Study & Evaluation Scheme

of

Bachelor of Computer Application
(BCA)

[Applicable for the Batch 2017-18]

COLLEGE OF COMPUTING SCIENCES & INFORMATION TECHNOLOGY

TEERTHANKER MAHAVEER UNIVERSITY
Delhi Road, Moradabad, Uttar Pradesh-244001
Website: www.tmu.ac.in

TEERTHANKER MAHAVEER UNIVERSITY
(Established under Govt. of U. P. Act No. 30, 2008)
Study & Evaluation Scheme
Of
Bachelor of Computer Application
SUMMARY

Programme   : **Bachelor of Computer Application (**BCA)

Duration   : Three years full time (six semesters)

Medium   : English

Minimum Required Attendance   : 75%

Maximum Credits   : 174

Minimum Credits required for the degree: 161

Assessment   :

Internal	External	Total
40	60	100

Internal Evaluation (Theory Papers):

Class Test I	Class Test II	Class Test III	Attendance	Assignment	Total
Best two out of the three					
10	10	10	10	10	**40**

Evaluation of Practical/Dissertations & Project Reports:

Internal	External	Total
50	50	100

Duration of Examination   :

External	Internal
3 hrs.	1.5hrs.

To qualify the course a student is required to secure a minimum of 45% marks in aggregate including the semester examination and teachers continuous evaluation. (i.e. both internal and external). A candidate who secures less than 45% of marks in a course shall be deemed to have failed in that course. The student should have secured at least 45% marks in aggregate to clear the semester.

Question Paper Structure

1. The question paper shall consist of 6 questions. Out of which first question shall be of short answer type (not exceeding 50 words) and will be compulsory. Question No. 1 shall contain 8 parts representing all units of the syllabus and students shall have to answer any five (weightage 2 marks each).

2. Out of the remaining five questions, The long answer pattern will have internal choice with unit wise questions with internal choice in each unit. In units having numerical, weightage and information should be available both in the syllabus and the paper pattern. The weightage of Question No. 2 to 6 shall be 10 marks each.

Internal Evaluation (50 marks)

The Internal evaluation would also be done by the Internal Examiner based on the experiment performed during the internal examination

EXPERIMENT (30 MARKS)	ATTENDANCE (10 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)

External Evaluation (50 marks)

The external evaluation would also be done by the External Examiner based on the experiment performed during the external examination.

EXPERIMENT (30 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)	TOTAL EXTERNAL (50 MARKS)

Study & Evaluation Scheme
Bachelor of Computer Application

Semester-I

S. No.	Category (Core & Non-core)	Course Code	Subject	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	NON CORE	BCA 101	Mathematics -I	4	1	0	5	40	60	100
2	CORE	BCA 107	Fundamental of Computer's and MS — Office	4	1	0	5	40	60	100
3	NON CORE	BCA 108	Digital Electronics	4	1	0	5	40	60	100
		Elective (Select Any One)								
4	NON CORE	BCA 109 / 213	Management concept and Organization Behaviors	4	0	0	4	40	60	100
	NON CORE	BCA 112 / 214	Environmental Studies							
5	NON CORE	BCA149	English Communication & Soft Skills – I	3	0	2	4	40	60	100
6	CORE	BCA 151	MS-Office and Internet Lab	0	0	4	2	50	50	100
7	NON CORE	BCA 153	Digital Electronics Lab	0	0	4	2	50	50	100
		Total		19	3	10	27	300	400	700

Semester-II

S. No.	Category (Core & Non-core)	Course Code	Subject	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	CORE	BCA 202	Programming in C	5	1	0	6	40	60	100
2	NON CORE	BCA 207	Computer Organization and Architecture	4	1	0	5	40	60	100
3	CORE	BCA 212	Web Technologies	4	1	0	5	40	60	100
		Elective (Select Any One)								
4	NON CORE	BCA 210	Fundamentals of E—Commerce	4	1	0	5	40	60	100
	NON CORE	BCA 208	Numerical Methods							
	NON CORE	BCA 211	Information Security Fundamental							
		Elective (Select Any One)								
5	NON CORE	BCA 109 / 213	Management concept and Organization Behaviors	4	0	0	4	40	60	100
	NON CORE	BCA 112 / 214	Environmental Studies							
6	NON CORE	BCA249	English Communication & Soft Skills – II	3	0	2	4	40	60	100
7	CORE	BCA 251	C Language Lab	0	0	4	2	50	50	100
8	CORE	BCA 255	Web Technologies Lab	0	0	4	2	50	50	100
		Total		24	4	10	33	340	460	800

Semester-III

S. No.	Category (Core & Non-core)	Course Code	Subject	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	CORE	BCA 302	Data Structure using C	4	1	0	5	40	60	100
2	CORE	BCA 306	Operating System	4	1	0	5	40	60	100
3	NON CORE	BCA 312	Database Management System	4	1	0	5	40	60	100
4	CORE	BCA 309	Computer Network	3	1	0	4	40	60	100
	Elective (Select Any One)									
5	NON CORE	BCA 308	System Analysis and Design	3	1	0	4	40	60	100
	NON CORE	BCA 310	Object Oriented Programming Concept and UML							
	NON CORE	BCA 311	Microprocessor and Peripherals							
6	NON CORE	BCA349	English Communication & Soft Skills – III	3	0	2	4	40	60	100
7	CORE	BCA 354	Data Structure lab Using C	0	0	4	2	50	50	100
8	NON CORE	BCA 353	Data Base Systems Lab	0	0	4	2	50	50	100
	Total			**21**	**05**	**10**	**31**	**340**	**460**	**800**

Semester-IV

S. No.	Category (Core & Non-core)	Course Code	Subject	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	CORE	BCA 402	Software Engineering	4	1	0	5	40	60	100
2	CORE	BCA 404	OOPs & C++	5	1	0	6	40	60	100
3	NON CORE	BCA 407	Computer Graphics	4	1	0	5	40	60	100
	Elective (Select Any One)									
4	NON CORE	BCA408	Fundamentals Of Accounting	5	1	0	6	40	60	100
	NON CORE	BCA 409	IT Governance, Risk & Information Security Management							
	NON CORE	BCA 410	Scientific Computing							
	NON CORE	BCA 411	Ethical Hacking Fundamental							
	NON CORE	BCA 412	Mobile Device and Network Architecture							
	NON CORE	BCA 413	Management Information System							
5	NON CORE	BCA449	English Communication & Soft Skills – IV	3	0	2	4	40	60	100
6	CORE	BCA 452	OOPs & C++ Lab	0	0	4	2	50	50	100
7	NON CORE	BCA 453	Computer Graphics Lab	0	0	4	2	50	50	100
	Total			**21**	**04**	**10**	**30**	**300**	**400**	**700**

Semester-V

S. No.	Category (Core & Non-core)	Course Code	Subject	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	NON CORE	BCA 501	Linux Internals	4	1	0	5	40	60	100
2	CORE	BCA 512	Core Java Programming	4	1	0	5	40	60	100
3	CORE	BCA 513	PHP	4	1	0	5	40	60	100
Elective (Select Any One)										
4	NON CORE	BCA 510	Multimedia and Animation	4	1	0	5	40	60	100
	NON CORE	BCA 514	Distributed Operating System							
	NON CORE	BCA 515	Enterprise Resource Planning							
	NON CORE	BCA 516	Operation Research							
	NON CORE	BCA 517	Discrete Mathematics							
		BCA 518	Computer Forensics and Investigation							
5	CORE	BCA 551	Mini Project (Industrial Training)	0	0	0	3	50	50	100
6	CORE	BCA 555	Core Java Programming Lab	0	0	4	2	50	50	100
7	CORE	BCA 556	PHP Lab	0	0	4	2	50	50	100
8	NON CORE	BCA 557	Linux Lab	0	0	4	2	50	50	100
			Total	**16**	**04**	**12**	**29**	**360**	**440**	**800**

Semester-VI

S. No.	Category (Core & Non-core)	Course Code	Subject	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	CORE	BCA 609	Programming with C#	4	1	0	5	40	60	100
2	CORE	BCA 610	Android Programming	4	1	0	5	40	60	100
Elective (Select Any One)										
3	NON CORE	BCA 611	Data Warehouse and Data Mining	4	1	0	5	40	60	100
	NON CORE	BCA 612	Cloud Computing							
	NON CORE	BCA 613	Cryptography and Network Security							
	NON CORE	BCA 614	Python Programming							
	NON CORE	BCA 615	Computer Ethics and Cyber Laws							
4	CORE	BCA 653	Project Work	0	0	6	3	50	50	100
5	CORE	BCA 657	C# Lab	0	0	6	3	50	50	100
6	CORE	BCA 658	Android Lab	0	0	6	3	50	50	100
		Total		**12**	**3**	**18**	**24**	**270**	**330**	**600**

Evaluation Scheme for Short Term Courses

Objective: University allows students to undertake additional subjects/course(s) (In-houseoffered by the university through collaborative efforts or courses in the open domain by various internationally recognized universities) and to earn additional credits on successful completion of the same. Each program will be approved in advance by the University following the standard procedure of approval and will be granted credits as per the approval.

In case of the students having taken such additional subjects/courses

1. Each course will have its evaluation criteria and credits allocated based on the teaching/practical hours associated with it; after due processing as per university ordinance and approval of the Vice Chancellor. The notification to the same shall happen before the start of the subject/ course.

2. In case a student fails to secure minimum required credits then the additional subject(s) shall be counted for calculating the minimum credits required for the award of degree.

3. If a student has secured minimum required credits then these courses shall be shown as additional subjects in the consolidated mark sheet to be issued by the examination division.

BCA – Semester I
MATHEMATICS – I

Course Code: BCA 101   **L-4, T-1, P-0, C-5**

Objective: This paper provides mathematical handling for certain types of problems in matrix, set theory, differential calculus and series.

Course Contents

Unit - I
Definition and types of matrices such as square, row, Column, diagonal, identity, symmetric, singular, non-singular Matrices.Operation of matrices such as addition, subtraction, multiplication of matrices.   **(Lecture 08)**

Unit - II
Determinants and Adjoint of a matrix, Inverse of matrix, Solution of simultaneous linear equations by Matrix Method & Cramer's rule.   **(Lecture 08)**

Unit - III
Set & subset, Finite and Infinite set, Equal set, Null set, Proper subset, universal set, Singleton set. Union, Intersection, complement of set. Common applications of set.   **(Lecture 08)**

Unit - IV
Differentiation of functions, derivatives of some common functions, polynomials, exponential, logarithmic & trigonometric functions.   **(Lecture 08)**

Unit - V
Mathematical Series- Arithmetic, Geometric & Harmonic Series.   **(Lecture 08)**

Learning Outcome

By the end of this course a student should be able to:

- Understand the foundations of mathematics
- Be able to perform basic computations in higher mathematics
- Be able to read and understand set related operation.
- Be able to write and understand basic derivations.

Text Books:
1. Vasistha A. R., Matrices, Krishna Publications.
2. O P Malhotra, S K gupta,"ICSE Mathematics" S Chand

Reference Books:
1. Seth M.Ray, Elements of Matrix and Determinants
2. Shanti Narayan, Differential Calculus,S.Chand
*Latest editions of all the suggested books are recommended.

BCA – Semester I
FUNDAMENTAL OF COMPUTER'S AND MS-OFFICE

Course Code: BCA 107   **L-4, T-1, P-0, C-5**

Objective: To give the basic knowledge of Computer hardware and application software to the students. Students able to learn how computers work and how that can be used to make your work more efficient. Also provide the knowledge of the MS Office software package.

Course Contents

Unit-I
Computer Basics: Introduction and definition of computer, Computer Generations, Characteristics of Computer, Advantages and Limitations of computer, Classification of computers, Functional components of a computer system (Input, CPU, Storage and Output Unit), Types of memory (Primary and Secondary), **Computer Hardware**: Input Devices- Mouse, Bar Code Reader, Keyboard, Scanner, Joystick, Output Devices-VDU, Printer, Plotters, Types of Computer Software.   **(Lecture 08)**

Unit-II
Computer Languages: Introduction to languages, Compiler, Interpreter and Assembler, High Level Language to Machine Language Conversion , Evolution of programming language, Classification of Programming Languages, Features of a good Programming Language, Example of High Level Languages, Characteristics of a good language.
Number system: Binary number system, Octal &Hexa-decimal number system.
                                                                          (Lecture 08)

Unit-III
Algorithm, flowcharts: flowcharts symbols, sample flowcharts.
MS-DOS: Operating System, Basic Concepts of Operating System, Introduction of MS-DOS, Internal Commands-VOL,VER, DATE, TIME, CLS, DIR, CD, MD, PROMPT, TYPE, COPY, COPYCON , External Commands-MOVE, MORE, FIND, ATTRIB, TREE, DELTREE, EDIT, FORMAT
MS-WORD: Starting MS WORD, Creating and formatting a document, Changing fonts and point size, Table Creation and operations, Autocorrect, Auto text, spell Check, Word Art, Creating Shapes and Charts, Inserting objects, Page setup and margins, Page Preview, Printing a document, Macros, Mail Merge.   **(Lecture 08)**

Unit-IV
MS-EXCEL: Starting Excel, Work sheet, cell inserting Data into Rows/ Columns, Alignment, Text wrapping , Sorting data, Auto Sum, Use of functions, Cell Referencing form, Generating graphs, Worksheet data and charts with WORD, Creating Hyperlink to a WORD document, Page setup and margins, Print Preview, Printing Worksheets.
MS-ACCESS: Maintaining Database by creating Tables, Queries, Reports and Forms.
                                                                          (Lecture 08)
Unit-V
MS-POWERPOINT: Starting MS–Power Point,, Creating a presentation using auto content Wizard, Blank Presentation, creating, saving and printing a presentation, Adding a slide to presentation, Navigating through a presentation, slide sorter, slide show, editing slides, Using

Clipart, Word art gallery, Adding Transition and Animation effects, setting timings for slide show, preparing note pages, preparing audience handouts, printing presentation documents

Introduction of Internet: History of internet, Web Browsers, Searching and Surfing, Creating an E-Mail account, sending and receiving E-Mails.   **(Lecture 08)**

Learning Outcome

By the end of this course a student should be able to:

- To identify computer hardware and peripheral devices
- Familiar with software applications
- Understand file management
- Creating basic documents, worksheets, presentations with their properties.
- Experience working with email and recognize email netiquette.

Text Books:
1. Sinha P.K., Computer Fundamentals, BPB Publishing.
2. O'Leary Timothy, O'Leary Linda , Microsoft Office ,TMH Publication
3. Kanitkar Yashwant, Let Us C, BPB Publishing.

Reference Books:
1. Leon A. & Leon M., Introductions to Computers, Vikas Publication.
2. Norton Peter, Introductions to Computers, TMH Publication.
3. Price Michael, Office in Easy Steps ,TMH Publication.

*Latest editions of all the suggested books are recommended.

BCA – Semester I
DIGITAL ELECTRONICS

Course Code: BCA 108   **L-4, T-1, P-0, C-5**

Objective: This subject provides students an in–depth theoretical base of the Digital Electronics,the fundamental designing concepts of different types of Logic Gates, Minimization techniques and the computational details for Digital Circuits.

Course Contents

Unit - I
Number systems : Binary number system, Octal & Hexa-decimal number system, Conversion ofNumber System, r's & (r-1)'s, Binary arithmetic Operations, complement weighted & un-weighted codes (BCD,Excess-3,Gray code). **(Lecture 08)**

Unit - II
Logic Gates: AND, OR, NOT GATES and their Truth tables, NOR, NAND & XOR gates.
Boolean algebra: AND, OR, Inversion, Basic Boolean Law's, Demorgan's theorem, Minimization techniques: K -Map, Sum of Product & Product of Sum. **(Lecture 08)**

Unit III
Sequential Circuits: Flip Flop, Types of Flip Flop: R-S, D, J-K, T, Master Slave, and StateRealization of one Flip Flop Using Other Flip Flop. **(Lecture 08)**

Unit IV
Combinational circuits: Multiplexers, Demultiplexers, Decoders & Encoders, Half Adder, Full Adder, Half Subtractor, Full Subtractor. **(Lecture 08)**

Unit V
Registers: Shift Registers, Types of shift registers, Universal Shift Register withparallel load, Bi-directional Shift register. **(Lecture 08)**

Learning Outcome
By the end of this course a student should be able to:

- To understand and examine the structure of various number systems and its application in digital design.
- The ability to understand, analyze and design various combinational and sequential circuits.
- Ability to identify basic requirements for a design application and propose a cost effective solution.
- The ability to identify and prevent various hazards and timing problems in a digital design.

Text Book:

1.   Morris Mano, *Digital Logic*, Prentice Hall of India.

Reference Books:

1. Taub& Schelling, *Digital Integrated Electronics,* McGraw-Hill International Edition
2. Charles H.Roth, Jr. *Fundamentals of Logic Design*, Jaico Publishing House.
3. Donald D.Givone, *Digital Principles and Design*, Tata McGraw-Hill.
4. Bartee, *Digital Computer Fundamentals.*

*Latest editions of all the suggested books are recommended.

BCA – Semester I
MANAGEMENT CONCEPT AND ORGANIZATION BEHAVIORS

Course Code: BCA 109/213   **L-4, T-0, P-0, C-4**

Objective: The objectives of this subject are to enable
- to describe the nature and scope of management;
- to know the difference between management and administration;
- to understand the concepts of organizational behavior and its application in managing people

Course Contents

Unit - I
Introduction to Management: Meaning, nature and importance of management; Management functions; Management skills; Classical theories of management.   **(Lecture 08)**

Unit - II
Planning: Importance of planning; Types of plans; Planning and decision making process. Process of organizing; Organizational structure and design.   **(Lecture 08)**

Unit - III
Organizational Behavior: introduction to organizational behavior in management; Foundations of individual behavior-personality; Concept of perception & perception theories.   **(Lecture 08)**

Unit - IV
Concept of Course with theories, Concept of attitudes, Job design & job satisfaction. Concept of motivation with theories.   **(Lecture 08)**

Unit - V
Group: Foundations of group behavior; Leadership: power and politics. Organizational culture: Meaning, importance and characteristics of organization culture.   **(Lecture 08)**

Learning Outcome
By the end of this course a student should be able to:

- Understand how individual differences among employees affect organizational performance, including factors such as job attitudes, trust, personal values, perceptual processes and decision making.
- Apply motivation theories to leverage human capital.
- Learn to apply the research process to manage organizational issues related to human capital.
- Understand and apply group and team theories to optimize human performance in meeting organizational objectives
- Become adept at using the innovation process to develop and implement creative solutions to organizational issues, including product development.
- Understand the relationship between organizational culture and firm performance

- Understand and use a general behavioural process model which identifies organizational factors as the determinants of individual performance outcomes

Text Books:
1. Newstrom, John W. and Keith Davis, Organizational behavior: Human Behavior at Work,Tata McGraw-Hill, New Delhi.
2. Sharma, R.A., Organizational Theory and Behavior, Tata McGraw -Hill, New Delhi.
3. Prasad L.M., Principles and Practice of Management, Sultan Chand
4. Murugan and Shaktivel, Management Principles and Practices, New Age.

Reference Books:
1. Koontz, Harold, Cyril 'O' Donnell, And Heinz Weihrich, Essentials of Management, Fourth Edition, McGraw-Hill, Singapore.
2. Robbins, Stephen P. and Mary Koutler, Management, 5th ed., Prentice Hall of India Private Ltd., New Delhi.
3. Rendolph, Bobbitt, H., Organizational Behavior, 7th ed., Prentice Hall, New Jersey.
4. Srivastava & Chunawalla, Management Principles and Practices, Macmillan.
5. Koontz, Principles of Management, Tata McGraw Hill.

*Latest editions of all the suggested books are recommended.

BCA – Semester I
ENVIRONMENTAL STUDIES

Course Code: BCA 112/214   **L-4, T-0, P-0, C-4**

Objective: To create awareness among students about environment protection.

Course Content:

Unit I   **(Lectures 08)**

Definition and Scope of environmental studies, multidisciplinary nature of environmental studies, Concept of sustainability & sustainable development.

Ecology and Environment: Concept of an Ecosystem-its structure and functions, Energy Flow in an Ecosystem, Food Chain, Food Web, Ecological Pyramid& Ecological succession, Study of following ecosystems: Forest Ecosystem, Grass land Ecosystem & Aquatic Ecosystem & Desert Ecosystem.

Unit II   **(Lectures 08)**

Natural Resources: Renewable & Non-Renewable resources; Land resources and land use change;Land degradation, Soil erosion & desertification. **Deforestation**: Causes & impacts due to mining, Dam building on forest biodiversity & tribal population. **Energy Resources**: Renewable & Non-Renewable resources, Energy scenario & use of alternate energy sources, Case studies.
Biodiversity: Hot Spots of Biodiversity in India and World, Conservation ,Importance and Factors Responsible for Loss of Biodiversity, Biogeographical Classification of India

Unit III   **(Lectures 08)**

Environmental Pollutions: Types, Causes, Effects & control; Air, Water, soil & noise pollution, Nuclear hazards & human health risks, Solid waste Management; Control measures of urban & industrial wastes, pollution case studies

Unit IV   **(Lectures 08)**

Environmental policies & practices: Climate change & Global Warming (GreenhouseEffect),Ozone Layer - Its Depletion and Control Measures, Photo chemical Smog, Acid Rain Environmental laws: Environment protection Act; air prevention & control of pollution act, Water Prevention & Control of Pollution Act, Wild Life Protection Act, Forest Conservation Acts, International Acts; Montreal & Kyoto Protocols & Convention on biological diversity, Nature reserves, tribal population & Rights & human wild life conflicts in Indian context

Unit V   **(Lectures 08)**

Human Communities & Environment:

Human population growth; impacts on environment, human health & welfare, Resettlement & rehabilitation of projects affected person: A case study, Disaster Management; Earthquake, Floods & Droughts, Cyclones & Landslides, Environmental Movements; Chipko, Silent Valley, Vishnoi's of Rajasthan, Environmental Ethics; Role of Indian & other regions & culture in environmental conservation,

Environmental communication & public awareness; Case studies.

