BCA SEMESTER III

COURSE CODE : BCA301	COURSE TITLE : OBJECT ORIENTED CONCEPTS	
Total marks : 100	Total credits : 05	Total contact hours : 45
Course prerequisites : BCA 101		
Course objectives : To study the object- oriented concepts that can be applied for developing software using the object oriented methodology		

Course contents :

Unit		Topic			Weightage		References
#	Title	#	Content	Learning outcomes	hours	%	
I	Procedure-oriented to OO Programming shift	A	• Introduction to Procedure Oriented Programming (POP) • Example of POP	To revise the concepts of Procedure Oriented Programming	3	10	
		B	Problems/Limitations of Procedure-Oriented Programming/Paradigm	To understand the problems of Procedure Oriented Programming			
		C	Introduction to Object-Oriented Programming	To understand the concepts of Object-Oriented Programming			
		D	Basic concepts of OO Programming				
		E	Comparison of Procedure-Oriented And Object Oriented Paradigms				
		F	Benefits and limitations of Object-Oriented Programming				
II	Objects, classes and relationships	A	Objects • Meaning • Examples • Identification of objects in real world	To understand the concepts of using Objects	4	7	
		B	Attributes • Meaning • Examples				
		C	Procedures/ Functions/ Operations • Meaning • Examples • Nested functions				
		D	Classes • Meaning	To understand the concepts of creating and using	5	8	

			• Examples in real world • Encapsulation	Classes			
		E	Abstraction • Meaning • Classes as ADTs				
		F	Relationship between classes/objects • Types • Representation as diagram				
III	Constructors and Destructors	A	Constructors • Introduction • Parameterized constructors • Copy constructors	To understand the concept of constructors and its type	3	8	
		B	Destructors	To understand the concept of destructors			
	Polymorphism	A	Function Overloading • Introduction • Examples	Students are expected to know the meaning of function overloading	5	6	
		B	Operator Overloading • Introduction • Unary operators • Binary operators	To understand overloading of unary and binary operators		8	
V	Inheritance	A	• Introduction • Derived classes • Single inheritance • Private, public and protected members • Multilevel inheritance • Multiple inheritance • Hierarchical inheritance • Hybrid inheritance	To understand the methods of deriving classes from base class as well as deriving members of the class	5	10	
		B	• Virtual base classes • Abstract classes	To understand the use of virtual base class and abstract class	2	8	
VI	Aggregation	A	Introduction and Examples	To understand the concept of part-whole relationship	2	5	

	Generic Programming	A	• Introduction • Class Template • Function templates	To understand generic variables and their uses	4	8	
VIII	Exception Handling	A	Introduction	To understand meaning of Exception and the methods of handling exceptions	5	10	
		B	Types of errors				
		C	Exception handling mechanism • Throwing mechanism • Catching mechanism				
VIII	Managing input/output files	A	• Introduction • Streams • Types of streams • I/O stream	To understand the methods of creation of file and perform read and write operation on them	7	4	
		B	• Creation of file • Reading/writing characters/bytes			8	

References :

1. Object oriented analysis and design; James Rambough.
2. Object oriented programming using C++; (5e) E. Balagurusamy
3. Object oriented programming using Java; E.Balagurusamy.

BCA SEMESTER III

COURSE CODE : BCA302	COURSE TITLE : DATABASE MANAGEMENT SYSTEMS	
Total marks : 100	Total credits : 05	Total contact hours : 45
Course prerequisites : none		
Course objectives : To provide a strong formal foundation in database concepts, technology and to apply it in the field of software development		

Course contents :

Unit		Topic			Weightage		References
#	Title	#	Content	Learning outcomes	hours	%	
I	Introduction to DBMS	A	Basic Concepts: Database system, Database Management System	To know the basic database concepts and its terminology.	06	14	
		B	File oriented systems	To know the File Oriented System			
		C	Limitations of Traditional File Systems	To Understand the Limitations of the Traditional File Systems			
		D	Data independence	To know the concept of data independence in database systems			
		E	Database Architecture - Three-level Architecture	To understand the three level database architecture.			
		F	Data specification, security, integrity and access mechanisms	To understand the various mechanisms used in database systems namely the security, integrity and access			
		G	Data Definition Language (DDL) , SDDL	To know Data dictionary and DDL commands			
		H	Data Manipulation Language (DML)	To know the various DML commands			
		I	Database Users	To understand the various Database Users			
		J	DBMS: Functions, Capabilities, Advantages and Disadvantages	To be able to know its functions capabilities and advantages/disadvantages			
		K	Database Administration and Control	To understand the database administration and its control			
II	Data Models	A	Introduction to Data models	To introduce to the students the various Data Models	08	20	
		B	Brief overview of Hierarchical, Network, Relational, Object-relational and Object-oriented data	To briefly introduce the data models, its kind and usage			

			models				
		C	Outline of the Data definition and data manipulation constructs in each of the above data models				
		D	Comparison of the above data models	To understand the comparisons of the above models			
		E	Introduction to Current Direction	To introduce the students to current direction			
		F	Database Server, ODBC	To know the concepts of Database Server, ODBC and its usage			
		G	Client/Server Platforms	To understand C/S platforms, its architecture and application			
		H	Distributed Databases	To understand distributed databases and their applications			
		I	Data Warehousing and Data Mining	To introduce to the students the concepts of data ware housing and datamining			
III	Database Design Process	A	Database Design Approach	To understand the entire database design process	12	22	
		B	Conceptual modeling: Logical Model, Physical Model				
		C	Database Design tools	To know about the various database design tools			
		D	ER Concepts, Terminology, Diagrams	To introduce to the students the ER concepts its terminology and drawing the ERD's using case studies			
		E	Mapping Conceptual model into relational schema	To know how to convert ER model to Relational Model			
		F	Concepts of keys	To understand the concept of key, the various kinds of keys and its usage			
		G	Entity integrity, Unique Requirement and Fundamental integrity rules: entity integrity, referential integrity	To know the various integrity rules			
IV	Data Normalization Process	A	Introduction to data normalization and normal forms	To learn Data Normalization and the various normal forms	10	20	
		B	Benefits of normalization	To understand the benefits of normalization			

