or shall be assigned experiment/topic of their interest by the instructor / mentor, which will form the basis of their dissertation. The group in consultation with their instructor / mentor shall discuss and formulate a description of the dissertation. This should include :

- Title: A clear indication of the content of the Dissertation.
- Aims & Objectives: An overall statement of the nature of the work and what is intended to be done.
- Methodology: The Identification of the ways by which the above stated objectives are to be achieved.
- Timescale: Listing of the tasks involved in the Dissertation and estimation of the timescale involved for each task so as to ascertain the milestones by which the instructor / mentor can assess the progress.

## **Guidelines for Report Preparation:**

- The report should be in the range of 50-100 pages.
- The contents of the report shall include :
  - ✓ Title Page
  - ✓ Abstract

An abstract is a brief or condensed statement by the student, or the essential ideas of the student's work. The abstract must not exceed 600 words in length and should state a statement of the problem, an explanation of the methods and procedures used in gathering data, and a summary of the findings. It should not be just a summary statement of each chapter.

  - ✓ Acknowledgements
  - ✓ Table of Contents
  - ✓ Main Text
  - ✓ References
  - ✓ Appendices
- The Main Text shall consist of :
  - ✓ Introduction
  - ✓ Literature Survey
  - ✓ Methodology
  - ✓ Results
  - ✓ Discussions
  - ✓ Conclusion
- Paper Size: International standard paper size A4 (297 x 210 mm).
- Typing: On one side only.
- Margins: Top 1.0", Bottom 1.0", Left 1.5", Right 1.0".
- Line Spacing: 1.5.
- Character Spacing: Normal.
- Font: Times New Roman or any other non-fancy font.
- Font Size: 12 for Main Text; 10 for References.
- Page number: Pages should be numbered clearly and consecutively; Numbering should be done uniformly throughout the work.
- Diagrams / Charts: Should be arranged so as to open to the right.
- Larger font size may be used for chapter headings and sub headings; the chapter headings, sub headings and sub subheadings should be clearly distinguishable from each other; to distinguish chapter headings from sub headings and sub subheadings any consistent scheme may be adopted.
- References :
  - ✓ Should contain all the work that is consulted.
  - ✓ Should be arranged alphabetically and numbered consecutively.
  - ✓ Font : Same as the main text.
  - ✓ Line Spacing – single.
  - ✓ Documentation Style – IEEE referencing standards to be followed.

## **Accomplishments of the student after completing the course:**

1. Writing the dissertation will enable the student to be innovative and develop research bent of mind and be aware of new advancements in the field of Computer Science and Information Technology.
2. Student will acquire ability to think analytically, synthesize completed information, write well and organize the time as a result of dissertation will serve well regardless of a carrier the students choose.
3. It will prepare the students for serious research work in future.

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**

**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-8 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-488**

**Subject Name: - Project – Emerging Technologies (Internet of Things)**

**Course Credit: - 5**

**Objectives:** Students will understand the concepts of Internet of Things and can able to build IOT applications. The course will focus on creative thinking and on hands-on project development.

**In this subject student will develop Internet of Things project in following area.**

- IOT applications in Health Care
- IOT applications in Home Automation
- IOT applications in Agriculture
- IOT applications in Smart Cities
- IOT applications in Industrial Automation
- IOT applications in Wearables
- IOT applications in Transportation
- IOT applications in Retail
- IOT applications in Supply Chain
- IOT applications in Energy

### **Instructional Method and Pedagogy:-**

- A group of students (2-4) shall either choose themselves or shall be assigned project topic of their interest by the faculty,. Each group will develop project under the guidance of assign faculty member..
- At the start of course, the course delivery pattern, prerequisite of the subject, concept of IOT framework, architecture, and protocol will be discussed.
- Attendance is compulsory in laboratory. Internal evaluation of students which carries 30 marks overall.
- End of semester student will be submitted project report.