Field Work:

1. Visit to an area to document environmental assets; river/forest/flora-fauna etc.
2. Visit to a local polluted site: urban/ rural/industrial/agricultural.
3. Study of common plants, insects, birds & basic principles of identification.
4. Study of simple ecosystem; pond, river etc.

Learning Outcomes:

Based on this course, the Engineering graduate will understand / evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development.

Text Books:

1. "Environmental Chemistry", De, A. K., New AgePublishers Pvt.Ltd.

2. "Introduction to Environmental Engineeringand Science", Masters, G. M., PrenticeHall India Pvt. Ltd.

3. "Fundamentals of Ecology",Odem, E. P., W. B. Sannders Co.

ReferenceBooks:

1. "BiodiversityandConservation",Bryant, P. J., Hypertext Book

2. "Textbook of Environment Studies", Tewari, Khulbe&Tewari,I.K. Publication

  *Latest editions of all the suggested books are recommended.

BCA – Semester I
English Communication & Soft Skills – I

Course Code: BCA149   **L-3,T-0,P-2,C-4**

Objective: To make students able to express their views in simple and correct sentences by using linguistic and grammatical devices.

Course Content:
Unit -1 Introduction to English Language   **(06 hours)**
   a) Importance of English Language in the present scenario
   b) International Phonetic Alphabet: Consonant and Vowel Sounds
   c) Syllable, Word Stress and Intonation
   d) Rules of Spelling and Pronunciation
   e) Self Introduction and Introducing Others

Classroom Activity: (04 Hours)
Listening: Making the students listen the words of English properly from their teacher and other sources
Speaking: Drills on Word Stress and Intonation, Proper pronunciation of the given words and Conversation Practice
Reading: Making the students read the words of English from the given text
Writing: Making the students write the words of English dictated by their teacher

Unit -2 Basics of Grammar   **(06 hours)**
   a) Parts of Speech: Noun and its kinds, Pronoun and its kinds, Adjective and its kinds, Verb and its kinds, Adverb and its kinds, Preposition and its kinds, Conjunction and its kinds and Interjection
   b) Subject and Predicate
   c) Basic Sentence Pattern: Subject, Verb, Object, Adverbial, Adjunct and Complement

Classroom Activity: (04 Hours)
Speaking: Enabling the students speak out sentences by using the given parts of speech
Reading: Making the students identify different parts of speech in sentences
Writing: Asking the students do exercises on Parts of Speech, Subject-Predicate and Basic Sentence Patterns

Unit -3 Functional Grammar   **(06 hours)**
   a. Number: Singular and Plural; Person: First, Second and Third; Case: Nominative, Possessive and Objective
   b. Tense: Present, Past and Future
   c. Voice: Active and Passive
   d. Subject-Verb Agreement

Classroom Activity: (04 Hours)
Speaking: Enabling the students speak out sentences in different kinds of tense and voice
Reading: Making the students read and identify different kinds of tense and voice
Writing: Making the students write correct sentences

Unit -4 Comprehension Skills   **(06 hours)**
   a. Role of Listening
   b. Reading Comprehension
   c. Reasons for poor comprehension
   d. Improving comprehension skills
   e. Reading Passages from daily News Paper and Short Stories
   f. Writing Short Stories with the help of incomplete sentences

Classroom Activity: (04 Hours)
Listening: Involving the students listen to the passage read by their teacher
Speaking: Enabling the students deliver a speech on the given topics
Reading: Asking the students read the passage from daily news paper, short stories, etc.
Writing: Making the students answer the questions based on the passage given to them

Learning Outcome :
   1. Students will be able to learn the basics of English language.
   2. They will be able to write and speak.
   3. They will be able to give presentation from the podium.
   4. They will be able to speak in English on current issues.
   5. They will be able to improve their vocabulary through comprehension.

Text Books:
   1. Balasubramanian T., *A Textbook of English Phonetics for Indian Students*, Macmillan India Ltd., Madras. 1995.
   2. Nesfield J.C., *English Grammar Composition & Usage*, Macmillan Publishers.
   3. Hornby A.S., *Guide to Patterns & Usage in English,* Oxford University Press, New Delhi.
   4. Allen W. S., *Living English Structure*, Pearson Publication, New Delhi.
   5. Allen W. S., *Living English Speech*, Orient Longman, New Delhi.
   6. Wood F. T., *A Remedial English Grammar for Foreign Students,* Macmillan India Ltd., Chennai, 1965.

Reference Books:
   1. Taylor Grant, *English Conversation Practice*, Tata McGraw Hill New Delhi.
   2. Martin & Wren - *High School English Grammar & Composition,* S.Chand & Co. New Delhi.
   3. Arora V.N. & Chandra Lakshmi, *Improve Your Writing,* OUP, Chennai. 2000.
   4. Word Power Made Easy by Norman Lewis, W.R.Goyal Pub. & Distributors; Delhi.
   5. Hornby A.S., *Oxford Advanced Learners Dictionary of Current English*, 7th Edition.
   6. McCarthy, Michael, *English Vocabulary in Use*, Cambridge University Press.

BCA – Semester I
MS—OFFICE AND INTERNET LAB

Course Code:BCA 151   **L-0, T-0, P-4, C-2**

Course Contents

Introduction to Windows: Windows features including Control Panel and it's Components,Graphical features, Desktop setting with screensaver and wallpaper, Color, Background, Cut, Copy, Paste, Creating folder.

MS-WORD
Creating, Editing, Formatting: Font name, size, color, alignment, changing paragraph settings, Using Word Art ,Hyperlink, change case, spell checker, Mail Marge, Creating Tables, editing tables, alignment settings in tables

MS-EXCEL
Creating, Editing, Formatting: Font name, size, color, alignment, entering data, sorting data, Inserting, renaming and deleting Sheet, Inserting row, column, cell, picture, background, graph, symbol, applying formula in a cell, Call by Value, Call by Reference, hyperlink, object, diagram, Macro.

MS-POWERPOINT
Creating, Editing, Formatting: Font name, size, color, alignment, changing, Inserting table, picture, background, graph, symbol, hyperlink, object, and diagram, Slide Layout, Slide Design, Slide Show, Slide Sorter View, Slide Transition, Custom Animation, Inserting Sound and Movies in a Slide.

MS-ACCESS
Creating and editing Database using Table, Query, Report and Form.

Introduction to Internet
Web Browser, Search Engine, Creating E-Mail account, Attaching documents, Sending and Receiving E-Mails

Learning Outcome
By the end of this course a student should be able to:

- Create document file with different type of properties.
- Create excel file for different type of chart, function and create macros also
- Create power point presentation with animation and slide transaction.
- They can create database with queries operation, form and reports.
- Also student will be aware about the internet operations.

BCA – Semester I
DIGITAL ELECTRONICS LAB

Course Code: BCA 153   **L-0, T-0, P-4, C-2**

Course Contents

1) To study AND gate.
2) To study OR gate.
3) To study NOT gate.
4) To study NOR gate.
5) TO study NAND gate.
6) To study XOR gate.
7) To study NAND using AND and NOT.
8) To study NOR using OR and NOT.
9) Give truth table of AB+C'.and verify it.
10) Give truth table of A'B+C' and verify it.
11) To study XOR usingAND , OR and NOT.
12) To study XOR using NAND Gates.
13) To study XNOR gate.
14) To study XNOR using AND,OR,NOT gates.
15) To study XNOR using NOR gates.
16) To study XNOR using NAND gates.
17) To study NOR using NAND.
18) To study AND using NAND.
19) To study OR using NAND.
20) To study OR using NOR.
21) To study AND using NOR.
22) To study NAND using NOR.
23) To study XOR using NOR.
24) To study NOT using NAND.
25) To study NOT using NOR.
26) Give truth table of (A'B')'+C.and verify it.
27) Give truth table of (A+AB')C'.and verify it.
28) Give truth table of AB+BC'.and verify it.
29) Give truth table of (AB)'+C'.and verify it.
30) Give truth table of (A'BC+BC') and verify it.
31) To study Half Adder.
32) To study Full Adder.
33) To study HalfSubtractor.
34) To study Full Subtractor.
35) To study RS flip-flop using NOR gate.
36) To study D-type flip-flop using NAND gate.
37) To study JK flip flop using NOR gate.
38) To study T flip flop using NAND gate.
39) To study the 2 to 4 decoder.
40) To study decoder of Binary to Decimal.

Learning Outcome

By the end of this course a student should be able to:

- An ability to design the digital circuits with basic resistors and semiconductor devices to meet a set of specifications using simulator
- An ability to create combinational and sequential circuit using simulator.
- An ability to simulate the designed digital circuits using software.
- An ability to construct, analyze, and troubleshoot the digital circuits.
- Ability to measure and record the experimental data, analyze the results.

BCA – Semester II
PROGRAMMING IN C

Course Code: BCA 202   **L-5, T-1, P-0, C-6**

Objective: The objective of this course module is to provide the sound knowledge of C programming. It facilitates the student to develop programming capability to design programs as well as real life applications using C language. It also cover the concept of core programming like how to implement functions ,arrays and how to manage data in files using different operations like Pointers to functions and call back functions, Bitwise operations and a case based upon these operations, MACROs and their pitfalls

Course Contents

Unit - I
C Basics: History of C, Characteristics of C, C Program Structure, data types, Enumerated types, Variables, Defining Global Variables, Printing Out and Inputting Variables, Constants, Arithmetic Operations, Comparison Operators, Logical Operators, Order of Precedence, Escape sequence characters, Conditionals (The if statement , The switch statement) Looping and Iteration (The for statement, The while statement, The do-while statement, break ,continue, goto statements)   **(Lecture 08)**

Unit - II
Functions : (Function Prototyping, passing parameters (Actual and formal arguments), returning values, recursion, Scope of variable (local/global) , Storage classes :auto, extern, static, register, Library Functions.   **(Lecture 08)**

Unit - III
Arrays and Strings (Single and Multi-dimensional Arrays, Strings) **Pointers:** Pointer declaration, Pointers arithmetic,
Dynamic Memory Allocation and Dynamic Structures: malloc, calloc and realloc; sizeof
                                                              (Lecture 08)
Unit – IV
Structure and Union: Definition, Programs using Structure and Union, Difference between Structure and Union, User defined data types (typedef), Self-referential structures.
The C Preprocessor: Macros, File inclusion, Other Preprocessor Commands.   **(Lecture 08)**

Unit - V
File Handling: Opening and Closing data files, Read and Write Functions, different modes of Files, Library functions for file handling, Command Line Argument.   **(Lecture 08)**

Learning Outcome
By the end of this course a student should be able to:

- Understand the basic terminology used in computer programming
- Write, compile and debug programs in C language.
- Use different data types in a computer program.
- Design programs involving decision structures, loops and functions.

- Explain the difference between call by value and call by reference
- Understand the dynamics of memory by the use of pointers.
- Use different data structures and create/update basic data files

Text Books:
1. BalaguruswamyE., *Programming in ANSI C,* TMH
2. KanitkarYashwant, *Let Us C*, BPB
3. KanitkarYashwant, *Working With C*, BPB

References Books:
1. YashwantKanetkar, "Pointers in C", BPB Publications,
2. Paul Deitel and Harvey Dietel, "How to Program", PHI, 6th Ed.,
3. Behrouz A. Forouzan and Richard F. Gilberg, "Computer Science A Structured Programming Approach Using C", PHI, 3rd Ed.,
4. Jeri R. Hanly and Elliot B. Koffman, "Problem Solving and Programming in C", Pearson,
5. Rama N. Reddy and Carol A. Ziegler, "C Programming for Scientist and Engineers with Applications", Jones and Bartlet,

*Latest editions of all the suggested books are recommended.

BCA – Semester II
COMPUTER ORGANIZATION AND ARCHITECTURE

Course Code: BCA 207   **L-4, T-1, P-0, C-5**

Objective:
- To have a thorough understanding of the basic structure and operation of a digital computer.
- To discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division.
- To study the different ways of communicating with I/O devices and standard I/O interfaces.
- To study the hierarchical memory system including cache memories and virtual memory.

Course Contents

Unit - I
Basic Building Blocks: Half Adder, Full Adder, Half Subtractor, Full Subtractor, Decoder, Encoders, Multiplexer, Demultiplexer, Registers, Registers with parallel load,Bus and Memory Transfer, Three State Bus Buffers, MemoryTransfer.   **(Lecture 08)**

Unit - II
Register Transfer Language: Arithmetic Micro operation (Binary Adder, Binary Adder-Subtractor, Binary Increment and Arithmetic Circuit), Logic Micro operations (List of logic operation), Shift Micro operations, Arithmetic Logic Shift Unit.   **(Lecture 08)**

Unit - III
Processor Organization: General register organization, Stack organization, Reverse PolishNotation, addressing mode, Instruction type. .
Design of Control Unit: Introduction to Control Unit, Types of Control Unit (Hardwired & Micro programmed Control Unit)   **(Lecture 08)**

Unit - IV
Input-Output Organization: I/O Interface, I/O bus and interface modules, Strobe control, HandShaking, DMA, Interrupts & Interrupt handling, Direct Memory access: DMA Controller and DMA Transfer.   **(Lecture 08)**

Unit - V
Memory Organization: Memory Hierarchy, Main Memory: RAM & ROM chips, Memory Address Map, Cache memory, Virtual Memory, page replacement schemes.
                                                                         (Lecture 08)

Learning Outcome
By the end of this course a student should be able to:

- Understand the operation of electronic logic elements
- Understand the organization of a computer system in terms of its main components
- Understand the detailed operation of a simple microprocessor
- Understand different processor architectures
- Understand input/output mechanisms
- Understand the various parts of a system memory hierarchy
- Have practical experience of prototyping digital circuits
- Be able to interface digital circuits to microprocessor systems

Text Books:
1. Mano M., *Computer System Architecture*, Prentice Hall of India.
2. SubrataGhoshal, *Computer Architecture and Organization*, PEARSON

Reference Books:
1. Vravice, Zaky&Hamacher, *Computer Organization*, Tata McGraw Hill
2. Tannenbaum,*Structured Computer Organization*, Prentice Hall of India.
3. Hayes John P., *Computer Organization*, McGraw Hill.

*Latest editions of all the suggested books are recommended.

BCA – Semester II
WEB TECHNOLOGIES

Course Code: BCA 212   **L-4, T-1, P-0, C-5**

Objective: This course is designed to make the students aware of the web development standards and technologies, and to make them ready for developing the web applications. At the completion of this course the students will be able to attain good job in web development sector. Also by this course they will know, the current web development trend in the IT sector.

Course Contents

Unit - I
Web Essentials: Clients, Servers, and Communication. The Internet Protocols, HTTP, HTTPS, Markup Languages: An Introduction to HTML, History-Versions.
                                                                      (Lecture 08)

Unit – II
HTML: Formatting Tags, Links, List, Tables, Frames, forms, Comments in HTML, DHTML.
                                                                      (Lecture 08)

Unit – III
CSS: Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2, Overview and features of CSS3.
                                                                      (Lecture 08)

Unit - IV
Java Script: Introduction to Documents, forms, Statements, functions, objects in JavaScript, Arrays, FORMS, Buttons, Checkboxes, Text fields and Text areas.   **(Lecture 08)**

Unit - V
XML: Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Using XML with application. Transforming XML using XSL and XSLT.
                                                                      (Lecture 08)

Learning Outcome
By the end of this course a student should be able to:

- Analyze a web page and identify its elements and attributes.
- Create web pages using HTML and Cascading Styles sheets.
   Build dynamic web pages using JavaScript (client side programming).
- Create XML documents used in Web Publishing.
- Create XML Schema for data transfer in distributed environment.

Text Books:
   1. Burdman, Collaborative Web Development , Addison Wesley.

2. Bayross Ivan, Web Technologies Part II , BPB Publications.

Reference Books:
1. Robert. W. Sebesta, "Programming the World Wide Web", Fourth Edition, Pearson Education,
2. Deitel, Deitel, Goldberg, "Internet & World Wide Web How To Program", Third Edition, Pearson Education.
3. Marty Hall and Larry Brown,"Core Web Programming" Second Edition, Volume I and II, Pearson Education,
4. Bates, "Developing Web Applications", Wiley,
   *Latest editions of all the suggested books are recommended.

BCA – Semester II
Fundamentals of E—COMMERCE

Course Code: BCA 210   **L-4, T-1, P-0, C-5**

Objective: The purpose of this course is to introduce e-commerce, its impacts on business processes, and keys issues in the development of web-based business information systems and applications. This course deals with issues of security, electronic payments, mobile commerce and the future aspects of e-commerce.

Course Contents

Unit - I
An Overview of E-Commerce:Trade Process & Trade Cycles their linkages with informationexchange;Definitions of E-commerce & E-business & their difference;Problems with ManualSystems,Aims of E-commerce,Functions of E-commerce,Applications of E-commerce inbusiness functions,Tools & Technologies for E-commerce, Types of E-commerce, Issues & Challenges in E-commerce. **(Lecture 08)**

Unit – II
Electronic Data Interchange (EDI): Definition, Concept& Evolution of EDI, Traditional versus EDI enabled system for document exchange, EDI Layered Architecture, Process of EDI Message Exchange, Components of EDI. **(Lecture 08)**

Unit - III
Electronic Payment Systems: E-cash: Purchasing & using of e-cash; Electronic Purses their loading with cash and use; E-cheque payment system; Online Third Party Verified Payment System through Credit & Debit Cards. **(Lecture 08)**

Unit - IV
Security E-Commerce Transactions: Security issues: confidentiality, integrity, authentication ,non-repudiation & access control their objectives & techniques; Types of security attacks; Cryptography & Digital Signatures: Symmetric& asymmetric cryptography, Public-Private Key Cryptography, Digital signatures & their use, Public Key Infrastructure (Digital Certificate, Certification Authority, Registration Authority, Key Repository). **(Lecture 08)**

Unit - V
Business Strategy in an Electronic Age impact of Internet on Competition-Porter's Five Forces Model & Business Strategies in Digital Economy; Impact of IT Enabled Systems on Value Chain-Porter's Value Chain Model; Supply Chain &Supply Chain Management: Definition & flows in a supply chain.

(Lecture 08)

Learning Outcome
By the end of this course a student should be able to:

- Professional/academic knowledge and skills

- Acquire a good knowledge of e-commerce, both the technical and business aspects;
- Understand the principles and practices of e-commerce and its related technologies;
- Attributes for all-roundedness
- Follow trends of e-commerce;
- Build up on team work, presentation and technical writing skills.

Text Books:

1. E-commerce: Strategy, Technologies and Applications, David Whiteley, Tata McGraw Hill
2. E-Commerce: The Cutting Edge of Business, KK Bajaj &Debjani Nag, McGraw Hill.

Reference Books:
1. The Complete Reference: Internet, Margaret Levine Young, Tata McGraw Hill.
2. E-Commerce: Concepts, Models, Strategies, CSV Murthy, Himalayas Publishing House.
3. Frontiers of Electronic Commerce, Ravi Kalakota& Andrew B. Wilson, Addison - Wesley (An Imprint of Pearson Education)
4. Network Security Essentials: Applications & Standards, William Stallings, Pearson Education

*Latest editions of all the suggested books are recommended.

BCA – Semester II
NUMERICAL METHODS

Course Code: BCA 208   **L-4, T-1, P-0, C-5**

Objective: Numerical Analysis is the study of algorithms for solving problems of continuous mathematics. This course provides an introduction to finite differences, interpolation, numerical differentiation and integration, differential and linear equation.

Course Contents

Unit - I
Finite Differences: Types of operators and relations among operators, forward and backward difference table, Computation of Missing terms, Factorial Notations and reciprocal factorial. Polynomial in factorial notions.   **(Lecture 08)**

Unit - II
Solution of System of Linear Equation: Gauss Elimination method, Gauss Jordan method, Pivoting, Iterative methods –Gauss Seidel method, Gauss Jacobi method.
                                                                     (Lecture 08)

Unit - III
Interpolation: Newton's forward and backward interpolation formula. Interpolation with unequal Intervals- Lagrange's interpolation formula, Inverse Interpolation, Lagrange's method for inverse Interpolation.
Divided Difference: Divided difference table and properties, Newton Divided difference formula.   **(Lecture 08)**

Unit - IV
Numerical Differentiation: Numerical Differentiation by Newton's forward and backward interpolation formula.
Numerical Integration: Trapezoidal rule, Simpson 1/3 Rule, Simpson's 3/8**.**   **(Lecture 08)**

Unit - V
Solution of Differential Equation: Picard's Method, Euler's Method, Runge- Kutta Method and Predictor- Corrector Method.   **(Lecture 08)**

Learning Outcome
By the end of this course a student should be able to:

- Solve an algebraic or transcendental equation using an appropriate numerical method.
- Approximate a function using an appropriate numerical method to increase the accuracy in mathematical computing.
- Solve a differential equation using an appropriate numerical method.
- Evaluate a derivative at a value using an appropriate numerical method.
- Solve a linear system of equations using an appropriate numerical method.
- Perform an error analysis for a given numerical method.
- Prove results for numerical root finding methods.
- Calculate a definite integral using an appropriate numerical method.