		C	Normalization Rules,1NF, 2NF, 3NF and Higher NF	To know the normalization rules for the various normal forms			
		D	First Normal Form:1NF, Why convert to 1NF, Conversion to 1NF	To know what is 1NF, why is it required to convert to 1NF and how to convert to 1NF			
		E	Second Normal Form: 2NF Functional Dependency and Fully Functional Dependency Why convert to 2NF Conversion to 2NF	To know what is 2NF, why is it required to convert to 2NF and how to convert to 2NF			
		F	Third Normal Form: 3NF Transitive Dependence Why convert to 3NF Conversion to 3NF	To know what is 3NF, why is it required to convert to 3NF and how to convert to 3NF			
		G	Normalization considerations: Good and bad decompositions	To know what are good and bad decompositions, lossless and lossy decompositions			
		H	Multi-valued dependencies and Join dependencies	To know about multi valued dependencies and join dependencies			
		I	Higher Normal Forms: Boyce-Codd NF, 4NF, 5NF, Domain-Key NF	To introduce to higher normal forms such as BCNF, 4NF, 5NF, DKNF			
V	Transaction processing concepts	A	Transaction processing system	To introduce the students to Transaction Processing Sytem	05	14	
		B	Schedule, Recoverability, Serializability, locks	To briefly cover concepts of schedule, recoverability, serializability and locks			
		C	ACID Properties	To know about the ACID properties of a transaction			
VI	Emerging Trends in Database Technology	A	Multimedia Databases	To introduce the students to the newer emerging trends in database technology such as:- multimedia, Gnome, Knowledge and Mobile databases	04	10	
		B	Gnome Databases				
		C	Knowledge Databases				
		D	Mobile Databases				

References

1. Database System Concepts; (3e) A. Silberschatz, H.F. Korth and S. Sudarshan.
2. Fundamentals of Database Systems; (3e) R. Elmasri and S.B. Navathe.
3. Database Management Systems; (5e) A.K. Majumdar and P. Bhattacharyya.

BCA SEMESTER III

COURSE CODE : BCA303	COURSE TITLE : MANAGEMENT ACCOUNTING	
Total marks : 100	Total credits : 05	Total contact hours : 45
Course prerequisites : none		
Course objectives: The objective of this paper is to provide in-depth study of the body of knowledge comprising of various techniques of costing		

Course contents :

Unit		Topic			Weightage		References
#	Title	#	Content	Learning outcomes	hours	%	
I	Introduction to Management Accounting	A	• Evolution • Meaning • Definition • Scope • Objectives • Functions and limitations of management accounting	To study the function of management accounting	8	20	Cost Accounting by S.P. Jain and K.L Narang 12th Edition Management Accounting by J. Madegowda Management Accounting by R.S.N. Pillai Bagvathi
		B	• Management Accounting v/s Financial accounting • Management Accounting v/s Cost Accounting				
		C	Management Accounting: Tools and Techniques • Tools based on Financial accounting • Tools based on cost accounting • Tools based on Budgeting and Forecasting • Tools based on Mathematics	To familiarize with the different tools and techniques of management accounting			Cost Accounting by S.P. Jain and K.L Narang 12th Edition Management Accounting by R.S.N. Pillai Bagvathi
		D	Management Accountant • Role • Responsibilities • Functions	To understand the role and importance of a management accountant in an organization			
II	Budgeting and Budgetary Control	A	• Meaning • Definitions of Budgeting and Budget • The essentials of a good budget	To study the meaning of budget and budgeting and the overall function of budgetary control	13	24	Cost Accounting by S.P. Jain and K.L Narang 12th Editio Edition Management Accounting by J. Madegowda Management Accounting by R.S.N. Pillai Bagvathi Management Accounting and Financial Control by Dr. S.N. Maheshwari
		B	Budgetary Control: • Meaning • Definition • Objectives • Advantages and limitations				
		C	Classification of Budgets • On the basis of time i. Short Term budget ii. Medium term budget iii. Long term budget • On the basis of Function i. Master Budget ii. Functional	To familiarize with the different types of budgets			

			Budgets • On the basis of flexibility i. Fixed budget ii. Flexible budget • On the basis of nature of business activities i. Capital Budget ii. Revenue Budget				
		D	Preparation of Budgets: • Production Budget • Sales Budget • Flexible Budget • Cash Budget • Master Budget	To study the preparation of various types of budgets			
III	Marginal Costing	A	• Concept • Meaning • Definition • Advantages and Limitations of Marginal Costing	To study the technique of Marginal Costing	12	20	Cost Accounting by S.P. Jain and K.L Narang 12th Edition
		B	• Marginal Cost Statement • Profit Planning – Calculation of P/V Ratio • Break-Even Analysis • Break-even point and Chart Margin of Safety	To learn the preparation of marginal cost statement and calculation of P/V ratio, Break-even point and margin of safety			
		C	• Marginal Costing v/s Decision Making • Product Decision • Pricing Decision • Market Decision • Key Factor • Profitable Sales Mix	To study the various types of decisions affecting an organization			
IV	Standard Costing	A	• Concept • Meaning • Definition of Standard Costing	To study the meaning and definition of standard costing	10	20	Cost Accounting by S.P. Jain and K.L Narang 12th Edition
		B	Variance Analysis: Meaning and Types • Material Variances • Labour Variances • Overhead Variances • Sales Variances	To study the different types of variances			
V	Management Reporting	A	• Meaning • Essentials of reporting	To study the meaning and essentials of a good report	7	16	Cost Accounting by S.P. Jain and K.L Narang 12th Edition Management Accounting and Financial Control by
		B	Kinds of Reports	To study the various types of reports used in organizations			