### **Students learning outcomes**

On successful completion of the course, the student will:

- Understand the concepts of Internet of Things
- Recognize various devices, sensors and applications
- Analyze basic protocols in wireless sensor network
- Design IoT applications in different domain and be able to analyze their performance
- Implement basic IoT applications on embedded platform
- Create IoT solutions using sensors, actuators and Devices

### **Reference Books:**

1. Peter Waher," Learning Internet of Things "
2. Vijay Madisetti, Arshdeep Bahga, "Internet of Things: A Hands-On Approach"
3. Waltenegeus Dargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**

**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-8 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_CC-488**

**Subject Name: - Project – Emerging Technologies – Soft Computing**

**Course Credit: - 5**

### **Prerequisite:**

Clear understanding of the subjects KS\_C\_CC-113, KS\_C\_CC-123 and KS\_C\_CC-237 which will help to understand the concept of Soft Computing and execute the project .

Theoretical concept to be discussed in the Class:

- Introduction to Soft Computing
- Introduction to Fuzzy logic, Fuzzy membership functions, Operations on Fuzzy sets, Fuzzy relations, Fuzzy propositions, Fuzzy implications, Fuzzy inferences, Defuzzification Techniques
- Solving optimization problems: Concept of GA, GA Operators
- Introduction to ANN, ANN Architecture, ANN Training.

### **Project:**

- Application of Soft Computing.
- Each project to be guided by concern faculty member.

### **Reference Books:**

1. *Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis & Applications*, S. Rajasekaran, G. A. Vijayalakshmi, PHI.
2. *D. E. Goldberg, Genetic Algorithms in Search, Optimisation, and Machine Learning*, Addison-Wesley

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**

**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-10 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_SE- 5101**

**Subject Name: - Grand Project (Faculty)**

**Course Credit: - 25**

1. The grand project (5<sup>th</sup> year – 10<sup>th</sup> semester) carries 750 marks.

<b>4<sup>th</sup> year marks</b>	<b>5<sup>th</sup> year marks</b>	<b>Total marks</b>
150 marks		
120 (External)	30 (Internal)	600 marks 750

2. Students need to report minimum 2 times during this semester to their allocated faculty guide.
3. Students have to run(show live/local in the own laptop) the whole prototype /application /model created with respect to fulfilment of the full time integrated degree program – MSc C A and it from K. S. School of Business Management.
4. Important dates for the grand project:

Synopsis submission: 3<sup>rd</sup> week of  
February

Final grand project submission: 3<sup>rd</sup> week of April

5. Student need to provide following submission:

- a. Synopsis must contain:
  - 1) Definition of the Grand Project with Title
  - 2) Why this project is important ?
  - 3) Who finds the project useful?
  - 4) Issues which project is going to solve?

Students have to do necessary modification the synopsis if it is recommended by the guide.

- b. Documentation (as per third year project submission)
  - c. Prototype/application/model (live/on your own laptop – exe file)
6. Originality Certification: Student have to take and attached an originality certificate that this is to certify that this work of student/s is original, which must be endorsed by the company.
  7. If the company/organization in which the student has done his/her project is not allowing the student to execute project during the university exam then the company/organization has to send a confidential report clearly indicating their work is evaluated by the company or video of the application/model carried out by the student for his/her software project.
  8. Student needs to inform priorly to the college/respected faculty that company will not provide the code/exe file for the university exam.

**Note: Instruction for internal Faculty:**

When student/group is not able to show the grand project during the exam due to the company's policy, internal faculty must approach the company and find out the following:

1. Whether company allows the student/group to show the project with dummy data **OR** prototype.

***OR***
2. Whether company allows the student/group for the video recording/screen recording which representing the execution of whole project.

If company **cannot provide** both, either dummy data project or video/screen recording then internal faculty should refer point number-7 and take the report from the company.

# **GUJARAT UNIVERSITY**

**K. S. SCHOOL OF BUSINESS MANAGEMENT**

**[Five Years' (Full-time) Integrated Degree Course]**

## **Semester-10 [M.Sc. (CA & IT)]**

**Subject Code: - KS\_C\_SE- 5101**

**Subject Name: - Grand Project (Student)**

**Course Credit: - 25**

1. The grand project (5<sup>th</sup> year – 10<sup>th</sup> semester) carries 750 marks.

<b>4<sup>th</sup> year marks</b>	<b>5<sup>th</sup> year marks</b>	<b>Total marks</b>
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120 (External)	30 (Internal)	600 marks 750

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  - c. Prototype/application/model (live/on your own laptop – exe file)
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