Text Books
1. Grewal B. S., "Numerical methods in Engineering and Science", Khanna Publishers, Delhi
2. PradipNiyogi, "Numerical Analysis and Algorithms", TMH

References
1. GrewalRajaraman V., "Computer Oriented Numerical Methods", PHI
2. T. Veerarajan, T Ramachandran, "Theory and Problems in Numerical Methods", TMH
3. Francis Scheld, "Numerical Analysis", TMH
4. Manoj Kumar, "Computer based Numerical & Statistical Techniques", Krishna Prakashan.

*Latest editions of all the suggested books are recommended.

BCA – Semester II

INFORMATION SECURITY FUNDAMENTAL

Course Code: BCA 211   **L-4, T-1, P-0, C-5**

Objective: Upon successful completion of the course, students will have the ability to accomplish the following competencies accurately and efficiently:
- Describe legal and public relations implications of security and privacy issues
- Define and implement an information security strategy and architecture
- Plan and respond to intruders in a an information system
- Identify and prioritize information assets

Course Contents

Unit - I
Introduction to Information Security : Definition of Information Security, Evolution of Information Security; Basics Principles of Information Security; Critical Concepts of Information Security; Components of the Information System; Balancing Information Security and Access; Implementing IT Security, The system Development Life cycle, Security professional in the organization.   **(Lecture 08)**

Unit - II
The Need for IT Security : Business Needs-Protecting the functionality, Enabling the safe operations, Protecting the data, safe guarding the technology assets; Threats-compromises to Intellectual property, deliberate software attacks, Espionage and trespass, sabotage and vandalism; Attacks-Malicious Codes, Back Doors, Denial of Service and Distributed Denial of Service, Spoofing, sniffing, Spam, Social Engineering.   **(Lecture 08)**

Unit - III
Risk Management : Definition of risk management, risk identification, and risk control, Identifying and Accessing Risk, Assessing risk based on probability of occurrence and likely impact, the fundamental aspects of documenting risk via the process of risk assessment, the various risk mitigation strategy options, the categories that can be used to classify controls.
                                        (Lecture 08)

Unit - IV
Network Infrastructure Security and Connectivity : Understanding Infrastructure Security-Device Based Security, Media-Based Security, Monitoring and Diagnosing; Monitoring Network- Firewall, Intrusion Detection System, Intrusion Prevention system; OS and Network Hardening, Application Hardening; Physical and Network Security- Policies, Standards and Guidelines.   **(Lecture 08)**

Unit - V
Web and E-mail Security : Web Servers and Browsers, HTTP, Cookies, Caching, Plug-in, ActiveX, Java, JavaScript, Secure Socket Layer (SSL), Secure Electronic Transaction (SET). E-mail Risks, Spam, E-mail Protocols, Simple Mail Transfer Protocol (SMTP), Post office Protocol (POP), Internet Access Message protocol (ICMP). Secured Mail: Pretty Good Privacy (PGP), *S/MIME* (Secure/Multipurpose Internet Mail Extensions).   **(Lecture 08)**

Learning Outcome

By the end of this course a student should be able to:

- An overview of information security: confidentiality, integrity, and availability
- Malicious software (Viruses, Trojans, root kits, worms, botnets)
- Access control theory, access control matrix
- Information flow
- Security policies to prevent the threat from outside attack.
- Cybercrime and computer crime
- Intellectual property, copyright, patent, trade secret
- Hacking and intrusion
- Privacy, identity theft.
- Network Intrusion detection and prevention systems
- The inclusion of Firewalls will improve the filtration of contents.

Text Books
1. William Stallings "Cryptography and network security, principles and practices", Pearson
2. Gollmann, Dieter, "Computer Security", John Wiley & Sons Ltd.

References
1. Information Security Risk Analysis - Thomas R. Peltier, Third Edition, Pub: Auerbach,
2. Operating System Concepts, 8th Edition by Abraham Silberschatz, Peter B. Galvin, Greg Gagne, Pub: John Wiley & sons, Inc.,
3. Information security: Principles and Practice - Mark Stamp, 2nd Edition, Pub: John Wiley & Sons, Inc.,

*Latest editions of all the suggested books are recommended.

BCA – Semester I
MANAGEMENT CONCEPT AND ORGANIZATION BEHAVIORS

Course Code: BCA 109/213   **L-4, T-0, P-0, C-4**

Objective: The objectives of this subject are to enable
- to describe the nature and scope of management;
- to know the difference between management and administration;
- to understand the concepts of organizational behavior and its application in managing people

Course Contents
Unit - I
Introduction to Management: Meaning, nature and importance of management; Management functions; Management skills; Classical theories of management.   **(Lecture 08)**

Unit - II
Planning: Importance of planning; Types of plans; Planning and decision making process. Process of organizing; Organizational structure and design.   **(Lecture 08)**

Unit - III
Organizational Behavior: introduction to organizational behavior in management; Foundations of individual behavior-personality; Concept of perception & perception theories.   **(Lecture 08)**

Unit - IV
Concept of Course with theories, Concept of attitudes, Job design & job satisfaction. Concept of motivation with theories.   **(Lecture 08)**

Unit - V
Group: Foundations of group behavior; Leadership: power and politics. Organizational culture: Meaning, importance and characteristics of organization culture.   **(Lecture 08)**

Learning Outcome
By the end of this course a student should be able to:

- Understand how individual differences among employees affect organizational performance, including factors such as job attitudes, trust, personal values, perceptual processes and decision making.
- Apply motivation theories to leverage human capital.
- Learn to apply the research process to manage organizational issues related to human capital.
- Understand and apply group and team theories to optimize human performance in meeting organizational objectives
- Become adept at using the innovation process to develop and implement creative solutions to organizational issues, including product development.
- Understand the relationship between organizational culture and firm performance

- Understand and use a general behavioural process model which identifies organizational factors as the determinants of individual performance outcomes

Text Books:
5. Newstrom, John W. and Keith Davis, Organizational behavior: Human Behavior at Work,Tata McGraw-Hill, New Delhi.
6. Sharma, R.A., Organizational Theory and Behavior, Tata McGraw -Hill, New Delhi.
7. Prasad L.M., Principles and Practice of Management, Sultan Chand
8. Murugan and Shaktivel, Management Principles and Practices, New Age.

Reference Books:
6. Koontz, Harold, Cyril 'O' Donnell, And Heinz Weihrich, Essentials of Management, Fourth Edition, McGraw-Hill, Singapore.
7. Robbins, Stephen P. and Mary Koutler, Management, 5th ed., Prentice Hall of India Private Ltd., New Delhi.
8. Rendolph, Bobbitt, H., Organizational Behavior, 7th ed., Prentice Hall, New Jersey.
9. Srivastava & Chunawalla, Management Principles and Practices, Macmillan.
10. Koontz, Principles of Management, Tata McGraw Hill.

*Latest editions of all the suggested books are recommended.

BCA – Semester I
ENVIRONMENTAL STUDIES

Course Code: BCA 112/214   **L-4, T-0, P-0, C-4**

Objective: To create awareness among students about environment protection.

Course Content:

Unit I   **(Lectures 08)**

Definition and Scope of environmental studies, multidisciplinary nature of environmental studies, Concept of sustainability & sustainable development.

Ecology and Environment: Concept of an Ecosystem-its structure and functions, Energy Flow in an Ecosystem, Food Chain, Food Web, Ecological Pyramid& Ecological succession, Study of following ecosystems: Forest Ecosystem, Grass land Ecosystem & Aquatic Ecosystem & Desert Ecosystem.

Unit II   **(Lectures 08)**

Natural Resources: Renewable & Non-Renewable resources; Land resources and land use change;Land degradation, Soil erosion & desertification. **Deforestation**: Causes & impacts due to mining, Dam building on forest biodiversity & tribal population. **Energy Resources**: Renewable & Non-Renewable resources, Energy scenario & use of alternate energy sources, Case studies.
Biodiversity: Hot Spots of Biodiversity in India and World, Conservation ,Importance and Factors Responsible for Loss of Biodiversity, Biogeographical Classification of India

Unit III   **(Lectures 08)**

Environmental Pollutions: Types, Causes, Effects & control; Air, Water, soil & noise pollution, Nuclear hazards & human health risks, Solid waste Management; Control measures of urban & industrial wastes, pollution case studies

Unit IV   **(Lectures 08)**

Environmental policies & practices: Climate change & Global Warming (GreenhouseEffect),Ozone Layer - Its Depletion and Control Measures, Photo chemical Smog, Acid Rain Environmental laws: Environment protection Act; air prevention & control of pollution act, Water Prevention & Control of Pollution Act, Wild Life Protection Act, Forest Conservation Acts, International Acts; Montreal & Kyoto Protocols & Convention on biological diversity, Nature reserves, tribal population & Rights & human wild life conflicts in Indian context

Unit V   **(Lectures 08)**
Human Communities & Environment:

Human population growth; impacts on environment, human health & welfare, Resettlement & rehabilitation of projects affected person: A case study, Disaster Management; Earthquake, Floods & Droughts, Cyclones & Landslides, Environmental Movements; Chipko, Silent Valley, Vishnoi's of Rajasthan, Environmental Ethics; Role of Indian & other regions & culture in environmental conservation,

Environmental communication & public awareness; Case studies.

Field Work:

5. Visit to an area to document environmental assets; river/forest/flora-fauna etc.
6. Visit to a local polluted site: urban/ rural/industrial/agricultural.
7. Study of common plants, insects, birds & basic principles of identification.
8. Study of simple ecosystem; pond, river etc.

Learning Outcomes:

Based on this course, the Engineering graduate will understand / evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development.

Text Books:

4. "Environmental Chemistry", De, A. K., New AgePublishers Pvt.Ltd.

5. "Introduction to Environmental Engineeringand Science", Masters, G. M., PrenticeHall India Pvt. Ltd.

6. "Fundamentals of Ecology",Odem, E. P., W. B. Sannders Co.

ReferenceBooks:

3. "BiodiversityandConservation",Bryant, P. J., Hypertext Book

4. "Textbook of Environment Studies", Tewari, Khulbe&Tewari,I.K. Publication

*Latest editions of all the suggested books are recommended.

BCA – Semester II
English Communication & Soft Skills – II

Course Code: BCA249   **L-3,T-0,P-2,C-4**

Objective: To make students able to comprehend and express their views in simple and correct sentences.

Course Content:
Unit -1 Sentence Construction   **(06 hours)**
- a) Finite and Non Finite Verb
- b) Simple, Compound and Complex Sentence
- c) Conditional Sentence
- d) Narration: Direct and Indirect Speech
- e) Modals

Classroom Activity: (04 Hours)
Speaking: Enabling the students speak out simple, compound and complex sentences
Reading: Making the students pick out finite, non finite and modal verbs and comprehend their usage in the given passage
Writing: Enabling the students write different kinds of conditional sentences in direct and indirect speech

Unit -2 Presentation Techniques   **(06 hours)**
- a) Audience & Locale
- b) Audio-Visual Aids
- c) Organizing Contents
- d) Voice Dynamics
- e) Body Language
- f) Nuances of Speech Delivery

Classroom Activity: (04 Hours)
Listening: Involving the class listen to the speech delivered by students
Speaking: Enabling the students deliver a speech on different topics with the help of audio-visual aids
Reading: Asking the students read out technical and scientific paper
Writing: Making the students write a speech on current topics

Unit -3 Speaking Skills   **(02 hours)**
- a) Common Conversation: Situational and Structural
- b) JAM Session (Just a Minute Session) on various topics
- c) Describing a Scene, a Picture and an Event
- d) Extempore Speech

Classroom Activity: (08 Hours)
Listening: Involving the students listen to the conversation and speech made by their classmates
Speaking: Enabling the students speak on the given scene, picture, event and situation
Writing: Making the students write conversation and speech

Unit -4 Writing Skills   **(04 hours)**
   a) Principles of Paragraph Writing: Topic Sentence, Unity, Coherence
   b) Methods of Paragraph Writing
   c) Practice of Writing Paragraph
   d) Writing Application for Different Purposes

Classroom Activity: (06 Hours)
Writing: Making the students write paragraph and application for different purposes

Learning Outcome:
   - Students will be able to learn the basics of sentence construction.
   - They will be able to improve themselves in writing and speaking skills.
   - They will be able to comprehend and interpret various facets of life and nature.
   - They will be able to introduce themselves and others.
   - They will be able to deliver dialogues in different situations.

Text Books:
   1. Nesfield J.C., *English Grammar Composition & Usage*, Macmillan Publishers.
   2. Hornby A.S., *Guide to Patterns & Usage in English,* Oxford University Press, New Delhi.
   3. Allen W. S., *Living English Structure*, Pearson Publication, New Delhi.
   4. Allen W. S., *Living English Speech*, Orient Longman, New Delhi.
   5. Taylor Grant, *English Conversation Practice*, Tata McGraw Hill New Delhi.

Reference Books:
   1. Thomson A. J. & Martinet A. V., *A Practical. English. Grammar*, Oxford University Press, New Delhi.
   2. Martin & Wren - *High School English Grammar & Composition,* S.Chand & Co. New Delhi.
   3. Hornby A.S., *Oxford Advanced Learners Dictionary of Current English*, 7th Edition.
   4. McCarthy, Michael, *English Vocabulary in Use*, Cambridge University Press.
   5. Wood F. T., *A Remedial English Grammar for Foreign Students,* Macmillan India Ltd., Chennai, 1965.

BCA – Semester II
C—LANGUAGE LAB

Course Code: BCA 251   **L-0, T-0, P-4, C-2**

Course Contents

1) Given the values of the variables x, y and z, write a program to rotate their values such that x has the value of y, y has the value of z, and z has the value of x.
2) Write a program that reads a floating point number and then displays the right-most digit of the integral part of the number.
3) The distance between two cities (in Km) is input through the keyboard. Write a C program to convert and print this distance in meter, feet, inches and centimeter.
4) If a five-digit number is input through the keyboard, write a C program to calculate the sum of its digits without using loop.
5) If a four-digit number is input through the keyboard, write a C program to obtain the sum of thefirst and last digit of this number.
6) Program to find largest and smallest number from four given number.
7) Program to find whether a year is leap or not.
8) Program to find out the grade of a student when the marks of 5 subjects are given. The methodof assigning grade is as—

    | Per >= 85 | Division=First | grade=A+ |
    | Per< 85 and Per>= 70 | Division=First | grade=A |
    | Per< 70 and Per>= 60 | Division=Firs | grade=B+ |
    | Per< 60 and Per>= 50 | Division=Second | grade=B |
    | Per< 50 and Per>= 40 | Division=Third | grade=C |
    | Per < 40 | Division=Fail | grade= Fail |

9) A library charges a fine for every book returned late. For first 5 days the fine is 50 paise, for 6-10daysfineisonerupeeandabove10 daysfineis5 rupees.Ifyoureturnthebookafter 30 daysyour membership will be cancelled. Write a program to access the number of days the member islate to return the book and display the fine or the appropriate message.
10) Write a C program in which enter any number by the user and perform the operation ofproduct of digits of entered number.
11) Write a C program in which enter any number by the user and perform the operation of Sum ofdigits of entered number.
12) Write a C Program to convert Decimal number to Binary number.
13) Find the sum of this series upto n terms
    1+2+4+7+11+16+………..
14) Program to print Armstrong's numbers from 1 to 10000.
15) Program to find the sum of digits of a number until the sum is reduced to 1 digit.
    For example: 538769→ 38→11→2
16) Write a program to convert years into
    1. Minute
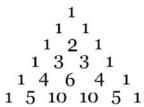   2. Hours
    3. Days
    4. Months
    5. Seconds
    Using switch () statements.
17) Write a C menu driven program that will perform the following operation.

1. Generate Fibonacci series as per given range which is entered by the user.
2. Print all the prime number between 1 to 300.
3. Exit

18) Write a C Program that will perform the logic of Perfect number.

19) Write a program to generate the following pattern –

  i. A   B   C   D   C   B   A

      A   B   C   C   B   A

      A   B   B   A

      A   A

  ii.

```
        1
      1   1
     1  2  1
    1  3  3  1
   1  4  6  4  1
  1  5  10 10 5  1
```

20) Write a currency program, which tells you how much numbers of 100, 50,20,10,5,2 and 1 Rsnotes will be needed for a given amount of money. For example if the total amount is Rs. 545then five 100 Rs. notes, two 20 Rs. Notes and one 5 Rs. Note will be needed.

Programs related to function:

1) Write a C program to perform the factorial of given number.

2) Write a C program that input numbers and display one of the following as per the desire of theuser:
    a. Sum of the numbers
    b. Difference of the numbers
    c. Product of the numbers
    d. Division of the numbers
    e. Exit
Provide separate functions for performing various tasks as Calculating.

3) Write a C program to find the sum of the following series using function.
X – X3/3! + X5/5! – X7/7! …….

4) Write a C program in which a function prime that returns 1 if its argument is a prime and returnzero otherwise.

5) Write a C program to perform the operation of $^nP_r$and operation of ^nC_rusing separate function.

6) A positive integer is entered through the keyboard. Write a function to obtain the prime factorsof this number.

7) Write a C program using function that find out the 4th bit of given number is on or off.

Program related to Recursion:

1) Write a C program to calculate factorial of a number using recursion. Number being entered byuser.

2) Write a C program to generate Fibonacci series using recursion. The user enters the limit ofseries.

3) Write a C Program to print the reverse of an integer number entered by user

Program related to Array:

1) Write a C program to count the number of positive, negative and zero number in the given listof numbers.

2) Write a C program for swapping of two arrays as per indexes accordingly both array have thesame size.
3) Write a C program in which enter 10 elements by the user and perform the operation of sortingin ascending order.
4) WAP to enter an integer array of size 10 and perform following operations on it.
   a. Display the Elements.
   b. Calculate the Sum and Average of Array.
   c. Find largest element.
   d. Find second largest element.
   e. Find the Smallest element.
   f. Display the Array in Reverse order.
   g. Exit
5) Write a C program to perform following operation on it.
   a. Generate n * n Matrix.
   b. Display n * n Matrix.
   c. Perform operation of Addition in two n * n Matrix.
   d. Perform operation of Subtraction in two n * n Matrix.
   e. Perform operation of Multiplication in two n * n Matrix.
   f. Exit
   Form perform every option generate a separate function.
6) Write a C program to perform following operation on it.
   a. Generate n * n Matrix.
   b. Display n * n Matrix.
   c. Perform operation of transpose of an n * n Matrix.
   d. Perform operation of sum of diagonal element of an n * n Matrix.
   e. Exit
   Form perform every option generate a separate function.
7) Write a program to search a given element in an Array using function if the element foundthen returns its position.

Programs related to String and Pointer:
1) Write a program to read a name through the keyboard. Determine the length of the string andfind its equivalent ASCII codes.
2) Write a program to remove the Occurrences of "The" word from entered text.
3) Write a program to delete all the occurrences of the vowels in a given text. Assume that the textlength will be of one line.
4) Write a program to copy the content of one string into another string using pointer and function.
5) Write a program to find that two strings are identical or not using pointer and function.

Programs related to Structure and Union:
1) Suppose you need to generate a result table which consists of student id, student name, marksof three subject and total marks. Write a program which takes input for ten students and displaysresult table. Also display student information separately who got the highest total. USE STUCTURES.
2) Suppose you need to store information of 10 persons. Information includes name and age. But criteria is: for the child age should be in form of full birth date, for an adult the age should be inyears only, while for aged person store age indicating the status 'O'. Use union for memory efficiency.
3) Write a program to maintain the library record for 100 books with book name, author's

name, and edition, year of publishing and price of the book.

Learning Outcome
By the end of this course a student should be able to:

- Explain the processes by which a C programme is compiled.
- Write basic C programs with variables and arithmetic operators.
- Use appropriate C programming statements to control flow of execution in a C programme.
- Design C programmes that are modular.
- Exercise good programming practices in the design of Programmes.