		C	Steps in Effective Reporting	To make the students understand how reporting is done in organizations			Dr. S.N. Maheshwari Cost and Management accounting (theory and problems) by M.N. Arora

BCA SEMESTER III

COURSE CODE : BCA304	COURSE TITLE : INTRODUCTION TO ECONOMICS	
Total marks : 100	Total credits : 05	Total contact hours : 45
Course prerequisites : none		
Course objectives : To introduce and study the concepts of economics and the factors that affect the social economy		

Course contents :

Unit		Topic			Weightage		References
#	Title	#	Content	Learning outcomes	hours	%	
I	Introduction to Economics	A	Origins Definitions of Economics	To study the meaning of economics and the different markets	08	16	
		B	Problem of scarcity				
		C	Different types of markets				
		D	Positive Economics and Normative Economics				
II	Demand Supply and Equilibrium	A	Total and marginal utility Law of diminishing marginal utility	To learn the concepts of marginal utility	12	24	
		B	Relationship between the diminishing marginal utility and demand				
		C	Law of Demand Demand curve Demand for a commodity Law of Supply Single Producer's supply of a commodity Shape of the supply curve	To learn the laws of demand and supply			
		D	Equilibrium Types of Equilibria Shift in Demand and Supply and equilibrium	To learn the concepts equilibrium			
III	Measurement of Elasticity	A	• Price elasticity of demand • Arc elasticity of demand • Income elasticity of demand • Cross elasticity of demand • Price elasticity of supply Importance of elasticity	To study the concepts and types of elasticity of demand	12	20	
IV	Theory of Production	A	Production function: Meaning and importance	To study the function of production	07	16	
		B	The law of variable proportion				
		C	Returns Scale				

V	Factor Pricing	A	Rent • Meaning of rent • Ricardian Theory of rent • Modern theory of rent	To study the pricing factor of rent	06	24	
		B	Wages • Meaning of wages in economics • Nominal and real wages • Factors determining wages	To study the pricing factor of wages			
		C	Interest • Meaning of interest • Abstinence theory of rent • Loanable funds • Liquidity Preference theory of Interest	To study the pricing factor of Interest			

References

1. Managerial Economics: Concepts and Applications; (8e) Christopher R. Thomas & S. Charles Maurice

BCA SEMESTER III							
COURSE CODE : BCA305			COURSE TITLE : OBJECT ORIENTED PROGRAMMING LABORATORY				
Total marks : 100		Total credits : 05			Total lab sessions : 15		
Course prerequisites : BCA301							
Course objectives : To learn to implement object oriented concepts through some object oriented programming language							
Course contents :							
Unit		Topic			Weightage		References
#	Title	#	Content	Learning outcomes	hours	%	

I	Introduction to OO language	A	• Application/Use of language
			• Simple program
			• Data types
			  o Basic
			  o User-defined
			• Basic statements
			  o Declaration
			  o Assignment
			  o Read/write
			  o If-else
			  o Loops
				To know what a program and its output looks like.
				To know basic syntax of a language
					01	5	

		B	• Referencing variables(C++) • Operators • Scope resolution operator • Data Conversions			5	
II	Functions	A	• Introduction • Main function • Function prototyping • Modes of parameter	To know to write functions, passing and returning parameters	01	7	

			passing • Return statement				
III	Classes and Objects	A	• Classes and objects • Arrays within classes • Static members	Implementing classes	03	8	
			• Arrays of objects • Objects as function arguments • Friendly functions(C++)			8	
IV	Constructors and destructors	A	• Simple constructors • Parameterized constructors • Multiple Constructors • Copy constructors	To implement different types of constructors		8	
		B	Destructors	To understand the implementation and use of destructors		4	
V	Function overloading and operator overloading	A	Function overloading	Write programs to overload functions	03	4	
		B	• Unary operator overloading • Binary overloading	Write programs to overload unary and binary operators		8	
		C	Manipulating strings	To create string as a class with functions to perform basic string operations and create objects of it		8	
VI	Inheritance	A	• Single inheritance • Multilevel inheritance • Multiple inheritance • Hierarchical inheritance • Hybrid inheritance	To implement all the types of inheritance and understand the way members are derived. To implement virtual base	02	8 4	

			• Virtual base classes				
VII	Generic Programming	A	• Class templates • Function templates • Template functions	To know to write programs using generic variables	01	7	
VIII	Exception Handling	A	• Syntax for exception handling code • Throwing mechanism • Catching mechanism	To know the methods of exception handling	02	7	
IX	Managing input/output files	A	Streams Types of streams I/O stream	Students should know to create files and perform read/write operations using a program	02	2	
			Creation of files Reading/writing characters/bytes			7	