BCA – Semester II
WEB TECHNOLOGIES LAB

Course Code: BCA 255   **L-0, T-0, P-4, C-2**

Course Contents

1. Create a simple HTML document about yourself or a topic of your choice using the basic tags learned in the first lesson.
2. Add bold and italic words to your document, save and view.
3. Add a header to your document, save and view.
4. Add paragraph and break tags to your document, save and view.
5. Add a horizontal rule where appropriate, save and view.
6. Add an unordered list to your document, save and view.
7. Add an ordered list to your document, save and view.
8. Add a definition list to your document, save and view.
9. Create a new file called *yournamefile2.htm* (it can be very basic).
10. Create a link to Yahoo (*http://www.yahoo.com*).
11. Create a link from *yournamefile2.htm* to *yournamefile1.htm*.
12. Create a page that shows the different types of heading available and show each in the same page.
13. Open one of your HTML files in your editor.
14. Add an image to your document using the tag, <IMG SRC="image.gif"> (Note**: image.gif** is a generic name. Your image may be **horse.gif** or **scenery.gif**. *Also, the image must be placed in the same directory or folder as your HTML file.* Although the image *can* be in another directory, the way to reference that image in your image tag isn't a part of this exercise). Save and view.
15. Align a short description to the bottom of your image, save and view.
16. Align the description to the top of the image, save and view.
17. Add a simple table to *yournamefile1.htm* without borders. Make the table with 2 rows and columns, save and view.
18. Add border value of 1, save and view.
19. Add a border value of 5, save and view.
20. Make the top row a table header, save and view.
21. Align all data elements to the middle of their cells, save and view.
22. Center one of your headers in *yournamefile1.htm*, save and view.
23. Center your image, save and view.
24. Align the image to the right, save and view.
25. Put a border around the image with a value of 1; save and view each.
26. Add a horizontal rule that is aligned to the left, is 50% of the width of the page and has a size value of 5, save and view.
27. Give some text (non-header) a font size value of +3, save and view.
28. Put a background color and text color on your page. In order to do this you must obtain the hexadecimal value for the color you want to use. The hex values are at the top of each color swatch (a 6 digit alpha-numeric number). Just plug the value in at the appropriate place in your **Body** tag.
29. Add title and footer to each page you have created till now.
30. Draw a home page of the 'Teerthankar Mahaveer University' (with tables).

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31. Design a website that displays the information about the total courses offered by the university. The website should show the information about each subject in a well formatted manner. Use proper images and colors in the website.
32. Create the gallery page of the "Teerthankar Mahaveer University". In this page the different thumbnails of the pictures should be there and on the click the big picture should be seen in a new window.
33. Create a contact page of the university. The different types of controls should be seen there.

Program related to CSS
1. Create a page that will show the inline style of css.
2. Create a page that will show the embedding style of css.
3. Create a page that will show the different types of selectors
4. Create a page that will be done by the file style of CSS.
5. Create a page that will show the different types of property in CSS.
6. Create a page that will display the user information. The formatting will be done by the inline cascading style sheet.
7. Create a web page that will display the different style on a single page using the single style sheet with the help of DIV Tag.
8. Create a web page that will display the different ten properties of style sheet like margin, align, float etc.

Program related to JavaScript
1. Write a JavaScript program which contain a Textbox and a submit button. To perform the operation of calculate the sum of its digits as per click on the submit button.
2. If a five digit number input through the keyboard in the textbox, to perform logic of reverse the number as per click on submit button.
3. If a five digit number is input through the keyboard, write a JavaScript program to print a new number by adding one of each of its digit which will be input in the Textbox. For example if the number that is input 12391 then the output should be displayed as 23402 as per click on submit button.
4. According to the Gregorian calendar, it was Monday on the date 01/01/1990. If any year is input through the keyboard write a JavaScript program to find out what is the day on 1st January of this year.
5. A library charges a fine for every book returned late. For first 5 day the fine is 50 paise, for 6-10 days fine is one rupee and above 10 days fine is 5 rupees. If you return the book after 30 days your membership will be cancelled. Write a JavaScript program to accept the number of days the member is late to return the book and display the fine or the appropriate message as per click on the submit button.
6. If the three sides of a triangle are entered through the keyboard in three textbox, write a program to check whether the triangle is isosceles, equilateral, scalene or right—angled triangle as per click on the submit button.
7. Write a JavaScript program that performs the logic of prime number finding between 1 to 300. But condition is that it will print all the number in reversing order.
8. Write a JavaScript program that performs the logic of Fibonacci series as per given range. But condition is that it will reverse order.
9. Write a menu driven program which has following option:
   a. Factorial of a number
   b. Armstrong or not

  c. Odd or even

  d. Magic number or not

  e. Perfect number or not

10. Write a javascript general—purpose function to convert any given year into the textbox. The following table shows the roman equivalents of decimal numbers:

Decimal	Roman	Decimal	Roman
1	i	100	c
5	v	500	d
10	x	1000	m
50	L		

Example:

Roman equivalent of 1988 is mdccclxxxviii

Roman equivalent of 1525 is mdxxv

11. A positive number entered through the keyboard. Write a JavaScript function to obtain the prime factors of this number. For example, prime factors of 24 are 2,2,2 and 3, whereas prime factor of 35 are 5 and 7.

12. Write a JavaScript program in which 25 numbers are entered from the keyboard into an array. Write a program to find out how many of them are positive, how many are negative, how many are even and how many are odd.

13. Implement the selection sort, bubble sort and insertion sort algorithm on a set of 25 number using JavaScript.

14. Write a JavaScript program to interchange the odd and even components of an array.

15. Create a JavaScript Program which count how many character are placed in the text area. This application contain two Button one for Total Count and another for showing the content and counting character.

16. Write a JavaScript program in which contain 3 Textbox which contain day, month, year from user and a button, onclick on that button you will find the days of week.

17. Write a JavaScript program in which browser contains a textbox and a button. Perform sum the digit from 1 to range of digit which u have enter in the textbox and show the sum of the digit as per given range in the alert massage with word conversion.

18. Write a JavaScript Stopwatch program in which browser contains two Textbox and a button: one Textbox contain predetermine time and another Textbox contain Times as per decreasing order according to First Textbox when clicking on button when the time is 00:00:00 then you will get a alert massage.

19. Write a JavaScript program in which browser contains a textbox and a button. Perform the following validation when hit on the Button

  a. The textbox field would not be Blank

  b. Check the length of the input string in to the Textbox it would not be less than 3 and greater than 10. If the range is less than 3 and greater than 10, than perform a alert massage with the range of string.

20. Write a JavaScript Stopwatch program in which browser contains two Textbox and a button: one Textbox contain predetermine time and another Textbox contain Times as per increasing order start from 00:00 the clock will raise an alert message when the time will same as the time on first Textbox.

21. Write a JavaScript Program that will find out how many days left in this month.

22. Write a JavaScript Program that will contain a input box that will show the visitor how long they have been on your page. Time is running in increment operation.
23. When someone visits your web page, JavaScript will start the clock. When the leave that page, they will be alerted with the time they have been viewing the page.
24. Perform the Checkbox Validation using JavaScript.
25. Perform Phone Number Validation using JavaScript.
26. Perform Date Validation sing JavaScript.
27. Perform Email address Validation using JavaScript.
28. Write a JavaScript Program that will validate credit card entry.
29. Write a JavaScript program in which browser contains three textbox and a button. Perform the following operation and validation as per First textbox contain FirstName and Second Textbox contain Lastname in Proper Case. The Third Textbox contains UserId as per this rule when u hit on the Submit Button. The rule is userId contain 6 Character from the starting of Last Name and 1 cheracter of the firstname from starting after concatenate show this string as a userId in the third Textbox. If the Last Name has not 6 Character than collect all the character from the Last name and swap remaining blank from – and concatenate first character of First Name.

Example:-   First Name   Ram

                   Last Name   Laxman

                   UserID   LaxmanR

But If

                   First Name   Ram

                   Last Name   Laxm

                   UserID   Laxm—R

- Only Characters are Allowed in text Box
- Blank Text Box Not Allowed
- Locked UserID Text Box Mean no one can Change the Content.

Learning Outcome

1. Understand the various steps in designing a creative and dynamic website.
2. They will able to write html, JavaScript, CSS codes .
3. They will have clear understanding of hierarchy of objects in HTML and XML.
4. Finally they can create good, effective and customized websites.
5. Know regarding internet related technologies. Systematic way of developing a website.
6. Design dynamic and interactive web pages by embedding Java Script code in HTML. Use Java Script to validate user input.
7. Know the advantages and use of different types of CSS.

BCA – Semester III
DATA STRUCTURE USING C

Course Code: BCA 302   **L-4, T-1, P-0, C-5**

Objective: To give an overview about how the data organizes and the techniques to organize the data. Develop good understanding of how operations are performed on data in various data structures including hierarchical representation. To develop a base for advanced computer science study.

Course Contents

Unit-I
Introduction: Basic Terminology, Elementary Data Organization, Data Structure operations, Algorithm, Complexity and Time-Space trade-off. **Arrays:** Array Definition, Representation and analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C, Character string operation.   **(Lecture 08)**

Unit-II
Stack: Array Representation and Implementation of stack, Operations on Stack: Push & Pop, Linked Representation of Stack and Operations Associated with Stack, Applications of stack: Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using Stack. **Queue:** Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, and Circular queue.   **(Lecture 08)**

Unit-III
Linked list: Representation and Implementation of Singly Linked List, Traversing and Searching of linked List, Overflow and Underflow, Insertion and deletion to/from Linked List, Insertion and deletion algorithms, Doubly linked list, Circular List, Linked List v/s Array.
                                                                            (Lecture 08)
Unit-IV
Sorting: Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort, and Heap Sort. Comparative Analysis of above Sorting algorithms. **Searching:** Sequential search, Binary Search.   **(Lecture 08)**

Unit-V
Trees: Basic terminology, Binary Trees, Binary tree representation, algebaric Expressions, Complete Binary Tree, Array and Linked Representation of Binary trees, Traversing Binary tree, Binary Search Tree. **Graph:** Basic terminology, Graph representation using adjacency matrix, Graph representation using adjacency list.   **(Lecture 08)**

Learning Outcome
By the end of this course a student should be able to:

- Appreciate the need for optimized algorithm.
- Able to walk through insert and delete for different data structures.
- Ability to calculate and measure efficiency of code .
- Able to walkthrough algorithm.
- Improve programming skills.

Text Books:

1. Lipschutz, Data Structure, Tata McGraw Hill.
2. Tenenbaumet. al A.M., Data Structures Using C & C++, Prentice Hall of India.
3. KanitkarYashwant, Data Structure Using C, BPB.
4. Salaria R.S., Data Structure Using C, Khanna Publishers.

Reference Books:
1. Horowitz and Sahani, Fundamentals of Data Structures, Galgotia.
2. Kruse et.al R., Data Structures and Program Design in C, Pearson Education.
3. Cormen T. H., Introduction to Algorithms, Prentice Hall of India.
4. Loudon K., Mastering Algorithms with C, Shroff Publisher & Distributors.
5. Bruno R Preiss, Data Structures and Algorithms with Object Oriented Design Pattern in C++, John Wiley & Sons Inc.
6. Adam Drozdek, Data Structures and Algorithms in C++, Thomson Asia.

*Latest editions of all the suggested books are recommended.

BCA – Semester III
OPERATING SYSTEM

Course Code: BCA 306   **L-4, T-1, P-0, C-5**

Objective: :This course has theory component to teach you the concepts and principles that underlie modern operating systems. In this component, you will learn about processes and processor management, concurrency and synchronization, memory management schemes, file system and secondary storage management, security and protection, etc.

Course Contents

Unit - I
Introduction to the Operating System (OS), Types of Operating System: Batch System, Time Sharing System, Real Time System. Multi Programming, Distributed System, Functions and Services of OS.   **(Lecture 08)**

Unit - II
Process Management: Process Concept, Process State, Process Control Block, Process Scheduling, CPU Scheduling - Scheduling Criteria, Scheduling Algorithms, Preemptive & Non Preemptive Scheduling.   **(Lecture 08)**

Unit - III
Deadlocks-System model, Characterization, Deadlock Prevention, Deadlock Avoidance and Detection, Recovery from deadlock.   **(Lecture 08)**

Unit - IV
Memory Management: Logical Address, Physical Address, External and Internal Fragmentation. Concept of paging, Page table structure - Hierarchical Paging, Hashed Page Tables, Inverted Page Table.

                                                                      (Lecture 08)
Unit -V
Information Management: File Concept, Access Methods, Directory Structure. Device Management: Disk Structure, Disk Scheduling Algorithms.   **(Lecture 08)**
Learning Outcome
By the end of this course a student should be able to:

- Understand the basic working process of an operating system.
- Understand the importance of process and scheduling.
- Understand the issues in synchronization and memory management.

Text Books:
1. Silbershatz and Galvin," Operating System Concept", Addition Weseley, .
2. Nutt, G., "Operating Systems", Addison-Wesley.
3. GodboleAhyut, "Operating System", PHI.

Reference Books:
1. 1.Flynn, Mchoes, "Understanding Operating System", Thomson Press, Third Edition,
2. Tannenbaum,"Operating System Concept", Addition Weseley.
3. Joshi, R. C. and Tapaswi, S., "Operating Systems", Wiley Dreamtech.

*Latest editions of all the suggested books are recommended.

BCA – Semester III
DATABASE MANAGEMENT SYSTEM

Course Code: BCA 312   **L-4, T-1, P-0, C-5**

Objective: This syllabus design is an attempt to provide the basic information about database management system and the development. It will also provide the basic conceptual background necessary to design and develop simple database application. The major objective of this subject are :

- Provide an introduction of DBMS and their use
- Describe the main features and function of the DBMS
- Describe the features of relational database and E-R models
- Implement SQL queries
- Draw ER diagrams
- Design database.

Course Contents

Unit I
Introduction: An overview of database management system, Database System Vs File System, Database system concepts and architecture, data models schema and instances, data independence and data base language and their interfaces, Data definition language, DML, Overall Database Structure.

(Lectures 08)

Unit II
Data modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagram to tables, extended ER model.

Relational data Model and Language: Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra.

(Lectures 08)

Unit III
SQL: Characteristics of SQL, Advantages of SQL, SQL data types and literals, Insert, update and delete operations ,sub queries, Aggregate functions, Joins, Unions, Intersection, Minus operations. Roles and Privileges.

(Lectures 08)

Unit IV
Data Normalization: Functional dependencies, Normal form up to 3rd normal form & BCNF
Transaction Processing Concepts: Transaction system, testing of serializability, Serializability of schedules, conflict & view serializable schedule, recoverability, Recovery from transaction failures.

(Lectures 08)

Unit V
Concurrency Control Techniques: Concurrency control, locking Techniques for concurrency control, Time stamping protocols for concurrency control, validation based protocol, multiple granularity. Overview of recovery techniques and Database Security.

(Lectures 08)

Learning Outcome

By the end of this course a student should be able to:

- Understand, appreciate and effectively explain the underlying concepts of database technologies

- Design and implement a database schema for a given problem-domain

- Normalize a database

- Populate and query a database using SQL DML/DDL commands.

- Declare and enforce integrity constraints on a database

- Design and build a GUI application using a 4GL

- Concept of transaction and concurrency.

Text Books :
1. Silberschatz Abraham, Korth Henry &Sudarshan S., Database Systems Concepts, McGrawHill,.
2. Elmarsi R. &Navathe S.B., Fundamentals of Database Systems, Addison Wesley,.
3. Date C.J., An Introduction to Database Systems, Addition Wiley.
4. Alexis Leon&Mathews Leon," Fundamentals of Database Management Systems ",LeonVikasPublication.

Reference Books:
1. Melton Jim& Simon Alan, Understanding the New SQL: A Complete Guide, Morgan Kaufmann Publishers,
2. Majumdar A. K. &Battacharya P., Data Base Management Systems, Tata McGraw Hill,
3. Bipin Desai, An Introduction to Database Systems, Galgotia Publications,.

*Latest editions of all the suggested books are recommended.

BCA – Semester III
COMPUTER NETWORK

Course Code: BCA 309 **L-3, T-1, P-0, C-4**

Objective: The Objective of this subject is to provide the Fundamental Knowledge of Computer Networks and to provide the knowledge of some recent trends in Computer Networks.

Course Contents

Unit - I
Introductory Concepts: Goals and Applications of Networks, Network structure and architecture, the OSI reference model, services, networks topology, Physical Layer-transmission, switching methods, Integrated services digital networks. **(Lecture 08)**

Unit - II
Medium access sub layer: Channel allocations, LAN protocols, ALOHA Protocols- Pure ALOHA, slotted ALOHA, Carrier Sense Multiple Access Protocols, CSMA with Collision Detection, Collision free Protocols, IEEE standards, Ethernet, Error correction & detection algorithms, elementary data link layer protocols, sliding window protocols, error handling, High Level Data Link Control . **(Lecture 08)**

Unit - III
Network Layer: Point-to Point networks, concept of virtual circuit and LAN, routing algorithms, congestion control algorithms, internetworking, TCP/IP protocol, UDP, SCTP, IP addresses, IPv6 Packet Format , Subneting. **(Lecture 08)**

Unit - IV
Transport Layer: Design issues, connection management, Internet Transport Protocol (UDP), Ethernet transport Protocol, Transmission Control Protocol. (TCP). **(Lecture 08)**

Unit - V
Application Layer: Domain Name System, Simple Network Management Protocol, Electronic mail, File Transfer Protocol, Hyper Text Transfer Protocol, Introduction to Cryptography and Network Security Communication Security (IPSec, Firewalls). Implement a program for encryption a text with network security algorithm. **(Lecture 08)**

Learning Outcome
By the end of this course a student should be able to:

- Explain the importance of data communications and the Internet in supporting business communications and daily activities.
- Explain how communication works in data networks and the Internet.
- Recognize the different internetworking devices and their functions.
- Explain the role of protocols in networking.
- Analyze the services and features of the various layers of data networks.
- Design, calculate, and apply subnet masks and addresses to fulfill networking requirements.

Text Books:
1. Computer Networks by A. S Tanenbaum", Pearson education
2. Data and Computer Communication by W. Stallings, Macmillan Press
3. Computer Networks & Internet with Internet Applications by Comer Pearson Education
4. Internetworking with TCP/IP by PHI
5. Data Communication and Networking by Forouzan TMH

Reference Books:
1. Computer Networks with Internet Protocols by W Stallings, Pearson Education
2. Local and Metropolitan Area Networks by W Stallings, Pearson Education

*Latest editions of all the suggested books are recommended.

BCA – Semester III
SYSTEM ANALYSIS AND DESIGN

Course Code: BCA 308   **L-3, T-1, P-0, C-4**

Objective: This subject aims to provide an understanding of the role of system analysis and design within various system development life-cycle, to develop an awareness of the different approaches that might be taken to system analysis and design and also to understand the activities of the system analyst and system designer, apply some current techniques.

Course Contents

Unit - I
System Definition and concepts: General Theory system, Manual and automated system, Real life Business Sub-Systems. System Environments and Boundaries, Real-time and distributed system, Basic principles of successful system, Approach to system development: Structured System Analysis and Design, Prototype, Joint Application Development, Role and Need of System Analyst.   **(Lecture 08)**

Unit - II
Introduction to System Development Life Cycle (SDLC), Various phases of SDLC: System Analysis, Design, Development, Implementation, Maintenance; Documentation: Principles of System Documentation, Types of documentation and their importance.   **(Lecture 08)**

Unit - III
Data and fact gathering techniques: Interviews, Group Communication -Questionnaires; Assessing Project Feasibility: Technical, Operational, Economic and Cost Benefits Analysis. Modern Methods for determining system requirements: Joint Application Development Program, Prototyping, Business Process Re-engineering. System Selection Plan and Proposal.
                                                                         (Lecture 08)
Unit - IV
Module specifications, Top-down and bottom-up design, Module coupling and cohesion, Structure Charts. Process Modeling, Logical and physical design, Conceptual Data Modeling: Entity /Relationship Analysis, Entity-Relationship Modeling, ERDs and DFDs. Process Description: Structured English, Decision Tree, Decision Table, Data Dictionary. **(Lecture 08)**

Unit - V
Classification of forms, Input/output forms design, User-interface design, Graphical interfaces. Standards and guidelines for GUI design, Designing Physical Files and Databases: Designing Fields, Designing Physical Records, Designing Physical Files, Designing Databases, System planning considerations, Conversion methods, procedures and controls, Testing and Validation, Preparing User Manual, Maintenance Activities and Issues.   **(Lecture 08)**

Learning Outcomes

By the end of this course a student should be able to:

- Gather data to analyze and specify the requirements of a system.
- Design system components and environments.
- Build general and detailed models that assist programmers in implementing a system.

- Design a database for storing data and a user interface for data input and output, as well as controls to protect the system and its data.

Text Books:
1. E M Awad, 'Systems Analysis and design', Galgotia(P) Ltd.
2. Whitten J. L, Bentley L. D, 'Systems Analysis and Design Methods', Tata McGraw-Hill.
3. A. Dennis and B. H. Wixom, 'Systems Analysis and Design', John Wiley & Sons, Inc.

Reference Books:
1. A Hoffer, F George, S Valaciah, **'**Modern System Analysis & Design' Low Priced Edition,Pearson Education.
2. V K Jain, 'Systems Analysis and design', Dreamtech Press.

*Latest editions of all the suggested books are recommended.

BCA – Semester III
OBJECT ORIENTED PROGRAMMING CONCEPT AND UML

Course Code: BCA 310   **L-3, T-1, P-0, C-4**

Objective: To provide the students the overview of the Object Oriented Programming approach and the benefits of this approach. Also its aim to provide the basic understanding of the UML.

Course Contents

Unit-I
Introduction: Introduction to Computing and Programming Paradigms, Introducing Object Oriented Approach, History of Object Oriented Programming, Comparing with other paradigms, Benefits of OOP and Application of OOP.   **(Lecture 08)**

Unit-II
Design: Real World Modeling and Relationships, OOP and control flow, Object Oriented analysis and design, Object Relational mapping, State Diagrams.   **(Lecture 08)**

Unit-III
Objects and Class: Overview of Class and Object, States identity and behavior of objects, Data Abstraction and Encapsulation, Dynamic Dispatch and message passing.   **(Lecture 08)**

Unit-IV
Inheritance: Type of Inheritance, Applications of Inheritance, Design constraints, Polymorphism: Types of polymorphism, Implementation Aspects: Static and Dynamic polymorphism.