BCA SEMESTER III							
COURSE CODE : BCA306		COURSE TITLE : DATABASE MANAGEMENT SYSTEMS LABORATORY					
Total marks : 100		Total credits : 05			Total lab sessions: 15		
Course prerequisites : BCA302							
Course objectives : To implement the relational database concepts, practically using some database management system software that can be used as a backend tool for an application							
Course contents :							
Unit		Topic			Weightage		References
#	Title	#	Content	Learning outcomes	hours	%	
I	Entity-Relationship Model	A	• Identifying entities of the system • Identifying the relationships of the system • Identify specialization, generalization and aggregation within the system	The learn to model the real world concepts using ER modeling	02	15	
II	Normalization	A	Conversion of ER model into normalized tables	To learn to convert the ER model into tables as a fundamental concept for building applications	03	10	
III	Data Definition Language	A	Database creation, alteration and deletion	To learn to create, alter and delete the database	04	25	
		B	Table creation, alteration and deletion	To learn to create, alter and delete the table			
		C	Data Types	To learn to identify and assign the appropriate data types to the fields of the tables			
		D	Primary Key, Foreign Key, Domain Creation	To learn to identify and assign the appropriate keys to the fields of the tables			
		E	Specify Integrity constraints • Check • Unique • Null	To learn to apply the integrity constraints on the tables			
		F	Row insertion, updating and deletion.	To learn to update the rows through the various operations of DDL			
IV	Data Manipulation language	A	• Simple select query • Select with where clause • Group function and having clause	To learn to execute the basic queries available in DML	03	25	
		B	• Operators	To learn to execute the			

			• Functions • Aggregate Functions • Set operations • Sorting data	various functions available in DML			
		C	Sub query • Returning single row • Returning multiple rows • Returning more than one column • Correlated sub query • Joining tables	To learn to execute the sub-queries available in DML			
		D	Views	To learn to execute views using the DML constructs			
V	Transaction Processing	A	• Start Transaction • Commit • Rollback • Save point • Locks	The student should be able to learn the concept of transactions	02	15	
		B	• Triggers • Stored procedures	To learn to create and execute triggers and procedures			
		C	• Database Privileges and Roles: • Grant • Revoke • Public	To learn to assign database privileges and roles to users of the system			
VI	Report Generation	A	Report Generation	To learn to generate reports for the system	01	10	

BCA SEMESTER III

COURSE CODE : BCA307	COURSE TITLE : COMMUNICATION AND PRESENTATION SKILLS	
Total marks : 100	Total credits : 05	Total contact hours : 45
Course prerequisites : none		
Course objectives : To teach the process of interpersonal and group communication and develop skills of communication and idea presentation		

Course contents :

Unit		Topic			Weightage		References
#	Title	#	Content	Learning outcomes	hours	%	
I	Fundamentals of communication	A	The concept of communication	To study the basic concept of communication	01	18	Principles and Practice of Business communication by Aspi Doctor & Rhoda Doctor.
		B	Communication process	To study the complete communication process	01		
		C	Role of sender and receiver		01		
		D	Encoding, decoding feedback		03		
		E	How to achieve effective communication	To study the aspects of effective communication	02		
II	Types of communication	A	Formal and informal communications	To differentiate between formal and informal communications	01	18	Principles and Practice of Business communication by Aspi Doctor & Rhoda Doctor. Business communication – Urmila Rai, Himalaya Publishing House - Mumbai.
		B	Horizontal, Vertical, Downward, Upward, communications	To study the different types of communication	02		
		C	Grapevine		03		
		D	Consensus & Consultation		04		
		E	Methods of communication:	To learn the different methods of communication			
		F	Verbal, Face to face, Non-verbal				
III	Oral Communication	A	Direct Face-to-Face2888888888 verbal Communication	To study the different forms of oral communication	01	18	Principles and Practice of Business communication by Aspi Doctor & Rhoda Doctor. Communication – DR. C.S. Rajvinder, Himalaya Publishing
			Remote Verbal Communication				

							House – Mumbai
IV	Interview Techniques	A	How to prepare for an Interview	To learn to prepare for an interview	03	23	Principles and Practice of Business communication by Aspi Doctor & Rhoda Doctor.
		B	Types of Interviews	To study the different types of Interviews	02		
		C	Candidates preparation for a Job Interview	To understand the preparation for facing a job interview	02		
		D	Planning and Conducting a Job Interview	To learn the process of conducting a job interview	03		
		E	Advantages and drawbacks of Interviews	To know the advantages and drawbacks of interviews			
V	Presentation Skills	A	Preparation of a presentation	To study the aspects of presentation preparation	01	18	Persuasive Presentations – Geoffrey Moss, Vikas Publishing House Pvt. Ltd.
		B	Matter researching	To learn the different forms of matter researching	01		
		C	Understanding the audience	To study audience's frame of mind and manipulation techniques	02		
		D	Placing plants within audience				
VI	Methods of Presentation	A	Use of technology	To learn to use modern aids of presentation	02	20	Persuasive Presentations – Geoffrey Moss, Vikas Publishing House Pvt. Ltd. Public Speaking and Influencing Men in Business. – Dale Carvegie, D B Taraporevala Sons & Co. Pvt. Ltd.
		B	Presentation Softwares	To study the common presentation maker softwares	02		
		C	Use of language, Gestures and Body language	To learn to use body language to assist better expression of thought			
		D	Obtaining real –time feedback	To learn to use real-time feedback for instant reaction			
		E	Case Studies on presentation making	To apply all skills learnt to prepare class presentations			

BCA SEMESTER IV

COURSE CODE : BCA401	COURSE TITLE : SOFTWARE ENGINEERING	
Total marks : 100	Total credits : 05	Total contact hours : 45
Course prerequisites : none		
Course objectives : To study the concepts of software engineering with the aim of acquiring skills to develop software applications, following all standardized procedures and techniques		

Course contents :

Unit		Topic			Weightage		References
#	Title	#	Content	Learning outcomes	hours	%	
I	Introduction to Software Engineering	A B	Introduction to Software • Definitions • Dual role of Software • Need to discuss Software	To know the meaning of Software To know that software has a dual role and is in demand today	04	10	
		C	Characteristics of Software	To learn the various characteristics of Software			
		D	Introduction to Software Engineering • Definition	To know what we mean by software engineering			
		E	History, motivation and challenges of Software Engineering	To learn why, how and when the concept of software engineering evolved			
		F	Software Engineering: The Layered Technology	To learn that as why is software engineering called as a layered technology			
		D	Introduction to Software Quality: • Characteristics/Attributes	To study the characteristics of a good quality software			
II	Software Development Process and methodologies	A	Introduction to Software Process Model • Definition • Characteristics of software process.	To understand the meaning of Software Process and the characteristics of the software development process	09	14	
		B	Software development processes and methodologies • Waterfall • Prototyping • Iterative • Spiral • Unified process • Agile methodology	To introduce the different types of process models and methodologies available in software development			
		C	Water fall Model • Introduction • Diagram • Characteristics	To learn the concept of the Waterfall Model			

			• Strengths • Weakness/Problems				
		D	Prototyping • Introduction • Diagram • Characteristics • Strengths • Weakness/Problems	To learn the concept of Prototyping			
		E	Iterative Model • Introduction • Diagram • Characteristics • Strengths • Weakness/Problems	To learn the concept of the Iterative Model			
		F	Spiral Model • Introduction • Diagram • Characteristics • Strengths • Weakness/Problems	To learn the concept of the Spiral Model			
		G	Unified Process • Introduction • Characteristics • Phases of Unified Process • Diagram • Strengths • Weakness/Problems	To learn the concept of the Unified Process			
		H	Agile Methodology • Introduction • Characteristics • Phases of Unified Process • Diagram • Strengths • Weakness/Problems	To learn the concept of the Agile Methodology			
		I	Benefits of iterative and incremental approach with emphasis on Unified process	To know the differences, benefits and limitations of iterative and incremental process			
III	Requirements	A	Requirement • Definition	To know the meaning of Requirement in software engineering	02	08	
		B	Types of Requirements: • User Requirements • System Requirements • Functional, Non-functional, Domain Requirements	To learn the types of requirements found in software systems			

		C	Problems with Requirements using Natural Language	To learn the problems faced when gathering requirements using natural language			
IV	Unified Modeling Language	A	UML • Introduction to UML • Origins of UML • Need for UML	To know the origins and the need of UML in software development	03	04	
		B	Types of UML diagrams • Use case diagram • Class diagram • Activity diagram • Sequence diagram • State Chart Diagram • Collaboration Diagram • Deployment Diagram • Object Diagram	To study a brief introduction to the different UML diagrams			
		C	Behaviour Diagram I: Use Case Modeling (Scenario Based Modeling) • Introduction • Need • Components of Use Case ▪ Actor ▪ Use Case ▪ Use Case Relationship ▪ (Include, Extend and Use Case Generalization) • Writing Use Cases Formally • Use Case Diagram	To identify the functional requirements of the system with the help of Use Case Modeling	03	08	
		D	Structure Diagrams: Static Modeling using Class Diagram • Introduction • Need • Class ▪ Attributes ▪ Operations • Associations ▪ One-to-One • One-to-Many • Many-to-Many • Role Names • Association Class • Ternary Association • Recursive Association	To able to use the various components to model a system using Class Diagram	05	10	

			• Aggregation • Generalization				
		E	Interaction Diagram: Sequence Diagram • Introduction • Need • Object Representation, Life Line and Activation Boxes • Combining Fragments ▪ Alt Fragment • Loop Fragment • Opt Fragment • Break Fragment	To be able to learn and show the flow of control and data among the things in the system being modeled using Sequence Diagram	03	06	
		F	Behaviour Diagram II: Dynamic Modeling using Activity Diagram • Introduction • Need • States ▪ Start State ▪ End State ▪ Activities State • Flow Line • Fork and Join • Swim Lanes	To be able to learn and model the functionality of the system with work flows using Activity Diagram	04	08	
		G	Behaviour Diagram II: Dynamic Modeling using State Chart Diagram • Introduction • Need • Representation of State • Simple events	To be able to learn and model the various states of the objects of the system using State Chart Diagram	03	06	
V	Requirements Engineering Process	A	Introduction • Definition	To know the meaning of Requirements Engineering Process	02	08	
		B	Phases of Requirements Engineering Process: • Requirements elicitation • Requirements analysis and negotiation • Requirements specification • Requirements validation • Requirements management	To learn briefly the various phases of Requirements Engineering Process			
		C	Techniques for Requirements	To learn the various	01		

			Elicitation • Brainstorming • Interview • Prototyping • Requirement Workshop	techniques in brief used in requirements elicitation			
VI	Feasibility Study	A	Feasibility Study • Definition • Importance • Types of Feasibility study ▪ Technical ▪ Operational ▪ Resource ▪ Legal/Ethical ▪ Economical	To learn the importance and the types of feasibility study that can be used for a software system	02	06	
VII	Software Requirement Specification	A	Software Requirements Document (SRS) • Definition • Importance of SRS • Characteristics of SRS • Format of SRS	To learn the importance and how to document the SRS for a software system	02	06	
VIII	Project Scheduling using Gantt Chart	A	Introduction to Project Scheduling	To study in brief the need for project scheduling for a software project	02	06	
		B	Timeline Chart: Gantt Chart • Introduction • Components of a Gantt Chart • Drawing a Gantt Chart	To study the use of Gantt Chart as tool for scheduling in a software project			