                                                                 (Lecture 08)
Unit - V
UML : What is UML, What is Modeling, UML Diagrams, Use Case Diagram, Class Diagram, Activity Diagram, Package Diagram, State-TransitionDiagram, Sequence Diagram, Collaboration, Diagram Component Diagram.   **(Lecture 08)**
Learning Outcome
By the end of this course a student should be able to:

- Specify simple abstract data types and design implementations, using abstraction functions to document them.
- Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.
- Name and apply some common object-oriented design patterns and give examples of their use.
- Design applications with an event-driven graphical user interface.

Text books:
1. Designing Flexible Object Oriented systems with UML- Charles Ritcher
2. Object Oriented Analysis & Design, Sat/.inger. Jackson, Burd Thomson
3. Object oriented Modeling and Design with UML-James Rumbaugh, MichealBlaha

Reference Books:
1. The Unified Modeling Language User Guide-Grady Booch, James Rumbaugh, Ivar Jacobson.
2. Object Oriented Modeling and Design-James Rumbaugh

BCA – Semester III
MICROPROCESSOR AND PERIPHERALS

Course Code: BCA 311   **L-3, T-1, P-0, C-4**

Objective:
- To understand basic architecture of 8 bit and 16 bit microprocessors.
- To understand interfacing of 16 bit microprocessor with memory and peripheral chips involving system design.
- To understand techniques for faster execution of instructions and improve speed of operation and performance of microprocessors.
- To understand RISC and CISC based microprocessors.
- To understand concept of multi core processors.

Course Contents

Unit - I
Introduction: Overview of Microcomputer Structure and Operation, Evolution of Microprocessor, Microcontroller, Microprocessor Architecture and its basic operation, Microprocessor applications – Microprocessor based system design aids and peripherals.
                                                                        (Lecture 08)

Unit -II
Introduction to 8-bit Microprocessors: 8085 Microprocessor Architecture, Register Structure, Instruction Set, Interrupt Structure, Bus Organization, Overview of the instruction groups of 8085 and the addressing modes. Introduction to 16-bit Microprocessors: Architecture of 8086, Register Organization, Addressing Modes, Instruction Set, Interrupts and Interrupt Service Routines (ISR's), 8086 pin functions, Bus operation, Memory segmentation, Clock generator, Memory Buffer**.**   **(Lecture 08)**

Unit -III
Assembly Language Programming: Basic syntax of 8086 Assembly language, Instruction templates, Assembly language program development tools, Arithmetic and Logic instructions, Program Control Instructions (jumps, conditional jumps), Loops, Instruction timing and delay loops, Handling Strings, Procedures, Assembler Directives**.**   **(Lecture 08)**

Unit -IV
Microprocessor based Interfacing: Programmed I/O, Interrupt Driven I/O, DMA, Parallel I/O, Programmable Interrupt Controller, and DMA Controller. Interfacing of the Peripheral Controllers, Keyword and Display Interface using 8255**.**   **(Lecture 08)**

Unit -V
Advanced Microprocessor: Introduction to bit slice processor, signal processing processor, Overview of the Pentium Processor, Hyper Threading, Core-2-duo, RISC architecture Of IBM, CISC architecture of SUN SPARC.   **(Lecture 08)**

Learning Outcome:

By the end of this course a student should be able to:

- Students should be able to solve basic binary math operations using the microprocessor. / microcontroller
- Students should be able to demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target microprocessor / microcontroller.
- Students should be able to program using the capabilities of the stack, the program counter, and the status register and show how these are used to execute a machine code program.
- Students should be able to apply knowledge of the microprocessor's internal registers and operations by use of a PC based microprocessor simulator.

Text Books:
1. "Microprocessor Architecture, Programming, and Applications with the 8085", Gaonkar, Ramesh S., Pen Ram International Publishing.
2. "Advanced Microprocessors and Peripherals: Architecture Programming and Interfacing", Ray, A.K. &Burchandi, K.M. Tata McGraw Hill.
3. "Microprocessors Interfacing", Hall D.V., Tata McGraw Hill.
4. "Microprocessors and Microcontrollers", B.P. Singh &Renu Singh, New Age International.
5. "Advance Microprocessor", Deniel Tabak, TMH.
6. "The 8088 and 8086 Microprocessors", Triebel & Singh, Pearson Education.
7. "IBM PC Assembly Language & Programming", Peter Abel, PHI.
8. 8086 Microprocessor Programming and Interfacing the PC, Kenneth Ayala.

Reference Books:
1. "Microcomputer Systems: The 8086/8088 Family", Liu and Gibson G.A., Prentice Hall (India).
2. "INTEL microprocessors", Brey, Barry B., Prentice Hall (India).
3. "Advanced Microprocessor & Interfacing", Ram B., Tata McGraw Hill.
4. "Microprocessors and Interfacing & Applications", Renu Singh & B.P. Singh, New Age International.

*Latest editions of all the suggested books are recommended.

BCA – Semester III
English Communication & Soft Skills – III

Course Code: BCA349   **L-3,T-0,P-2,C-4**

Objective: To make students learn basics of communication through business correspondence, oral and technical presentation.

Course Content:

Unit -1 Basics of Communication   **(06 hours)**
   a) Language as a Tool of Communication
   b) Meaning and Definition of Communication
   c) 7 Cs of Communication
   d) Kinds and Process of Communication
   e) Importance of communication
   f) Barriers to Communication

Classroom Activity: (04 Hours)
Listening: Involving the students listen lectures on the above topics delivered by their teacher
Speaking: Enabling the students speak on different topics
Reading: Asking the students read the topics from books and class notes
Writing: Making the students write on the given topics

Unit -2 Forms of Technical Communication   **(06 hours)**
   a) Report Writing: Project Report, Thesis and Dissertation Writing, Structure of Report and Steps towards Report writing
   b) Proposal Writing: Essentials of Proposal Writing, Types of Proposal and Structure of Proposal
   c) Technical/Scientific Paper Writing: Essentials of Technical/Scientific Paper Writing
   d) Difference between Technical Communication (Objective Style) and General Writing (Literary Composition)

Classroom Activity: (04 Hours)
Writing: Making the students write different kinds of report, proposal and technical paper

Unit -3 Business Correspondence   **(06 hours)**
   a) Principles of Business Correspondence
   b) Business Letters: Sales Letter, Claim or Complaint Letter, Credit Letter, Letters of Enquiry
   c) Bio-Data, Resume and Curriculum Vitae
   d) Job Application (Cover Letter), Joining Report and Resignation Letter
   e) Writing Email, Notice, Circular and Press Note
   f) Preparing Agenda and Minutes of the Meeting

Classroom Activity: (04 Hours)
Writing: Making the students write different kinds of business correspondence

Unit -4 Oral Communication   **(04 hours)**

a) Art of Public Speaking: Welcome Speech, Introductory Speech, Vote Of Thanks, Farewell Speech and Extempore Speech
b) Role Play in diverse situations
c) Debate on current issues
d) Ad made Show

Classroom Activity: (06 Hours)
Listening: Involving the students listen lectures on theoretical part delivered by their teacher
Speaking: Enabling the students deliver various kinds of speech and play role in diverse situations
Writing: Making the students write important points during debate

Text Books:
1. Raman Meenakshi & Sharma Sangeeta, *Technical Communication-Principles & Practices* O.U.P. New Delhi. 2008.
2. Chabbra T. N., *Business Communication*, Sun India Pub. New Delhi.

Reference Books:
1. Ruther Ford A., *Basic Communication Skills*, Pearson Education, New Delhi.
2. Sehgal M.K. & Khetrapal Vandana, *Business Communication*, Excel Books, New Delhi.
3. Mitra Barun K., *Effective Technical Communication*, O.U. P. New Delhi.
4. Mishra Sunita & Muraliksishra C., *Communication Skills for Engineers,* Pearson Education, New Delhi.

Learning Outcome:
1. Students will be able to learn fundamentals of communication.
2. They will be able to learn various kinds of business correspondence and technical communication.
3. They will be able to make extempore speech.
4. They will be able to learn the art of public speaking.
5. They will be able to play various kinds of role in different situations.
6. They will be able to demonstrate innovative ideas through Ad –made shows.
7. They will be able to express their views during debate.

BCA – Semester III
DATA STRUCTURE USING C LAB

Course Code: BCA 354   **L-0, T-0, P-4, C-2**

Course Contents

Program based on:
Array: Insertion of element in an array, deletion of element from an array.
Sorting : Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Two Way Merge Sort and Heap Sort.
Searching: Sequential search, binary search.
Stack: Array Representation and Implementation of stack, Operations on Stacks: Push & Pop, Conversion of Infix to Prefix and Postfix Expressions.
Queue: Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, Circular queue
Linked list: Representation and Implementation of Singly Linked List, Traversing and Searching, Inserting and Deleting of Linked List. Same operation in Doubly Linked List, Circular Linked List.
Binary Search Tree: Creation, searching and traversal.

Learning Outcome:
By the end of this course a student should be able to:

- Understand the need for Data Structures when building application.
- Appreciate the need for optimized algorithm.
- Able to walk through insert and delete for different data structures.
- Ability to calculate and measure efficiency of code .
- Appreciate some interesting algorithms like Huffman, Quick Sort, and Shortest Path etc.
- Able to walkthrough algorithm.
- Improve programming skills.

BCA – Semester III
DATABASE SYSTEMS LAB

Course Code: BCA 353   **L-0, T-0, P-4, C-2**

Course Contents

The Program to be implemented using SQL:

1) Create Table, insert data into tables, Deletion, Updation
2) Retrieval of data using SQL statement with all possible clauses.
3) Using aggregate function
4) Using group by and having clause
5) Write query for Join, set operation, and nested queries.
6) Creating View

Learning Outcome:
By the end of this course a student should be able to:

- Understanding the core terms, concepts, and tools of relational database management systems.
- Understanding database design and logic development for database programming.

BCA – Semester IV
SOFTWARE ENGINEERING

Course Code: BCA 402   **L-4, T-1, P-0, C-5**

Objective: The study of this course will help students to understand how to manage the development of industrial strength software. They will learn about various phases of software development and use of various development models for the same. They will learn the concepts of software design, software testing and maintenance. They will learn about the role of software reliability and quality assurance.

Course Contents

Unit -I
Introduction: Software Engineering approach, Need of engineering aspect for Software Design, SDLC, Software Crisis, Software Process, Process models (Classical Waterfall Model, Build-nFix Model, Iterative Waterfall Model, Prototyping Model, Evolutionary Model and Spiral Model)   **(Lecture 08)**

Unit -II
Software Requirement Analysis and Specifications: Software Requirement Specifications, Need of SRS, Steps for constructing good SRS, Behavioral and Non-Behavioral requirements, Analysis Model   **(Lecture 06)**

Unit -III
Software Design: Design Concepts & Principle, problem partitioning, abstraction, and top down and bottom up-design, Cohesion & Coupling, How to measure degree of Cohesion and Coupling, Function Oriented Design, DFDs, Structure Chart, Object Oriented Design. Coding: Top-Down and Bottom–Up programming, Structured programming, Programming style, Do's and Don'ts for Coding   **(Lecture 10)**

Unit -IV
Software Testing: Validation and Verification, Black Box testing approach, White Box testing approach, Levels of testing: Unit Testing, Integration Testing, Validation testing, System testing and debugging.   **(Lecture 08)**

Unit -V
Software Maintenance: Software Maintenance Process and its types, Introduction to Reverse Engineering. Software Reliability & Quality Assurance: Software Reliability issues, Software quality, Overview of Quality Standards like ISO 9001, SEI-CMM and its comparison with ISO, Introduction, scope and architecture of CASE.   **(Lecture 08)**

Learning Outcome
By the end of this course a student should be able to:

- Understand the importance of the stages in the software life cycle.
- Understand the various process models.
- Be able to design software by applying the software engineering principles.

Text Books:
1. Rajib Mall, "Software Engineering ", PHI
2. K.K.Agrawal&Yogesh Singh, "Software Engineering", New Age Publication
3. R. S. Pressman, "Software Engineering – A practitioner's approach" , McGraw Hill Int.Ed

Reference Books:
1. Ian Sommerville. Software Engineering, Pearson Education (Addison Wesley)
2. P. Jalote, "An Integrated approach to Software Engineering", Narosa,
3. Waman S. Jawadekar,"Software Engineering: Principles and Practice", McGraw Hill

*Latest editions of all the suggested books are recommended.

BCA – Semester IV
OOPs & C++

Course Code: BCA 404   **L-5, T-1, P-0, C-6**

Objective: To get a clear understanding of object-oriented concepts and to understand object oriented programming through C++ and to develop real life applications using Object Oriented Programming (OOP) concepts.

Course Contents

Unit - I
Introduction: Introducing Object-Oriented Approach, Relating to other paradigms (functional, data decomposition). Basic terms and ideas: Abstraction, Encapsulation, Inheritance, Polymorphism, Basic programming of C++.   **(Lecture 08)**
Unit - II
Classes and Objects: Encapsulation, abstract data types, Object & classes, attributes, methods, C++ class declaration, State identity and behavior of an object, Constructors and destructors, object types, Meta class, abstract classes.   **(Lecture 08)**

Unit - III
Inheritance: Access specifiers, Types of inheritance, Ambiguity resolution in Multiple Inheritance, Constructor calling (Implicit and Explicit Constructor call) to base class, Containership and inheritance, Virtual Base Class.   **(Lecture 08)**
Unit - IV
Friend: Friend Function, Friend Member Function and Friend Class.
Polymorphism: Function Overloading, Operator overloading, operator overloading using Friend. Virtual function & Pure Virtual function   **(Lecture 08)**
Unit - V
File Handling: Stream Classes Hierarchy, Opening and closing FILE, Read and write in file. File pointers and Manipulations, Error Handling in File Operation,Command line Argument.
                    (Lecture 08)

Learning Outcome
By the end of this course a student should be able to:

- Describe the differences between procedure oriented programming and object oriented programming.
- Define the three key features of the object-oriented programming language: encapsulation (abstraction), inheritance, and polymorphism.
- Describe the benefits of object oriented programming.
- Declare a class.
- Create objects, array of objects, and pointer to an object of a class.
- Identify the differences between private, public and protected members of a class.
- Describe how to access private, public and protected members of a class.
- Define member functions inside the class definition and outside the class definition.
- Understand the memory allocation of objects and class methods.
- Declare and use static data members and static methods.

- Design and use friend functions and friend classes.
- Use constructor and destructor functions to initialize and destroy class objects.
- Use inheritance to build class hierarchies.
- Overload operators to work with user-defined classes.
- Apply the facilities offered by C++ for Object-Oriented Programming.

Text Books:
1. Lafore R., *Object Oriented Programming using C++*, Galgotia.
2. Venugopal A.R. &Rajkumar, T. Ravishanker,*Mastering C++*, Tata McGraw Hill.
3. Lippman S. B. &Lajoie J., *C++ Primer*, Addison Wesley.

Reference Books:
1. Parasons D., *Object Oriented Programming with C++*, BPB Publication.
2. Steven C. Lawlor, *The Art of Programming Computer Science with C++*, Vikas Publication.
3. Schildt Herbert, *C++: The Complete Reference*, Tata McGraw Hill.
4. Tony Gaddis, Watters, Muganda, *Object-Oriented Programming in C++*, Dreamtech.

*Latest editions of all the suggested books are recommended.

BCA – Semester IV
COMPUTER GRAPHICS

Course Code: BCA 407   **L-4, T-1, P-0, C-5**

Objective: This subject covers computer graphics concepts and basic techniques for operating with two- dimensional objects. It gives an overview of typical applications of computer graphics. On completion of this subject, the student will be able to understand and apply the basic principles, techniques, and algorithms for generating and interacting with simple graphical objects on display screen

Course Contents

Unit - I
Introduction Of Computer Graphics: Application areas of Computer Graphics, Overview of graphics systems. **Graphics primitives:** video-display devices, and raster-scan systems, random scan systems, Plasma displays, LCD, input devices.   **(Lecture 08)**

UNIT - II
Output Primitives: Points and lines, Line drawing algorithms: DDA, Bresenham's algorithm, Circle drawing algorithms: Mid-point algorithm, Bresenham's algorithm, Filled area primitives: Scan line polygon fill algorithm, Boundary-fill and Flood-fill algorithms.
                                                                (Lecture 08)

Unit - III
2-D Geometrical Transforms: Translation, rotation, scaling, reflection and shear transformations, homogeneous coordinate system, composite transforms, transformations between coordinate systems, Introduction of 3-D Transformation   **(Lecture 08)**

Unit - IV
2-D Viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland – Hodgeman polygon clipping algorithm, Curve clipping, Text clipping.
                                                                (Lecture 08)

Unit - V
Computer Animation: Design of animation sequence, General computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications.
                                                                (Lecture 08)

Learning Outcome
By the end of this course a student should be able to:

- Students will demonstrate an understanding of contemporary graphics hardware.
- Students will create interactive graphics applications in C++ using one or more graphics application programming interfaces.
- Students will write program functions to implement graphics primitives.
- Students will write programs that demonstrate geometrical transformations.
- Students will demonstrate an understanding of the use of object hierarchy in graphics applications.
- Students will write program functions to implement visibility detection.
- Students will write programs that demonstrate computer graphics animation.
- Students will write programs that demonstrate 2D image processing techniques.

Text Books:
1. Donald Hearn &M.Pauline Baker, *Computer Graphics C Version*, Pearson Education.
2. VanDam, Feiner& Hughes, *Computer Graphics Principles &Practice*, Pearson Education.
3. Steven Harrington, *Computer Graphics*, Tata McGraw Hill.
4. Schaum's Outline Computer Graphics,McGraw-Hill.

Reference Books:
1. Donald Hearn &M.Pauline Baker, *Computer Graphics*, Prentice Hall of India.
2. Zhigand Xiang, Roy Plastock, Schaum's Outlines, *Computer Graphics,* TataMc-Graw Hill.
3. David F Rogers, *Procedural Elements for Computer Graphics*, Tata McGraw Hill.
4. GovilShalin, *Principles of Computer Graphics*, PAI, Springer.
5. Steven Harrington, *Computer Graphics*, Tata McGraw Hill.
6. Amrendra N Sinha and Arun D Udai," Computer Graphics", TMH.

*Latest editions of all the suggested books are recommended.

BCA - Semester IV
FUNDAMENTALS OF ACCOUNTING

Course Code: BCA 408   **L-5, T-1, P-0, C-6**

Objective: The basic objective of this course is to provide knowledge of Accounting and helps accounting in taking business.

Course Contents
Unit - I
Accounting: Meaning and Concepts, Difference between accounting and book keeping, Importance and Limitations of Accounting, Users of Accounting information, Accounting Principles, Conventions and Concepts.   **(Lecture 08)**

Unit - II
Subsidiary Books: Purchase book, sales book, purchase return book, sales return book, debit note, credit note Types of accounts, golden rules of accounting, Preparation of Journal, Ledger and Trial balance.   **(Lecture 08)**

Unit - III
Preparation of Final Accounts: Manufacturing Account, Trading Account, Profit and Loss Account, Balance Sheet (without adjustments).   **(Lecture 08)**

Unit - IV
Common Size Statements: Comparative Financial Statements, Balance Sheet, Profit and Loss Account.   **(Lecture 08)**

Unit - V
Preparation of Bank Reconciliation Statement   **(Lecture 08)**

Learning Outcome
By the end of this course a student should be able to:

- Develop and understand the nature and purpose of financial statements in relationship to decision making.
- Develop the ability to use the fundamental accounting equation to analyze the effect of business transactions on an organization's accounting records and financial statements.
- Develop the ability to use a basic accounting system to create (record, classify, and summarize) the data needed to solve a variety of business problems.
- Develop the ability to use accounting concepts, principles, and frameworks to analyze and effectively communicate information to a variety of audiences.
- Develop the ability to use accounting information to solve a variety of business problems.

Text Books:
1. Maheswari S.N. & Maheswari S. K., Introduction to Financial Accountancy, Vikas Publications
2. Grewal. T.S. ,Fundamentals of Accounting, Sultan chand & Sons Pvt Ltd New Delhi
3. Goel D.K. , Introduction to Accounting
Reference Books:

1. Jawahar Lal, Financial Accounting, Wheeler Publishing.
2. Gupta R.L. & Radhaswamy-Fundamentals of Accounting
3. Chawla & Jain-Financial Accounting.

BCA – Semester IV
IT GOVERNANCE, RISK & INFORMATION SECURITY MANAGEMENT

Course Code: BCA 409   **L-5, T-1, P-0, C-6**

Objective:
- To study governance through IT technology.
- To study different facilities provided by government through electronic media.
- To study increase internal efficiency and service levels to constituents.

Course Contents

Unit – I

IT Governance : Introduction & Concepts, Role of Governance in Information Security, Best Practices for IT Governance. Role of IT Strategy Committee, Standard IT Balanced Scorecard. Val-IT framework of ISACA.   **(Lecture 08)**

Unit - II

ICT Infrastructure & Service: National level, State level, District level.
National e-governance projects: Advertisement Automation System for DAVP, e-Courts Project, Electronic Post (ePost), e-Panchayat Mission Mode Project.   **(Lecture 08)**

Unit – III

Information Systems Strategy : Role of Strategic Planning for IT, Role of Steering committee, Policies and Procedures.   **(Lecture 08)**

Unit - IV

Risk Management Program : Develop a Risk Management Program. Risk Management Process, Risk Analysis methods. Risk-IT Framework of ISACA.   **(Lecture 08)**

Unit - V

Information Security Management: Introduction, Performance Optimization, IT Security roles & responsibilities, Segregation of Duties, Description of COBIT and other Frameworks.
                                                                  (Lecture 08)

Learning Outcome:
By the end of this course a student should be able to:

- The Information Security Governance and Risk Management domain entails the identification of an organization's information assets and the development, documentation, implementation, and updating of policies, standards, procedures, and guidelines that ensure confidentiality, integrity, and availability.
- Management tools such as data classification, risk assessment, and risk analysis are used to identify threats, classify assets, and to rate their vulnerabilities so that effective security measures and controls can be implemented.

Text Books:
1. IT Governance – Peter Weill and Jeanne Ross, Pub: Harvard Business Review Press

Reference Books:
1. Managing Risk and Information Security – Malcolm Harkins, Pub: Apress;
2. Information Security Risk Analysis – Thomas R.Peltier

*Latest editions of all the suggested books are recommended.

BCA – Semester IV
SCIENTIFIC COMPUTING

Course Code: BCA 410   **L-5, T-1, P-0, C-6**

Objective: Course Objective is to have an investigation of the flexibility and power of project-oriented computational analysis. This course is a survey of numerical solution techniques for ordinary and partial differential equations. This course is a graduate breadth course to give students exposure to the algorithms and implementations often used in scientific computing.

Course Contents
Unit - I
Number System: Binary, Octal, Hexadecimal and Decimal, Floating Point Numbers. Binary Arithmetic: Basic Rules of Binary Addition, Subtraction, multiplication and division. Floating point format, Finite precision, round-off, machine epsilon, Error propagation and catastrophic cancellation   **(Lecture 08)**

Unit-II
Numerical linear algebra: Gaussian elimination, LU decomposition, Band-diagonal system of equations, Iterative methods, Eigen Systems
Numerical integration: Newton-Cotes Method, Romberg Method, Gaussian Quadrature, Monte Carlo Methods   **(Lecture 08)**

Unit - III
Root finding: Bisection, Regula-Falsi, Newton-Raphson and extension to multi-dimension
Optimization: Search by section, Newton's method, steepest descent, Conjugate gradient, Simulated annealing   **(Lecture 08)**

Unit - IV
Numerical differentiation: Finite difference, Spectral differentiation
Initial value Ordinary Differential Equations: Forward and backward Euler, Predictor corrector and Runge-Kutta schemes, Stiff ODE's   **(Lecture 08)**

Unit - V
Boundary value problems: Shooting method, Finite-difference method
Partial differential equations: Hyperbolic and parabolic equations, Elliptic equations
                                                                                 (Lecture 08)

Learning Outcome
By the end of this course a student should be able to:

* Analyse a range of mathematical problems, model and / or solve them using an appropriate method and implement the solutions using one or more of the commonly-used programming environments listed above.
* Document your computer code so that others can understand it more easily
* Interpret and report on the results obtained.

Text Books:
1. W. H. Press, S. A. Teukolsky, W. T. Vetterling, and B. P. Flannery. *Numerical Recipes in C: The Art of Scientific Computing*. Cambridge University Press.
2. W. H. Press, S. A. Teukolsky, W. T. Vetterling, and B. P. Flannery. *Numerical Recipes in Fortran: The Art of Scientific Computing, volume 1-2*. Cambridge University Press.
3. J. Stoer and R. Bulirsch. *Introduction to Numerical Analysis*. Springer Verlag,

Reference Books:
1. *MATLAB documentation*. Online reference. http://www.mathworks.com/.
2. D. J. Hingham and P. J. Hingham. *MATLAB guide*. Society of Industrial and Applied Mathematics
3. C. F. van Loan. *Introduction to Scientific Computing: A Matrix-Vector Approach using MATLAB*. Prentice Hall

*Latest editions of all the suggested books are recommended.

BCA – Semester IV
ETHICAL HACKING FUNDAMENTAL

Course Code: BCA 411   **L-5, T-1, P-0, C-6**

Objective:
- To understand how intruders escalate privileges.
- To understand Intrusion Detection, Policy Creation, Social Engineering, Buffer Overflows and different types of Attacks and their protection mechanisms
- To learn about ethical laws and tests.

Course Contents

Unit - I
Introduction to Ethical Hacking: Hacking Methodology, Process of Malicious Hacking, Foot printing and Scanning: Foot printing, Scanning. Enumeration: Enumeration. System Hacking and Trojans: System Hacking, Trojans and Black Box Vs White Box Techniques.   **(Lecture 08)**

Unit – II
Hacking Methodology: Denial of Service, Sniffers, Session Hijacking and Hacking Web Servers: Session Hijacking, Hacking Web Servers. Web Application Vulnerabilities and Web Techniques Based Password Cracking: Web Application Vulnerabilities, Web Based Password Cracking Techniques   **(Lecture 08)**

Unit - III
Web and Network Hacking : SQL Injection, Hacking Wireless Networking, Viruses, Worms and Physical Security: Viruses and Worms, Physical Security. Linux Hacking: Linux Hacking. Evading IDS and Firewalls: Evading IDS and Firewalls.   **(Lecture 08)**

Unit - IV
Report writing & Mitigation: Introduction to Report Writing & Mitigation, requirements for low level reporting & high level reporting of Penetration testing results, Demonstration of vulnerabilities and Mitigation of issues identified including tracking.   **(Lecture 08)**

Unit – V
Ethical Hacking Laws and Tests : An introduction to the particular legal, professional and ethical issues likely to face the domain of ethical hacking, ethical responsibilities, professional integrity and making appropriate use of the tools and techniques associated with ethical hacking – Social Engineering, Host Reconnaissance.   **(Lecture 08)**

Learning Outcome

By the end of this course a student should be able to:

- Describe the concepts of ethical hacking.
- Explain the stages of a cyber attack.
- Describe and perform basic reconnaissance exercises.
- Describe various types of malware and cyber attack vectors and players.
- Describe and perform various methods for evading security controls.
- Describe and perform vulnerability and pen testing assessments and exercises.

Text Books:
1. Michael T. Simpson, Kent Backman, James E. "Corley, **Hands-On Ethical Hacking and Nework Defense"**, Second Edition, CENGAGE Course.

Reference Books:
1. Steven DeFino, Barry Kaufman, Nick Valenteen, "**Official Certified Ethical Hacker Review Guide"**, CENGAGE Course.
2. Patrick Engebretson, "**The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made Easy**", Syngress Basics Series – Elsevier.
3. Whitaker & Newman, " **Penetration Testing and Network Defense"** , Cisco Press, Indianapolis.

*Latest editions of all the suggested books are recommended.

BCA – Semester IV
MOBILE DEVICE AND NETWORK ARCHITECTURE

Course Code: BCA 412   **L-5, T-1, P-0, C-6**

Objective:
- To introduce the principles of Network Design
- To understand the process of Network Deployments
- To gain basic insight of Network Operations and Maintenance

Course Contents

Unit - I
Communication Principles: Wireless Communication Principles, Radio Communication, Analog and Digital Communication, Benefits of Digital Signals, Computer Network, OSI Model, Mobile Network OSI layer functions, Mobile Network Protocol Layers. Introduction to Basic Telephony, POTS (Plain Old Telephone Service), Telephony Networks, PSTN (Public Switched Telephone Network), Telephone Network Hierarchy, Telecommunication Networks, Fixed Networks, Mobile Networks.   **(Lecture 08)**

Unit - II
Mobile Cellular Networks : Cellular Network Concepts, Cells and Base Stations, Frequency and Interface in Cells, Access Channels, Mobile Network Architecture, Mobile Network, Mobile Network Subsystems, Mobile Station, Base Station Subsystems, Network Switching Subsystems, Mobile Network Protocol Stacks, Core Networks, PLMN (Public Land Mobile Network), Mobile Network Fundamentals, Mobile Network Features, Mobility, Registration, Handoff, Roaming, Mobile Network Fundamentals (SMS), SMS (Short Message Service), SMS Network Architecture, SMS Network Elements, SMS Protocols, SMS Applications & Short Codes.
(Lecture 08)

Unit - III
GSM and CDMA Networks: GSM History, GSM RF Channels, 2G Network Architecture, GSM Protocol Stack, GPRS Standards, CS and PS Domains, GPRS Architecture, GPRS Network Architecture, GPRS Protocols, CDMA Evolution, 2G CDMAOne, CDMA 2G Standards, 3GPP2 Network Architecture, Mobile IP, UMTS Spectrum, UMTS Radio Access Network, UMTS Protocol Stacks, SIP Network, UMTS Multiple Access Network Architecture, 4G.   **(Lecture 08)**

Unit - IV
Handset Evolution, Handset Characteristics and Features : Mobile Phone and Network Evolution, Cellular Networks, Cell Phones, Mobile Phones, Mobile Handset Characteristics, Wireless Cellular, Bluetooth , Display, Keypad, Camera, Mobile Handset Categories, Low end Phones, Feature Phones, Smart phones, Handset Components, Handset Design, Handset Manufacture, Handset Bill of Materials, assembling handsets.   **(Lecture 08)**

Unit - V
Hardware Architecture and Subsystems : Handset hardware architecture, Primary Hardware Subsystems, Element inside a Mobile Handset, Hardware Architecture Evolution, Processing Subsystem architecture, Hardware architectural trends, CPU and Memory, Memory, Internal storage, Hardware evolution, Introduction to the Radio subsystems, Function of the RF Subsystems**,** Handset Power Requirements, Power Management, Power reduction techniques,

Power Subsystem components, Introduction and Definition to the SIM, Smartcards in general and concept of Mobile Identity , Functions and usage of the SIM , Phones without SIMs.

(Lecture 08)

Learning Outcome
By the end of this course a student should be able to:

1. Explain the limitations of fixed networks; the need and the trend toward mobility; the concepts portability and mobility.

2. Describe and analyse the network infrastructure requirements to support mobile devices and users.

3. Illustrate the concepts, techniques, protocols and architecture employed in wireless local area networks, cellular networks, and perform basic requirements analysis.

4. Apply techniques and technologies to design and communicate a simple mobile application for smaller devices.

Text Books:
1. Wireless and Mobile Network Architectures by Yi-Bang Lin and Imrich Chlamtac, Wiley-India
2. Mobile Networks Architecture by Andre Perez, Wiley

Reference Books:
1. Mobile Computing – Technology, Application & Service Creation by Asoke. K Talukder, Roopa R. Yavagal, Asoke K. Talukder, Tata McGraw-Hill
2. GSM - Architecture, Protocols and Services by JörgEberspächer, Hans-JoergVögel, Christian Bettstetter, Christian Hartmann John Wiley & Sons

* Latest editions of all the suggested books are recommended.

BCA – Semester IV
MANAGEMENT INFORMATION SYSTEM

Course Code: BCA 413   **L-5, T-1, P-0, C-6**

Objective: The Management Information system is an idea which is associated with man, machine, marketing and methods for collecting information's from the internal and external source and processing this information for the purpose of facilitating the process of decision making of the business. In this process, computer has added on more dimensions such as speed, accuracy and increased volume of data that permit the consideration of more alternatives indecision making process.

Course Content

Unit - I
Foundation of Information Systems in Business: Information system in business, The Components of an Information system, Types of information systems.   **(Lecture 08)**

Unit - II
Concept of MIS, Structure of MIS, MIS & Decision Support Systems, End user and Enterprise Computing Application software and System software.   **(Lecture 08)**

Unit - III
Managerial Overview: Database Management: Managing Data Resources, Technical foundation of database management Resources. Fundamentals of strategic advantage, Using Information for strategic advantage.   **(Lecture 08)**

Unit - IV
Business Applications of Information Technology: Internet & Business, Intranet, Extranet & Enterprise Solutions, Information System for Managerial Decision Support.
                                                                                       (Lecture 08)

Unit - V
Managing Information Technology: Managing Information Resources and technologies, Global information technology, Security and control Issues in Information system, ethical and societal challenges of IT.   **(Lecture 08)**

Learning Outcome
By the end of this course a student should be able to:

- Students would be able to understand the usage of MIS in organizations and the constituents of the MIS.
- The student would understand the classifications of MIS, understanding of functional MIS and the different functionalities of MIS. This would be followed by case study on Knowledge management.
- This module lead to linking MIS to business strategy and the areas in which MIS would lead to strategic advantage. This would be followed by case study and guest lecture.
- The student learns the functions and issues at each stage of system development. Further different ways in which systems can be developed are also learnt.

- This module provides understanding about emerging MIS technologies like ERP, CRM, SCM and trends in enterprise applications.
- This leads in understanding the relationship between database management and dataware house approaches, the requirements and applications of dataware house.

Text Books:
1. Brian O., *Management Information System*, Tata McGraw Hill
2. Gordon B., Davis &Margrethe H. Olson, *Management Information System*, Tata McGraw Hill
3. Brian O., *Introduction to Information System*, McGraw Hill.

References Books:
1. Murdick, *Information System for Modern Management*, PHI.
2. Jawadekar, *Management Information System*, Tata McGraw Hill.
3. Jain Sarika, *Information System*, PPM.
4. Davis, *Information System*, Palgrave Macmillan.

*Latest editions of all the suggested books are recommended.

BCA – Semester IV

English Communication & Soft Skills – IV

Course Code: BCA449   **L-3,T-0,P-2,C-4**

Objective: To enhance students' soft skills and personality by inculcating values in them for suitable employability.

Course Content:
Unit -1 Soft Skills and Personality Development   (06 hours)
    a) Introduction to Soft Skills
    b) Classification of Soft Skills
    c) Manners and Etiquettes
    d) Traits of Leadership

Classroom Activity: (02 Hours)
Listening: Involving the students listen lectures on the above topics delivered by their teacher
Speaking: Enabling the students speak on the above topics
Writing: Making the students write on the given topics

Unit -2 Technical Vocabulary and Presentation   (06 hours)
    a) Abbreviations and Technical terms of Computer Science
    b) Writing Paragraph on Eminent Personalities in the field of Computer Science and Information Technology: Charles Babbage, Dennis Ritchie, Larry Page, Tim Berners Lee, Larry Ellison, Bill Gates, Michael Dell, Philip Don Estridge, Charles Ranlett Flint, Martin Cooper, Steve Jobs and Mark Elliot Zuckerberg.
    c) Speech on Eminent Personalities in the field of Computer Science and Information Technology: Sundar Pichai, N. R. Narayana Murthy, Azim Premji, Nandan Nilekani, Sam Pitroda and Pranav Mistry.
    d) Presentation on the Profile of Leading Companies of Information Technology: Microsoft Corporation, Oracle Corporation, IBM (International Business Machines), SAP, Symantec Corporation, EMC and Hewlett Packard Enterprise
    e) Writing Scientific and Technical Paper

Classroom Activity: (06 Hours)
Listening: Involving the students listen lectures on the above topics delivered by their teacher
Speaking: Enabling the students speak on the above topics
Writing: Making the students write on the given topics

Unit -3 Values and Ethics   (06 hours)
    a) Values and Ethics
    b) Different Attitudes to Work
    c) Ethics at Work Place
    d) Professional Ethos and Code of Professional Ethics

Classroom Activity: (04 Hours)
Listening: Involving the students listen lectures on the above topics delivered by their teacher

Speaking: Enabling the students speak on the above topics
Writing: Making the students write on the given topics

Unit -4 Job Interview Strategies   (02 hours)
   a) Body Language
   b) Debate on current issues and Leading Companies of Information Technology
   c) Group Discussion
   d) Preparing Relevant Probable Questions for Interview
   e) Mock Interview

Classroom Activity: (08 Hours)
Listening: Involving the students listen lectures on theoretical part delivered by their teacher
Speaking: Enabling the students speak effectively during group discussion and mock interview
Writing: Making the students write important points during group discussion

Text Books:
   1. Mitra Barun K., *Personality Development and Soft Skills*, O.U.P., New Delhi. 2012.
   2. Onkar R.M., *Personality Development and Career Management: A Pragmatic Perspective*, S. Chand & Co. Ltd., New Delhi. 2011.
   3. Mishra Sunita & Muraliksishra C., *Communication Skills for Engineers,* Pearson Education, New Delhi.

Reference Books:
   1. Raman Meenakshi & Sharma Sangeeta, *Technical Communication-Principles & Practices*, O.U.P. New Delhi. 2008.
   2. Chabbra T N, *Business Communication*, Sun India Pub. New Delhi.
   3. Sehgal M.K. & Khetrapal Vandana, *Business Communication*, Excel Books, New Delhi.
   4. Newstron John W., *Organizational Behaviour: Human Behaviour at work*- Tata McGraw Hill.
   5. Luthans fred, *Organizational Behaviour*-Tata Mcgraw Hill.
   6. Sanjay Kumar & Pushp Lata, *Communication Skills*, Oxford University Press.
   7. Govindarajan M., *Engineering Ethics*, Prentice Hall (India), New Delhi

Learning Outcome:
 1. Students will be able to communicate effectively.
 2. They will be able to develop their personality and soft skills.
 3. They will be able to face interview confidently.
 4. They will be able to participate actively in group discussion.
 5. They will be able to inculcate values and ethics in their life.
 6. They will be able to develop their competence for suitable job in a good organization.

BCA – Semester IV

OOPs & C++ LAB

Course Code: BCA 452   **L-0, T-0, P-4, C-2**

Course Contents

1) Program illustrating basic input/output operations using CIN, COUT.
2) Implementing class and objects.
3) Implementing function overloading.
4) Implementing various constructors and destructor
5) Program illustrating overloading of various operators.
6) Program illustrating use of Friend, Inline, Static Member functions, default arguments.
7) Program illustrating various forms of Inheritance
8) Program illustrating use of virtual functions, virtual Base Class.
9) Program illustrating use of file handling

Learning Outcome

By the end of this course a student should be able to:

- An understanding of the principles behind the object oriented development process.
- Competence in the use of object oriented programming language in the development of small to medium sized application programs

BCA – Semester IV

COMPUTER GRAPHICS LAB

Course Code: BCA 453   **L-0, T-0, P-4, C-2**

Course Contents

1) Programs for designing objects in graphics by using Library functions.
2) Programs to draw the line, circle by using algorithms.
3) Programs to fill polygons by using algorithms.
4) Programs to implement line clipping.
5) Programs to implement 2-D transformation on objects.
6) Programs to do basic animation by using graphics.

Learning Outcome

By the end of this course a student should be able to:

- Using OpenGL for Graphics
- Programming User -interface issues
- Concepts of 2D & 3D object representation
- Implementation of various scan & clipping algorithms
- 2D modeling
- Implementation of illumination model for rendering 3D objects
- Visibility detection & 3D viewing
- Implementation of a project based on learned concepts.

BCA – Semester V

LINUX INTERNALS

Course Code: BCA 501   **L-4, T-1, P-0, C-5**
Objective: This comprehensive course is designed to provide the knowledge and skills to students so that they can work in Linux environments. The course covers areas of Linux architecture, file system and graphical environment, Linux commands, file permissions, process management and shell meta characters, working of vi editors, different scripts.

Course Contents
Unit I
Linux Introduction and File System: Basic Features, Advantages of Linux, Disadvantages of Linux Installing requirement, Installing the Linux system, Basic Architecture of Unix/Linux system, Kernel, Shell. Linux File system-Boot block, super block, Inode table, data blocks, How Linux access files, storage files, Linux standard directories.

(Lecture 08)

Unit II
Files and directories: Files and Directories, Examples of Absolute Paths, Current Directory, Making and Deleting Directories, Relative Paths, Special Dot Directories, Using Dot Directories in Paths, Hidden Files, Paths to Home Directories, Looking for Files in the System, Specifying Multiple Files, Specifying Files with Wildcards, Chaining Programs Together.

(Lecture 08)

Unit III
Linux Essential Commands pwd, cd, ls, who, who am i, which, cp, mv, rm, mkdir, touch, hostname, cat, cal, mount, umount, login, logout, echo, wget, wc, grep, dd, test, chmod, date, du, head, tail, id, kill , ln, more, less, find.
Shell Meta Characters: Filename Substitution Meta characters, Redirection Meta characters, Process Execution Metacharacters, Conditional Execution Using && and ||, Quoting Meta characters, Positional Parameters and Special Parameters.   **(Lecture 08)**

Unit IV
VI EDITOR A Text Editor Vim: Modes of Operation, The first Editing Session, Block Commands, Search, Find and Replace, Delete and Paste, Yank and Paste, Set Commands, Customizing The vi Environment, Multiple File Editing in vi, Command Line Options in vi.
Shell Programming I
Shell Variables, Shell Keywords, Another way of Assigning Values to Variables, Unix-defined or System Variables, Unchanging Variables, Positional parameters, Passing Command Line Arguments, Setting Values of Positional Parameters, Displaying Date in Desired Format, Using Shift on Positional Parameters, Arithmetic in Shell Script, tput Command.

(Lecture 08)

Unit V
Shell Programming II
Control Instructions in Shell, Taking Decisions, if Statement, test Command, File Tests, String Tests, Use of Logical Operators, Hierarchy of Logical Operators, Case Control Structure, Loop Control Structure, Loops, while Loop, until loop, for Loop, Using for with Command Line Arguments, Nesting of Loops, break Statement, continue Statement.