References:

1- Software Engineering By Roger Pressman (4e)
2- Software Engineering- A Practioner's approach by Pankaj Jalote
3- Software Engineering by Ian Sommerville
4- UML Distilled by Martin Fowler
5- Object Oriented Analysis and Design Using UML by Mahesh Matha
6- Requirements:
    a. http://www.inf.ed.ac.uk/teaching/courses/ip/CS2Ah0405-SoftwareRequirements.pdf
7- Feasibility Study
    a. http://www.exforsys.com/tutorials/programming-concepts/feasibility-study-why-needed-before-programming.html
    b. http://www.learn.geekinterview.com/it/sdlc/project-planning-and-feasibility-study.html
    c. http://www.indiastudychannel.com/resources/102399-Feasibility-Types-Fesibility.aspx

BCA SEMESTER IV

COURSE CODE : BCA 402	COURSE TITLE : COMPUTER NETWORKS	
Total marks : 100	Total credits : 05	Total contact hours : 45
Course prerequisites : none		
Course objectives: To introduce the concepts, terminologies and technologies used in modern day data communication and computer networking.		

Course contents :

Unit		Topic			Weightage		References
#	Title	#	Content	Learning outcomes	hours	%	
I	Data Communications	A	Beginnings of Networking and data communication • ARPAnet	To study the origins of modern day Internet	05	10	
		B	Networks • Components and Categories • Types of Connections • Topologies	To study the classification of networks			
		C	Protocols and Standards • Layered Architecture • ISO / OSI model • TCP/IP model	To understand the need of layered architecture			
		D	Applications of Networks	To know the applications of networks in all fields of modern world			
		E	Examples of Network	To understand the Internet architecture			
II	Physical layer	A	Functions of Physical layer	To know the functions of physical layer	08	15	
		B	Data Encoding • Manchester • Differential Manchester	To understand the techniques used in data encoding			
		C	Transmission Media • Twisted pair • Coaxial Cable • Fiber Optics • Wireless Media	To study the different data transmission media			
		D	Physical layer Devices • Repeaters	To know the function of repeaters			
III	Data Link Layer	A	Functions of Data link layer	To know the functions of data link layer	10	25	
		B	Data Framing techniques	To understand the data			

			• Character Count • Character Stuffing • Bit Stuffing	framing techniques			
		C	Error detection and correction • Parity • CRC • Hamming code	To study the different error detection and correction methods			
		D	Protocols • Stop and wait • Go back-N ARQ • Selective repeat ARQ • Sliding window • HDLC	To learn the data link layer protocols			
		E	Network Standards • Ethernet IEEE 802.3 • IEEE 802.4 • IEEE 802.5 • IEEE 802.11 • FDDI • SONET	To study the different IEEE standards for computer networking			
		F	Data Link layer devices • Bridges	To know the function of bridges			
IV	Network layer	A	Functions of Network layer	To know the role of the network layer in data communication	10	20	
		B	Network Service types • Virtual Circuits • Datagrams	To study the two network service types			
		C	Routing Algorithms • Shortest path routing • Distance Vector routing • Link State routing	To the concept of routing and the different algorithms used for routing			
		D	Internetworking	To learn the concepts of internetworking			
		E	Internet Protocol • Frame Format • Addressing • Subnetting	To study the IP protocol suite			
		F	Network layer devices • Gateways	To know the function of gateways			
V	Transport layer	A	Functions of Transport layer	To know the functions of the transport layer	06	15	

		B	Transport Service • Connection less • Connection oriented	To study the differences between the two services of the transport layer			
		C	Protocols • User Datagram Protocol • Transmission Control Protocol	To learn the transport layer service protocols			
		D	Quality of Services parameters	To understand the parameters that determine the quality of a transport service			
		E	DSL Service	To know the concept of a DSL service			
VI	Application layer	A	Functions of Applications layer	To know the role of the application layer in data communication	06	15	
		B	Protocols • FTP • SMTP	To study the two main protocols of network applications			
		C	Domain Name System	To understand the concept and the working of a DNS			
		D	Principles of Cryptography	To know the concept of data security and cryptography			

Reference

1. Data Communications and Networking; Behrous A. Forouzan.
2. Computer Networks; (3e) Andrew S. Tanenbaum.

BCA SEMESTER IV

COURSE CODE : BCA403	COURSE TITLE : MANAGEMENT FUNCTIONS	
Total marks : 100	Total credits : 05	Total contact hours : 45
Course prerequisites : none		
Course objectives : To introduce the different concepts of management functions within an organizational framework		

Course contents :

Unit		Topic			Weightage		References
#	Title	#	Content	Learning outcomes	hours	%	
I	Planning	A	Concept of Planning Definitions of Planning Importance of Planning	To study the function of planning	08	20	
		B	Types of Planning :- • Corporate and Functional Planning • Strategic and Operational Planning • Long-term and Short-term Planning • Proactive and Reactive Planning • Formal and Informal Planning	To familiarize with the different types of planning			
		C	Planning in Indian Organizations Objectives :- Meaning and Definition	To understand the function of planning in the Indian perspective			
		D	Management by Objectives :- Meaning and definitions Features of M.B.O. Process of M.B.O Advantages of M.B.O.	To study the concept of management by objectives			
II	Organizing	A	Meaning and Definitions Concept of Organization Organization as a structure	To study the various concepts of organizing	12	24	
		B	Factors affecting organization structure :- • Environment • Strategy • Technology • Size • People				
		C	Authority and Responsibility :-	To study the different types of power and authority			