(Lecture 08)

Learning Outcome

By the end of this course a student should be able to:

- Will be able to describe and use the LINUX operating system.
- Will be able to describe and use the fundamental LINUX system tools and utilities.
- We will able to describe and write shell scripts in order to perform basic shell programming.
- Will be able to describe and understand the LINUX file system.

Text Books:
1. Unix – Sumitaba Das
2. Unix Shell Programming – Yashwant Kanetkar, Bpb Publications,

Reference Books:
1. Red hat Linux Administration By Michael Turner and Steve Shah-McGraw-Hill Companies, Inc Publisher.
2. Redhat Fedora linux for Dummies By Naba Barkakati-Wiley Publishing, Inc.
3. RHCSA/RHCE Red Hat Linux Certification Study Guide (Exams EX200 & EX300), (Certification Press) [Paperback], Michael Jang, McGraw-Hill Osborne Media.
4. Using Linux By Jack Tackett, David Gunter, Phi, Eee Edition .
5. Red Hat Linux Bible –Cristopher Negus, Idg Books India Ltd.

*Latest editions of all the suggested books are recommended.

BCA – Semester V
CORE JAVA PROGRAMMING

Course Code: BCA 512   **L-4, T-1, P-0, C-5**

Objective: The main objective of this course is to provide a straight forward way for the students to get their minds around Java and object-oriented programming. It also helps the students to get hands on experience on Java and to develop the cross platform applications. This course covers all the necessary topics that any students require to create an application in Java.

Course Content

Unit -I
An Introduction to Java: Java Platform, Buzzwords, Short History on Java, Installing JDK, Setting the PATH.
Fundamental Programming Structures: A Simple Java program, Data Types, Variables, Operators, Control Flow, Arrays, Big Numbers.
Objects and Classes: Introduction to Object Oriented Programming, Defining Your Own class, Introducing Methods, Method Overloading, Constructors, The this Keyword, Garbage Collection, Object Destruction and Finalize, Argument Passing Mechanism, Using Object as Parameter, Returning Object, Recursion, Introducing Final, Understanding static, Introducing Nested and Inner Classes, Using Command Line Argument, Variable Length Arguments, and Ambiguity.   **(Lecture 08)**

Unit-II
Inheritance: Base class, Super class and Sub class, The Object class, Using Super keyword, Method Overriding, Dynamic Method Dispatch, Using Abstract Classes, Using final keyword with Inheritance.
Packages: Finding Package and CLASSPATH, Access Protection, Importing Package
Interfaces: Implementing Interfaces, Applying Interfaces, Variable in Interfaces, Interfaces can be extended.
Exception Handling: Exception Type, Using try and catch, multiple catch Clauses, Nested try Statements, Using throw keyword, Using throws keyword, Using Finally, Chained Exception.
Input / Output: I/O Basic, The Stream Classes, Reading Console Input, Writing Console Output, The Print Writer Class, The Closeable and Flushable Interface, The Byte Stream Classes, The Character Streams Classes, Using a Stream Tokenizer, Serialization.
                                                                    (Lecture 08)
Unit- III
Graphics Programming: Applet Fundamentals, Applet Architecture, An Applet Skeleton, Overriding update(), Applet Display Method, Requesting Repainting, The HTML APPLET Tag, getDocumentBase() and getCodeBase() Method. **Introducing AWT:** AWT Classes, Window Fundamentals (Component, Container, Panel, Window, Frame, Canvas), Working with Frame. Working with Graphics, Working with Shapes, Working with Colors, Working with Fonts, Displaying Image.
Event Handling: Basics of Event Handling, Delegation Event Model, Event Classes, Event Listener Interfaces, Handling Mouse Events.

AWT Controls: Button, Label, Checkbox, CheckboxGroup, Choice, List, Scrollbar, TextField, TextArea, Menu Bar and Menu, Dialog Boxes.

Introduction to Layout Management: Flow Layout, Border Layout, Grid Layout, GridBag Layout.   **(Lecture 08)**

Unit -IV

Swings: Swings Overview, Creating a Swing Applet and Application.

Swing Components: Icon, JLabel, JTextField, JTextArea, JPasswordField, JButton, JCheckBox, JRadioButton, JComboBox, JList, JProgressBar, JMenubar, JMenu, JToolBar, JScrollPane, JPanel, JTable, JSlider, JInternalFrame, Dialog Boxes.   **(Lecture 08)**

Unit -V

Multithreading: Threads, Interrupting Threads, Thread States, Thread Priorities, Synchronization, Suspending, Resuming and Stopping Threads, Using Threads and Swings.

JDBC: Introduction to JDBC, Types of JDBC Drivers, JDBC-ODBC Bridge, Connecting to a database, Inserting and Retrieving Data from the Database.

Utilities: Using JAR and JAVADOC utilities.   **(Lecture 08)**

Learning Outcome

By the end of this course a student should be able to:

- The students will have the competence in the use of Java Programming language.
- The development of small to medium sized application programs that demonstrate professionally acceptable coding.

- The students will have the competence in the use of Java Programming language.
- An understanding of the principles and practice of object oriented programming in the construction of robust maintainable programs which satisfy the requirements.
- Design and implement an application that demonstrates their competency with Java syntax, structure and programming logic, incorporating basic features of the language as well as some features from the I/O (Input/Output) or GUI libraries.
- Competence in the use of Java Programming language in the development of small to medium sized application programs that demonstrate professionally acceptable coding and performance standards.

Text Books:
1. Patrick Naughton& Herbert Schildt, *The Complete Reference JAVA2,* Tata McGraw Hill
2. Cay S. Horstmann& Gary Cornell, *Core Java 2 Volume I – Fundamentals*, PHI

Reference Books:
1. Balagurusamy E., *Programming in JAVA*, Tata McGraw Hill
2. Steven Holzner, *Java2 Black Book*, Dreamtech
3. Mark Wutica, "Java Enterprise Edition", QUE

*Latest editions of all the suggested books are recommended.

BCA – Semester V
PHP

Course Code: BCA 513   **L-4, T-1, P-0, C-5**

Objective: PHP is the latest trend in the IT sector and this course is designed to make the students aware of the web development standards and technologies, and to make them ready for developing the web applications with the help of PHP as a language. At the completion of this course the students will be able to attain good job in web development sector. Also by this course they will know, the current web development trend in the IT sector.

Course Content

Unit - I
Web Servers: Introduction to web server. Installation and Configuration of WAMP ,LAMP and XAMPP. An Introduction to server side scripts. Role of client side script and serer side scripts on web development. Difference of PHP with other server side languages.   **(Lecture 08)**

Unit - II
PHP-Introduction to PHP, History, Web Server, WAMP, Installation and Configuration files, Syntax, Operators, Variables, Constants, Control, Structure, Language construct and functions, Function – Syntax, Arguments, Variables, References, Returns and Variable Scope.
                                                                      (Lecture 08)

Unit - III
Arrays and its types, Date and Time functions, OOP's – Installation, Modifiers, Inheritance, Interfaces, Exceptions, Static Methods and Properties, String functions. Web Features- Sessions, Forms, GET and POST data, Cookies.
                                                                      (Lecture 08)

Unit - IV
Introduction to MySQL, Putting password on root. Creating users on MySQL. Creating database In MySQL. Creating table and using sql queries in MySQL .Database connectivity in PHP with mysql_connect and PDO and using, insertion, deletion, updating and retrieval of data from database using PHP.   **(Lecture 08)**

Unit - V
Introduction to AJAX, AJAX and its applications, working of AJAX, Introduction to web services, advantages of web services, web services platform elements, Using XML in PHP. Understanding the WordPress and CakePHP framework of PHP.   **(Lecture 08)**

Learning Outcome
By the end of this course a student should be able to:

* Understand process of executing a PHP-based script on a webserver.
* Be able to develop a form containing several fields and be able to process the data provided on the form by a user in a PHP-based script.
* Understand basic PHP syntax for variable use, and standard language constructs, such as conditionals and loops.
* Understand the syntax and use of PHP object-oriented classes.

- Understand the syntax and functions available to deal with file processing for files on the server as well as processing web URLs.
- Understand the paradigm for dealing with form-based data, both from the syntax of HTML forms, and how they are accessed inside a PHP-based script.

Text Books:
1. Ivan Bayross, HTML, DHTML, JavaScript, CSS, PHP, BPB Publications.
2. Ivan Bayross, PHP 5, BPB Publications.
3. Andrew Curioso, Ronald Bradford, Patrick Galbraith, Expert PHP and Mysql, Wiley Publishing.

Reference Books:
1. Professional PHP Programming ,Jesus Castagnetto ,Harish Rawat, Sascha Schumann, Chris Scollo,DeepakVeliath - Wrox Publications.
2. Beginning PHP and MySQL 5,W. Jason Gilmore,Apress Publication.
3. PHP 5 Advanced, Larry Ullman, Peachpit Press.

*Latest editions of all the suggested books are recommended.

BCA – Semester V
MUTIMEDIA AND ANIMATION

Course Code: BCA 510   **L-4, T-1, P-0, C-5**
Objective: To give the basic knowledge of multimedia and it's tools with the familiarity of Animation.

Course Content

Unit –I
Multimedia Basics: Evolution of Multimedia and its objects, Uses of Multimedia in different fields of specification, Multimedia hardware, Multimedia Software, Different stages to Design and Produce a multimedia application, Memory and Storage Devices, Communication Devices, Presentation and Object Generation Tools.   **(Lecture 08)**

Unit-II
Multimedia Components: Text-Character sets and general guidelines.
Graphics- Vector Drawing, Digital Image and its Characteristics. Image File Formats: BMP,JPEG, GIF, TIFF, PNG. Image Capturing
Audio-Analog Sound, Digital Audio, Digital Audio Concepts, Sampling Variables, MIDI Sound, MIDI under Windows Environment, Audio File Formats, Audio Capturing
Video-Analog and Digital Video, Characteristics of Digital Video, Video Capturing
                                                                           (Lecture 08)

Unit-III
Data and Image Compression: Lossless Compression Algorithm: Run Length Coding, Variable Length Coding-Arithmetic Coding, Huffman Coding, Shannon-Fano Algorithm, Dictionary Based Coding (LZW), JPEG Standards, Lossy Compression Algorithms-Lossy Transform Codes, Lossy Predictive codecs, JPEG Compression, Quantization   **(Lecture 08)**

Unit-IV
Audio and Video Compression: Lossy and Lossless Compression of Audio, Multimedia
Monitor Bitmaps, Color Models, Video Representation, Video Compression Techniques, Video
Compression based on motion Compensation, JPEG Standards   **(Lectures 08)**
Unit-V
Animation: Basics of Animation: Keyframes, In-between Frames, Timeline, Motion Tweening,
Reverse Frames, Types of Animation, Drawing Techniques ,Basic Animation Software-
Macromedia and Adobe Products, Layer Concepts, Scene sequence and It's formation using
multiLayers   **(Lecture 08)**

Learning Outcome
By the end of this course a student should be able to:

Students should be able to: explain, discuss and solve simple problems in the basic representation and handling of multimedia data (images, audio and animation), and the basic components of 3D-environments.

Text Books:
1. Tay Vaughan, *Multimedia-Making it Work*, TMH Publication
2. ZeNian Li and Mark S.Drew, *Fundamentals of Multimedia,* PHI/Pearson Education
3. SujataPandey, ManojPandey, *Multimedia (System, Technology and Communicatio*n), S.K.Kataria& Sons

Reference Books:
1. Ranjan Parekh, *Principles of Multimedia*, TMGH, New Delhi
2. Paul Wells,*The Fundamentals of Animation*, AVA Publishing House
3. Kogent Course Solutions,*Photoshop CS6 in simple steps,*Dreamtech Press

*Latest editions of all the suggested books are recommended.

BCA – Semester V
DISTRIBUTED OPERATING SYSTEM

Course Code: BCA 514 **L-4, T-1, P-0, C-5**

Objective: This course covers general issues of design and implementation of distributed operating systems. The focus is on issues that are critical to the applications of distributed systems and computer networks, which include interprocess communication, distributed processing, sharing and replication of data and files.

Course Content

Unit-I:
Introduction: Introduction to Distributed System, Goals of Distributed system, Hardware and Software concepts, Design issues. Communication in distributed system: Layered protocols, Client – Server model, Remote Procedure Calls and Group Communication. Middleware and Distributed Operating Systems. **(Lecture 08)**

Unit-II:
Synchronization in Distributed System: Clock synchronization, Mutual Exclusion, Election algorithm, the Bully algorithm, and a Ring algorithm, Atomic Transactions, Deadlock in Distributed Systems, Distributed Deadlock Prevention, and Distributed Deadlock Detection.
(Lecture 08)
Unit-III:
Processes and Processors in distributed systems: Threads, System models, Processors Allocation, Scheduling in Distributed System, Real Time Distributed Systems. **(Lecture 08)**

Unit-IV:
Distributed file systems: Distributed file system Design, Distributed file system Implementation, Trends in Distributed file systems. **(Lecture 08)**

Unit-V:
Distributed Shared Memory: What is shared memory, Consistency models, Page based distributed shared memory, and Shared variables distributed shared memory. **(Lecture 08)**

Learning Outcome
By the end of this course a student should be able to:

- Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system
- Learn the various resource management techniques for distributed systems
- Identify the different features of real time operating systems
- Modify existing open source kernels in terms of functionality or features used.

Text Books:
1. 1. Andrew S. Tanenbaum and Maarten van Steen "Distributed Systems: Principles and Paradigms", Prentice Hall.
2. MukeshSinghal and N.G. Shivaratri, "Advanced Concepts in Operating systems" Tata McGraw – Hill.

Reference Books:
1. Abraham Silberschatz, Peter B. Galvin, G Gagne, "Operating System Concepts", AddisonWesley.
2. Randy Chow and Theodore Johnson. "Distributed Operating Systems & Algorithms", Addison-Wesley.

*Latest editions of all the suggested books are recommended.

BCA – Semester V
ENTERPRISE RESOURCE PLANNING

Course Code: BCA 515   **L-4, T-1, P-0, C-5**

Objective: The student after completing this course should have gained:
- Comprehend the technical aspects of ERP systems
- Learn concepts of reengineering and how they relate to ERP system implementations
- Be able to map business processes using process mapping techniques
- Understand the steps and activities in the ERP life cycle
- Be able to identify and describe typical functionality in an ERP system

Course Content

Unit - I
ERP: An Overview: Concept of ERP, Reasons for Growth Of ERP**,** Problem areas in ERP implementations, The future of ERP Characteristics and features of ERP**,** Benefits of ERP.
                                                                        (Lecture 08)

Unit - II
Enterprise Modeling and Integration for ERP: Enterprise: An overview, Integrated Management Information, The role of enterprise, Business modeling, Integrated Data Model Scope of Enterprise system, Generic Model of ERP System, Client/Server Architecture Characteristics of client/Server Architecture, Different Components of ERP Client/Server Architecture.   **(Lecture 08)**

Unit - III
ERP And related Technologies: BPR(Business Process reengineering), BPR –The different phases, BPR and IT, Data Warehousing, Data Warehouse Components, Structure and Uses of Data Warehouse, Data Mining, Data Mining Process, Advantages and Technologies Used In Data Mining, OLAP, Supply Chain Management, ERP Vs SCM, CRM.   **(Lecture 08)**

Unit - IV
ERP Implementation: .Evolution of ERP, Evolution of Packaged Software Solutions, The Obstacles in ERP implementation, ERP Implementation Lifecycle (Different Phases), Implementation Methodology, ERP Implementation, The Hidden Costs, In-house Implementation-Pros and Cons, Vendors and role of vendors for ERP, Consultants and role of consultants for ERP.   **(Lecture 08)**

Unit - V
ERP Present and Future: Limitations of ERP, EIA(Enterprise Integration Application), EIA Products, ERP And E-Commerce, ERP and Internet, Future Directions in ERP.   **(Lecture 08)**

Learning Outcome
By the end of this course a student should be able to:

- examine systematically the planning mechanisms in an enterprise, and identify all components in an ERP system and the relationships among the components;
- understand production planning in an ERP system, and systematically develop plans for an enterprise;
- use methods to determine the correct purchasing quantity and right time to buy an item, and apply these methods to material management;

- understand the difficulties of a manufacturing execution system, select a suitable performance measure for different objectives, and apply priority rules to shop floor control.

Text Books:
1. Alexis Leon, "ERP Demystified", Tata McGraw Hill
2. Rahul V. Altekar "Enterprisewide Resource Planning", Tata McGraw Hill,

Reference Books:
1. Vinod Kumar Garg and Venkitakrishnan N K, "Enterprise Resource Planning – Concepts and Practice", PHI
2. Joseph A Brady, Ellen F Monk, Bret Wagner, "Concepts in Enterprise Resource Planning", Thompson Course Technology
3. Mary Summer, "Enterprise Resource Planning"-Pearson Education
4. Ellen Mon, Bret Wagner "Concepts in ERP", Second Edition of Cengage Learning.

*Latest editions of all the suggested books are recommended

BCA – Semester V
OPERATION RESEARCH

Course Code: BCA 516   **L-4, T-1, P-0, C-5**

Objective: Operations research is a vast branch of mathematics and computer science which encompasses many diverse areas of minimization and optimization. The central objective of operations research is optimization, i.e., "to do things best under the given circumstances." This general concept has great many applications in agricultural planning, biotechnology, data analysis, distribution of goods and resources, emergency and rescue operations, engineering systems design, environmental management, financial planning, health care management, inventory control, manpower and resource allocation, manufacturing of goods, military operations, production process control, risk management, sequencing and scheduling of tasks, telecommunications, and traffic control.

Course Content

Unit -I

Introduction to operation research (OR): Nature and meaning of 'OR', Principles of Modeling, General Methods for solving 'OR' Models, Main Characteristics of 'OR', Main phases of 'OR'. Scope of 'OR', Role of 'OR' in decision making, Quantitative techniques of 'OR', Development of 'OR' in India, Role of computers in Operation Research.

(Lecture 08)

Unit -II
Assignment Problems: Definition, Hungarian Method, Travelling salesman problems.

(Lecture 08)

Unit -III
Transportation Problems: Introduction to Transportation Model, Matrix Form of TP, Applications of TP Models, Basic Feasible Solution of a TP, Degeneracy in TP, Solution Techniques of TP, Different Methods for Obtaining Initial Basic Feasible Solutions viz. Matrix Minima Method, Row Minima Method, Column Minima Methods, Vogel's Approximation Method, Techniques for Obtaining Optimal Basic Feasible Solution.   **(Lecture 08)**

Unit -IV
Linear Programming Problems (LPP): Definition of LPP, Graphical Solutions of Linear Programming Problems, Simplex Method and Artificial Variable Method, Two Phase Method, Duality, Dual Simplex Method.   **(Lecture 08)**

Unit- V
Replacement: Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely.   **(Lecture 08)**

Learning Outcomes

By the end of this course a student should be able to:

- Identify and develop operational research models from the verbal description of the real system.
- Understand the mathematical tools that are needed to solve optimization problems.
- Use mathematical software to solve the proposed models.
- Develop a report that describes the model and the solving technique, analyse the results and propose recommendations in language understandable to the decision-making processes in Management Engineering

Text Books:
1. Sharma S.D., *Introduction to Operation Research*, KedarNath and Ram Nath& Co., Meerut
2. *Kapoor V.K., Operation Research*

Reference Books:
1. Taha H.A, *Operational Research-An Introduction*, Macmillan
2. Hiller and Libermann, *Introduction to Operational Research*, McGraw Hill, Company.
3. Swarup K., Gupta P.K &Manmohan A., *Operational Research*, S. Chand

*Latest editions of all the suggested books are recommended.

BCA – Semester V
DISCRETE MATHEMATICS

Course Code: BCA 517   **L-4, T-1, P-0, C-5**

Objective: Discrete mathematics has become popular in recent past because of its applications to computer science. Concepts and notations from discrete mathematics are useful in studying and describing objects and problems in computer algorithms and programming languages, and have applications in cryptography, automated theorem proving, and software development.

Course Content

Unit - I
Propositional Calculus: Propositions, Truth tables, Logical Equivalence, Logical implications, Algebra of propositions, Conditional propositions, Bi-conditional statements, Negation of Compound statements, Tautologies and Contradiction, Normal Form, Arguments, Fallacies.

(Lecture 08)

Unit - II
Boolean algebra and Circuits: Boolean Expression, Logic Gates, Logic Circuits, Boolean Functions, Sum of Product and Product of Sum Forms, Canonical Forms, Simplification of functions using K-Map.

(Lecture 08)

Unit - III
Set Theory: Basic concepts of Set theory, some operations on sets, Venn diagram, Basic Set identities, Cartesian product.
Relation: Definition, Types of relation, Pictorial representation of relation, Composition of Relation, Equivalence relation.
Function: Definition, Classification of function, Types of function (one to one, many to one, into, onto, objective), Composition of function, Inverse function, Identity function.

(Lecture 08)

Unit - IV
Combinatorics: Fundamental principles, Permutation and Combination, Recurrence Relation.

(Lecture 08)

Unit - V
Graphs and Trees: Introduction to graphs, Graph terminology, Application of Graphs, Finite and Infinite graphs, Incidence and Degree, Isolated vertex, Pendent Vertex, and Null graph.