			Concept of authority Sources of Authority Limits of Authority Power Sources of Power Responsibility				
		D	Delegation of authority Blocks to Effective Delegation Measures for Effective Delegation Centralization and Decentralization	To study delegation of authority within an organization			
III	Leadership	A	Concept of Leadership Difference between Leadership and Management	To understand the need for provisions and reserves	10	20	
		B	Leadership Theories :- • Charismatic Leadership Theory • Trait Theory • Behavioral Theory • Situational Theory Successful Leadership V/s Effective Leadership	To study the different theories of leadership			
		C	Leadership Development: - Ingredients of Leadership Development Leadership Development process	To learn the traits and qualities of a leader			
IV	Motivation	A	Concept of Motivation Motivation and Performance	To learn the relationship between motivation and performance	08	20	
		B	Theories of Motivation:- • Maslow's Need Hierarchy • Herzberg's Motivation – hygiene Theory • Mc Clelland's Needs Theory • Alderfer's ERG Theory • McGregon's Theory X and Theory Y	To study the different theories of motivation			
V	Decision Making	A	Meaning importance steps Types	To learn the different aspects of decision making	07	16	
		B	Controlling :-				

			Meaning Process Essentials				
		C	Communication:- Meaning Process Types Barriers and how to overcome them				

References

1. Management Concepts and Practices; Manmohan Prasad
2. Management concepts and Practices; Pradeep Kumar
3. Management Concepts and Strategies; J.S. Chandan

BCA SEMESTER IV

COURSE CODE : BCA404	COURSE TITLE : DATA ANALYSIS AND STATISTICAL TECHNIQUES	
Total marks : 100	Total credits : 05	Total contact hours : 45
Course prerequisites : none		
Course objectives : To introduce the concepts of analyzing data using mathematical and statistical techniques.		

Course contents :

Unit		Topic			Weightage		References
#	Title	#	Content	Learning outcomes	hours	%	
I	Probability and Distribution	A	Introduction Experiments Counting Rules and Assigning Probabilities Events and their Probabilities	To understand the concept of probability and probability distributions	09	15	
		B	Distribution Some basic Relationships of Probability Conditional Probability Baye's Theorem Normal Distribution Poisson Distribution				
II	Sampling, Sampling Distribution & Testing of Hypothesis	A	Introduction to Sampling Simple Random Sampling Estimation Point Estimation Interval Estimation	To develop the ability to carry out testing of hypothesis on a population based on statistical measures of samples	09	20	
		B	Introduction to Sampling Distributions • Sampling Distribution • Other Sampling Methods ❖ Population Mean: σ Known, σ Unknown ❖ Determining the Sample Size ❖ Population Proportion				
III	Correlation and Regression	A	Measures of Association between Two Variables • Covariance • Correlation	To be able to carry out simple linear regression analysis	06	15	
		B	Introduction to Regression • Simple linear Regression Model • Least Square				

			Method				
IV	Statistics	A	Introduction: • Definition of statistics • Data and Collection of data • Summarizing Qualitative and Quantitative Data: • Frequency Distribution • Graphs ❖ Frequency Polygon ❖ Histogram	To develop the ability to compute descriptive statistics including diagrammatic representation and interpretation	12	35	
		B	Measures of location • Mean • Median • Mode • Percentiles • Quartiles • Weighted Mean • Working with Grouped Data Measures of Variability				
		C	• Range • Quartile Deviation • Standard Deviation and Variance				
V	Data Mining	A	Data Mining • Introduction • Knowledge Discovery Process • Use and Applications	To know about some basic tasks in data mining and their applications	09	15	
		B	Mining Item Sets and Association Rules • Frequent Item Set Mining • Apriori Algorithm • Association Rule Mining				
		C	Classification and Clustering • Classification ❖ Definition ❖ Model Construction ❖ Model Usage • Clustering ❖ Definition ❖ Distance Measure				

			❖ Clustering Types ❖ K-means ❖ K-medoid • Outlier Analysis ❖ Definition ❖ Example				
		D	Data Mining • Introduction • Knowledge Discovery Process • Use and Applications				
		E	Mining Item Sets and Association Rules • Frequent Item Set Mining • Apriori Algorithm • Association Rule Mining				

Reference

1. S P Gupta, “Statistical Methods”, 30th edition, S Chand
2. R J Shah “Statistical Techniques”

BCA SEMESTER IV

COURSE CODE : BCA405	COURSE TITLE : GRAPHICAL INTERFACE DESIGN LABORATORY	
Total marks : 100	Total credits : 05	Total lab sessions : 15

Course prerequisites : BCA201

Course objectives :To learn to design software applications using the graphical interface designing programming language

Course contents :

Unit		Topic			Weightage		References
#	Title	#	Content	Learning outcomes	Sessions	%	
I	Introduction to GUI	A	Components of the GUI • Windows • Interactive Input Devices • Forms	To study the different components of a graphical user interface	01	05	
		B	Features of GUI				
		C	Laboratory exercises to observe and record different components of a graphical interface	To identify the different components by observing GUI software			
II	Components of GUI	A	GUI based forms controls • TextBoxes • ComboBoxes • PasswordBoxes • Check Boxes • Grid • Lists • Dialog Boxes • Command Buttons • Radio Buttons • Sliders • Progress Bars • Frames • Tabs etc	To learn the different form controls in a GUI and understand the characteristics and use of each	01	10	
		B	Characteristics of each control Advantages and limitations of each control				
		C	Laboratory Exercises to test each component and record its behavior in execution	To know the behavior of each of the form control in execution			
III	Form Design	A	Planning the layout of forms for accepting user input	To plan and design a neat, simple and user friendly forms	01	10	
		B	Using suitable controls to match the type of data to be input				
		C	Laboratory exercises to plan	To implement form design			

			the layout and design forms for different cases	principles for effective forms			
IV	Events	A	Types of events • Click • Double Click • KeyPress • MouseMove etc	To learn the different events in form design	01	15	
		B	Event Listening	To learn to capture different events			
		C	Laboratory exercises on capturing events in response to actions				
V	Programming	A	Programming Language	To study a suitable Graphical Interface designing programming language	03	20	
		B	Laboratory exercises to demonstrate the usage of all the constructs of the programming language	To study the different constructs of a Graphical Interface designing language			
VI	Form Processing	A	Form Validation	To learn to handle form data validations	05	25	
		B	Error handling	To learn to handle runtime errors caused by some abnormal conditions			
		C	Database Connectivity	To learn to connect to a suitable database to store data			
		D	Laboratory exercises to demonstrate form validations, error handling and database connectivity	To learn to create a full-fledged data input forms			
VII	Reports	A	Planning the Layout of a report	To learn to design reports for effective information presentation	01	10	
		B	Using suitable controls to display information using reports				
		C	Laboratory exercises to use reports to display information, based on data retrieved from the database	To learn to use reports for displaying information			
VIII	Software Creation	A	Developing a simple database application	To create a simple database software Application	02	05	

BCA SEMESTER IV

COURSE CODE : BCA406	COURSE TITLE : DATA ANALYSIS AND E-ACCOUNTING LABORATORY	
Total marks : 100	Total credits : 05	Total lab sessions : 15

Course prerequisites : None

Course objectives :To develop basic skills in data analysis by implementing different techniques of data analysis and maintaining accounts using common software applications

Course contents :

Unit		Topic			Weightage		References
#	Title	#	Content	Learning outcomes	Sessions	%	
I	Equation Solver	A	• Introduction to Equation Solver • Solving Linear equations in one variable • Solving Linear equations in two	To know to use Equation Solver to solve the simple problems	03	20	
		B	• Linear Programming Problem Formulation • Solving LPP using MS Equation Solver • Perform sensitivity analysis				
		C	• Solving Transportation Cost Problems • Work Assignment Problems • Perform sensitivity analysis				
II	Functions & Images	A	Functions • Plot Graphs for simple functions • Derivatives • Integration	To use algorithms for plotting graphs, image processing etc.	03	25	
		B	Image Processing • Matrices • Simple processing of Grey Scale images • Colour images				
		C	Algorithm Implementation • Implementing simple data analysis algorithms as standalone applications using -means(any programming language 1. K clustering) 2. Finding frequent item sets(apriori)				
III	Statistical Analysis	A	Managing Data • Listing cases, • Replacing missing values • Computing new	To use the different statistical concepts for data representation	03	35	

			variables • Recording variables • Exploring data • Selecting cases • Sorting cases • Merging files				
		B	Graphs • Creating and editing graphs and charts				
		C	Frequencies • Bar charts • Histograms • Percentiles				
		D	Descriptive Statistics • Measures of central tendency • Variability • Deviation from normality • Size and stability • Cross Tabulation • Chi-square analyses • The means Procedure				
		E	Bivariate Correlation • Bivariate Correlation • Partial Correlations • Correlation matrix				
		F	The T-test procedure • Independent – samples • Paired samples • One sample tests				
IV	E-Accountancy	A	• Creation of Company • Ledgers and Accounts • Creation of Journal and Ledgers • Creating and editing graphs and charts	To learn to use computer software for managing accounts	03	20	

References

1. SPSS
2. Microsoft Excel Resources

BCA SEMESTER IV							
COURSE CODE : BCA407		COURSE TITLE : TECHNICAL WRITING SKILLS					
Total marks : 100		Total credits : 05			Total contact hours : 45		
Course prerequisites : none							
Course objectives : To learn to document and report matter using technical jargon especially using the English language as the reporting medium							
Course contents :							
Unit		Topic			Weightage		References
#	Title	#	Content	Learning outcomes	hours	%	
I	Introduction to Written Communication	A	Principles of Commercial correspondence	To study the principles of correspondence	10	20	
		B	Language in a business letter including Jargon	To study the jargon for business letters			
		C	Letter Writing Basics	To study the conventions, formats of business letter writing			
		D	Layouts of Business Letters				
		E	Parts of a Business Letter				
II	Letters	A	Formal Letters	To learn to write formal letters	12	30	
		B	Informal Letters	To learn to write informal letters			
		C	Testimonials References Memos	To study writing different types of documents			
		D	Job Application Letters Appointment Letters Acceptance Letters Resumes Resignation Letters	To understand the differences between types of letters			
III	Media Related Writing	A	Press Releases and articles for the press	To learn to draft media articles depending on their types	11	20	
			Advertisements	To learn to draft an effective advertisement			
			E-mail and Netiquette	To know the rules and conventions of online correspondence			
			Fax Messages	To know facsimile correspondence			
			Tender Notices	To learn to draft tender notices for formal intimations			
IV	Report Writing	A	Introduction	To learn to collect data from meetings, briefings and prepare a report	12	30	
		B	How to collect data for a	To learn to collect data for			

			report	writing reports			
		C	Kinds of Reports	To study the different types of reports			
		D	What a Report usually contains	To study effective report writing skills			
		E	Reports written by individuals				
		F	Committee Reports				
		G	Evaluation of a Report				
		H	Report writing : Case study	To get practical experience on writing reports			

References

1. Principles and Practice of Business Communication; Rhoda Doctor and Aspi Doctor