(Lecture 08)

Learning Outcomes
By the end of this course a student should be able to:

- Understand the notion of mathematical thinking, mathematical proofs, and algorithmic thinking, and be able to apply them in problem solving.
- Understand the basics of discrete probability and number theory, and be able to apply the methods from these subjects in problem solving.
- Be able to use effectively algebraic techniques to analyse basic discrete structures and algorithms.
- Understand asymptotic notation, its significance, and be able to use it to analyse asymptotic performance for some basic algorithmic examples.
- Understand some basic properties of graphs and related discrete structures, and be able to relate these to practical examples.

Text Books:
1. Sarkar Swapan Kumar, *Discrete Mathematics*, S Chand
2. NarsinghDeo, *Graph Theory with Applications to Engineering and Comp. Science*, Prentice Hall of India.
3. Seymour Lipschutz& Marc Lipson, *Discrete Mathematics*, Tata McGraw Hill.

Reference Books:
1. Liu C.L., *Elements of Discrete Mathematics,* TMH.
2. Neville Dean, *Essence of Discrete Mathematics*, Prentice Hall.
3. Kenneth H. Rosen, *Discrete Mathematics and Its Applications*, McGraw Hill.
4. Richard Johnsonbaugh, *Discrete Mathematics*, Macmillan.

*Latest editions of all the suggested books are recommended.

BCA – Semester V
COMPUTER FORENSICS AND INVESTIGATION

Course Code: BCA 518   **L-4, T-1, P-0, C-5**

Objective: Forensic science is the application of science to the examination of physical evidence obtained in the investigation of a crime. This course emphasizes the role of forensic science within the criminal justice system. Some of the topics to be covered include the crime scene, collection of physical evidence, fingerprints, firearms, and serology.

Course Content

Unit - I

Computer Forensics : Introduction to Computer Forensics, Forms of Cyber Crime, First Responder Procedure- Non-technical staff, Technical Staff, Forensics Expert and Computer Investigation procedure.   **(Lecture 08)**

Unit - II

Storage Devices & Data Recover Methods : Storage Devices- Magnetic Medium, Non-magnetic medium and Optical Medium. Working of Storage devices-Platter, Head assembly, spindle motor. Data Acquisition, Data deletion and data recovery method and techniques.   **(Lecture 08)**

Unit - III

Forensics Techniques : Windows forensic, Linux Forensics, Mobile Forensics, Steganography, Application Password cracking-Brute force, Dictionary attack, Rainbow attack. Email Tacking – Header option of SMTP, POP3, IMAP.   **(Lecture 08)**

Unit - IV

Cyber Law : Corporate espionage, Evidence handling procedure, Chain of custody, Main features of Indian IT Act 2008 (Amendment)   **(Lecture 08)**

Unit - V

Current Computer Forensic tools: evaluating computer forensic tool needs, computer forensics software tools, computer forensics hardware tools, validating and testing forensics software E-Mail Investigations: Exploring the role of e-mail in investigation, exploring the roles of the client and server in e-mail, investigating e-mail crimes and violations, understanding e-mail servers, using specialized e-mail forensic tools.

Cell phone and mobile device forensics: Understanding mobile device forensics, understanding acquisition procedures for cell phones and mobile devices.   **(Lecture 08)**

Learning Outcomes

By the end of this course a student should be able to:

- Understand the role of computer forensics in the business and private world
- Identify some of the current techniques and tools for forensic examinations
- Describe and identify basic principles of good professional practice for a forensic computing practitioner
- Apply forensic tools in different situations.

Text Books:
1. Guide to Computer Forensics and Investigations –B. Nelson, et al, - Cengage

References Books:
1. Hacking Exposed Computer Forensics – Aaron Philipp, David Cowen, Chris Davis, Pub: McGraw Hill

*Latest editions of all the suggested books are recommended.

BCA – Semester V

MINI PROJECT (INDUSTRIAL TRAINING)

Course Code: BCA 551   **L-0, T-0, P-0, C-3**

Evaluation Process

Project Guide/Supervisor of the project will be nominated by Head of Department and the internal evaluation shall be done by three faculty members committee nominated by the Director of the college. The external evaluation will be done by the external examiner arranged by examination branch of the university.

Learning Outcome
By the end of this course a student should be able to:

- Acquire practical knowledge within the chosen area of technology for project development
- Identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach
- Contribute as an individual or in a team in development of technical projects
- Develop effective communication skills for presentation of project related activities

BCA – Semester V

CORE JAVA PROGRAMMING LAB

Course Code: BCA 555   **L-0, T-0, P-4, C-2**

Course Content

1) Developing simple console application in Java.
2) Programs based on loops, arrays, operators and big numbers.
3) Programs based on Classes and Objects.
4) Programs based on Method Overloading, Constructors.
5) Simple application based on static keyword.
6) Programs based on Inheritance.
7) Programs based on Method Overriding, Dynamic Method Dispatch, Abstract Classes.
8) Programs based on String Handling.
9) Simple application to demonstrate the working of Packages.
10) Developing a Simple Applet.
11) An applet to demonstrate the working of Mouse Events.
12) Programs based on the usage of all AWT controls.
13) A simple application to demonstrate the working of Frames.
14) A simple swing application.
15) Programs to demonstrate event handling on various swing components.
16) Programs based on applets and multithreading.
17) A simple application to retrieve and insert records in MS-Access database.
18) A simple application to retrieve and insert records in My-SQL database.
19) Use of JAR and JAVADOC utilities.

Learning Outcome
By the end of this course a student should be able to:

- The students will have the competence in the use of Java Programming language.
- The development of small to medium sized application programs that demonstrate professionally acceptable coding.

BCA – Semester V

PHP LAB

Course Code: BCA 556   **L-0, T-0, P-4, C-2**

Course Content

1. Basic program related to looping, control statement and functions.
2. Program related to array.
3. Program related to string.
4. Program related to Global Variables.
5. Form Validation in PHP
   a. Write a HTML file to create a simple form with 5 input fieldsviz: Name, Password,
   b. Email, Pincode, Phone No. and a Submit button.
   c. Write a PHP program to demonstrate required field validations to validate that allinput fields are required.
   d. Write a PHP program to validate Name, Email and Password.
   e. Write a PHP program to display error messages if the above validations do not hold.
   f. Create a form for your college library entering student details for each student in the college. Validate the form using PHP validators and display error messages.
6. File Handling in PHP
   a. Create a PHP program to demonstrate opening and closing a file.
   b. Create a PHP program to demonstrate reading a file.
   c. Create a PHP program to demonstrate writing in a file.
   d. Create a PHP program to read the following text from a file nitkkr.txt "National Institute of Technology, Kurukshetra (or NIT Kurukshetra), is a public engineering university located in Kurukshetra. In December 2008, it was accredited with the status of Institute of National Importance (INI)"And write to another file Coursephp.txt.
   e. Write a program in PHP to print the count of word the as an independent word in text file STORY.TXT. For example, if the content of the file STORY.TXT is "There was a monkey in the zoo. The monkey was very naughty." Then the output of the program should be 2.
7. Database in PHP
   a. Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Use PHP script for programs 1 and 2.
   b. Create a Cookie and add these four user ID□s and passwords to this Cookie.
   c. Read the User id and Passwords entered in the Login form and authenticate with the values (UserId and Passwords) available in the cookies. If he is a valid user (i.e., UserName and Password match) you should welcome him by name (UserName) else you should display "You are not an authenticated user".
   d. Write a PHP which does the following job: Insert the details of the 3 or 4 users who register with the web site by using registration form. Authenticate the user when he submits the login form using the UserName and Password from the database (instead of cookies).
   e. Create tables in the database which contain the details of items (books in our case like Book name, Price, Quantity, Amount) of each category. Modify your

catalogue page in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using PHP.

    f. Create and delete MYSQL database using PHP.

8. Session Tracking in PHP
   a. Write a PHP program to start a PHP Session.
   b. Write a PHP program to destroy a PHP Session.
   c. WAP to create a PHP Session without cookies.
   d. Write a PHP program to store current date-time in a COOKIE and display the "Last visited on date-time on the web page upon reopening of the same page.
   e. Write a PHP program to store page views count in SESSION, to increment the count on each refresh, and to show the count on web page.

9. Program related to AJAX

Learning Outcome

By the end of this course a student should be able to:

- Explain the processes by which a PHP programme is compiled.

- Write basic PHP programs with variables and arithmetic operators.

- Use appropriate C programming statements to control flow of execution in a PHP programme.

- Exercise good programming practices in the design of Programmes.

BCA – Semester V

LINUX LAB

Course Code: BCA 557   **L-0, T-0, P-4, C-2**

Course Content

Use of different commands CD, LS, CP, MD, RM, MKDIR, RMDIR, more, less, creating and viewing files, using CAT, file comparisons, View files, disk related commands, checking disk free spaces.

batch commands, kill, PS, who, sleep, Printing commands, grape, FGREP, find, sort, Cal, banner, touch, file, file related commands-WS, SAT, CUT, GREP, DD, etc. Mathematical commands- BC, EXPR, FACTOR, UNITS. VI EDITOR

Shell Programming conditional and looping statements, case statements, parameter passing and arguments, Shell variables, shell keywords, Creating Shell programs

Learning Outcome
- Install a Linux operating system with a custom partitioning scheme and log into and out of a UNIX/Linux computer system using graphical and command line environments.
- Use UNIX/Linux command line (shell) commands to navigate and manage the UNIX/Linux file system, customize the user shell environment, use archiving and compression to back up files, use file name globing and regular expressions to find files and text in the system, manage user and group accounts and permissions, manage processes and jobs, redirect command input and output, schedule processes for execution using cron and at, install and update software packages using graphical and command line utilities, locate and identify hardware device files in the UNIX/Linux system, configure and manage hardware devices connected to UNIX/Linux system, and write shell scripts to automate tasks including decision and repetition structures using a text editor such as vi.

BCA – Semester VI

PROGRAMMING WITH C#

Course Code: BCA 609   **L-4, T-1, P-0, C-5**

Objective:
- The ability to effectively use visual studio .NET.
- An understanding of the goals and objectives of the .NET Framework. .NET is a revolutionary concept on how software should be developed and deployed.
- A working knowledge of the C# programming language.
- An understanding of how to use forms to develop GUI programs under .NET.
- Knowledge of some of the tools available in the .NET Framework class library. (FCL)
- Improved object-oriented programming skill through practice and insights gained by studying a new programming language.

Course Content

Unit - I
Architecture of the .Net Framework Development Platform: Compiling Source Code into Managed Code, Metadata, Intermediate Language (IL), Common Language Runtime Services, Common Type System, Common Language Specification The .Net Framework Class Library, Just-In-Time Compilation, Unified Classes, Boxing and Unboxing.
C# Basics: Data Types, Literals and Variables, Operator, Program Control Statements, Class and Object, Arrays and Strings.   **(Lecture08)**

Unit - II
A Closer Look at Methods and Classes: C# Access Modifiers, Use ref and out parameter, Variable number of Arguments, Concept of Return Object and Array. Method Overloading, Overloading Constructors, Optional Arguments, Named Arguments, Recursion, Understanding Static. Operator Overloading, Indexers and Properties, **Inheritance:** Member Access using Protected Access, Calling Base Class Constructor, Name Hiding, Virtual Methods and Overriding, Abstract Classes, Using sealed to Prevent Inheritance.   **(Lecture 08)**

Unit - III
Interfaces, Exception Handling. Using I/O, Delegates and Events, Namespaces and Assemblies, Reflection, Unsafe Code, Networking and Socket.
Multithreading: Thread Class, Determining when a Thread Ends, Thread Priorities, Synchronization.   **(Lecture 08)**

Unit - IV
Windows Forms Controls: Working with Textbox, Buttons, Labels, Checkbox, Radio Buttons, List box, Combo Box, Picture Box, Menu, Events: The Change Event, The Click Event, The Key Down Event, The Form Load Event (IDE Environment).
Introduction to ADO.Net: Connected v/s. Disconnected Data Access. ADO.Net Architecture, Connection Object, SQL Command Object, Data Adapter Object, Data Reader Object, DataSet Object. Developing a Simple ADO.NET Based Application with Inserting, Deleting, Retrieving & Updating Data. Implementing Procedure.   **(Lecture 08)**

Unit - V

Asp.net Web Form Controls: Introduction to ASP.NET Web Forms, Implementation of ASP.NET controls: Dropdown List, Textbox, Button, Checkbox, Radio Button. Implementing Master Page, State Management, Validation Control. Developing a Simple ADO.NET Based Application.   **(Lecture08)**

Learning Outcomes

By the end of this course a student should be able to:

- Contrast and compare major elements of the .NET Framework and explain how C# fits into the .NET platform.
- Analyze the basic structure of a C# application and be able to document, debug, compile, and run a simple application.
- Create, name, and assign values to variables.
- Use common statements to implement flow control, looping, and exception handling.
- Create methods (functions and subroutines) that can return values and take parameters.
- Create, initialize, and use arrays.
- Explain the basic concepts and terminology of object-oriented programming.
- Demonstrate use of common objects and reference types.
- Demonstrate ability to create a C# Windows and web application using Visual Studio.

Text books:
1. Wiley," Beginning Visual C#", Wrox.
2. ".Net professional framework 4.5", Wrox.
3. "Black Book .Net Framework 4.5". DreamTech.
4. "C# 4.0 Complete Reference", by Herbert Schildt.
5. "Professional ASP.NET 4.5 in C# and VB" by Bill Evjen, Scott Hanselman, Devin Rader, Wrox.

Reference Books:
1. C#.Net Developers Guide- Greg Hack, Jason Werry, SaurabhNandu. (SyngRess).
2. Wrox Press Professional C# – Simon Robinson, Jay Glynn.

*Latest editions of all the suggested books are recommended.

BCA – Semester VI
ANDROID PROGRAMMING

Course Code: BCA 610   **L-4, T-1, P-0, C-5**

Objective:
- To study about the android architecture and the tools for developing android applications
- To create an android application
- To learn about the user interfaces used in android applications
- To learn about how to handle and share android data
- To learn about how to develop an android services and to publish android application for use

Course Content

Unit - I
Introduction
Android , Android Versions , Features of Android , Architecture of Android Obtaining the Required Tools , Android SDK , Installing the Android SDK Tools Configuring the Android SDK Manager – Eclipse , Android Development Tools (ADT) , Creating Android Virtual Devices (AVDs) , Creating Your First Android Application – Types of Android Application , Anatomy of an Android Application.   **(Lecture 08)**

Unit - II
Activities, Fragments and Intents
Understanding Activities , Creating Activities , Linking Activities Using Intents, Resolving Intent Filter Collision , Returning Results from an Intent , Passing Data Using an Intent Object , Fragments , Adding Fragments Dynamically , Life Cycle of a Fragment , Interactions between Fragments , Calling Built-In Applications Using Intents , Understanding the Intent Object , Using Intent Filters – Adding Categories , Displaying Notifications.   **(Lecture 08)**

Unit - III
Android User Interface
Understanding the Components of a Screen , Adapting to Display Orientation Managing
Changes to Screen Orientation , Utilizing the Action Bar , Creating the User Interface Programmatically , Listening for UI Notifications , Designing Your User Interface With Views , Using Basic Views , Using Picker Views , Using List Views to Display Long Lists , Understanding Specialized Fragments – Displaying Pictures And Menus With Views , Using Image Views to Display Pictures – Using Menus with Views , Additional Views. **(Lecture 08)**

Unit - IV
Databases, Content Providers and Messaging
Saving and Loading User Preferences , Persisting Data to Files , Creating and Using Databases , Content Providers , Sharing Data in Android , Using a Content Provider , Creating Your Own Content Providers , Using the Content Provider – Messaging , SMS Messaging , Sending E,mail.
                                                                     (Lecture 08)
Unit - V
Location Based Services, Networking and Android Services

Location Based Services , Displaying Maps, Getting Location Data, Monitoring a Location ,Project — Building a Location Tracker ,Networking ,Consuming Web Services Using HTTP , Consuming JSON Services , Sockets Programming Developing.
Android Services, Creating Your Own Services, Establishing Communication between a Service and an Activity, Binding Activities to Services, Understanding Threading, Publishing Android Applications , Preparing for Publishing, Deploying APK Files.   **(Lecture 08)**

Learning Outcome
By the end of this course a student should be able to:

- Understand the existing state of mobile app development via researching existing apps, meeting with industry professionals, and formulating new ideas.
- Display proficiency in coding on a mobile programming platform.
- Understand the limitations and features of developing for mobile devices.
- Create a complete Mobile app with a significant programming component, involving the sensors and hardware features of the phone.

Text Books:
1. Wei - Meng Lee, "**Beginning Android 4 Application Development**" , John Wiley & Sons, Inc.
2. Reto Meier, "**Professional Android 4 Application Development**" , John Wiley & Sons, Inc.

Reference Books:
1. Zigurd Mednieks, Laird Dornin, Blake Meike G, and Masumi Nakamura, "**Programming Android**", O'Reilly.

*Latest editions of all the suggested books are recommended.

BCA – Semester VI
DATA WAREHOUSE AND DATA MINING

Course Code: BCA 611   **L-4, T-1, P-0, C-5**

Objective: Data warehouse is used to manage the old data and mining is used for finding the appropriate information for decision making. The course provides knowledge of Data warehousing and Data mining.
Course Content

Unit - I
Data Warehousing: History of Data Warehouses; Concepts; Benefits; Comparison of OLTP and Data Warehousing, Data Marts.   **(Lecture 08)**

Unit - II
Principles of Dimensional Modeling: Objectives; Requirements to Data Design; STAR Schema: concept of Keys, Advantages.
Dimensional Modeling: Updates to the Dimension tables; miscellaneous dimensions; SNOWFLAKE schema; Aggregate fact tables; Families of STARS.   **(Lecture 08)**

Unit - III
Data Warehousing Architecture: Data: Operational, Store, Detailed, Lightly and Highly summarized, Metadata; Archive/Backup; Manager: Load, Warehouse, Query; Architecture models: 2,Tier, 3,Tier and 4,Tier .   **(Lecture 08)**

Unit - IV
OLAP: Definitions, Rules, Characteristics, Features and functions, Dimensional analysis; Hypercube; Drill, Down and Rollup; Slice, and, Dice or Rotation; OLAP Models.
                                                                        (Lecture 08)
Unit - V
Data Mining: Definition; Knowledge discovery process (KDP); OLAP vs. Data mining; Data mining vs. Data warehouse; Major data mining techniques; Cluster detection; Decision trees; Memory based reasoning; Neural networks; Genetic algorithms; Applications; Benefits.
                                                                        (Lecture 08)
Learning Outcome:
By the end of this course a student should be able to:

- Have a deeper understanding of database systems and their underlying theory to be able to improve the decision-making process.

- Understand the technology of data warehousing.

- Understand data mining concepts and techniques.

Text Books
1. Paul R. P., *Fundamentals Of Data Warehousing*, John Wiley and Sons.
2. Inmon W. H., *Building the Operational Data Store*, John Wiley and Sons.

References Books
1. Anahony S., *Data Warehousing In the Real World: A Practical Guide for Building DecisionSupport Systems*, John Wiley and Sons.
*Latest editions of all the suggested books are recommended.

BCA – Semester VI
CLOUD COMPUTING

Course Code: BCA 612   **L-4, T-1, P-0, C-5**

Objective: The main objective of this course is to teach the students what cloud is and how to use the cloud in computing. This course offers the students theoretical knowledge of cloud computing.

Course Content
Unit - I
Cloud Computing Introduction: Cloud computing fundamental, cloud types and services, Cloud Benefits, Business scenarios, Cloud Computing Evolution, cloud vocabulary, Essential Characteristics of Cloud Computing, Cloud deployment models, Cloud Reference Model, The Cloud Cube Model, Security for Cloud Computing, How Security Gets Integrated.
(Lecture 08)

Unit - II
Data Center Operations: The anatomy of cloud, Data Center Operations, Security challenge, implement "Five Principal Characteristics of Cloud Computing, Data center Security Recommendations.   **(Lecture 08)**

Unit - III
Governance and Enterprise Risk Management: Information security governance processes, Governance and enterprise risk management in Cloud Computing and Third Party Management Recommendations.   **(Lecture 08)**

Unit - IV
Compliance and Audit: Cloud customer responsibilities, Compliance and Audit Security Recommendations. Hybrid cloud implementation, aneka cloud platform.   **(Lecture 08)**

Unit - V
Traditional Security, Business Continuity, and Disaster Recovery: Risk of insider abuse, Security baseline, Customers actions, Contract, Documentation, Recovery Time Objectives (RTOs), Customers responsibility, Vendor Security Process (VSP)

Application Security: Web Application, Application Weaknesses, Attack Methods, What is Web Application Security, application security layer, vulnerability distribution, Why Web Application Risks Occur, Security solutions, Applications in cloud environments Security Recommendations.   **(Lecture 08)**

Learning Outcome
By the end of this course a student should be able to:

- Understand the fundamental principles of distributed computing
- Understand the importance of virtualization in distributed computing and how this has enabled the development of Cloud Computing
- Understand the business models that underlie Cloud Computing.
- Understand concepts of IAAS, SASS, PAAS

Text Books:
1. RajkumarBuyya, James Broberg, Andrzej M. Goscinsk, Cloud Computing: Principles and Paradigms, Wiley Publications.
2. Lee Gillam, Cloud Computing: Principles, Systems and Applications by Springer

Reference Books:
1. Armando Escalante, Handbook of Cloud Computing by Springer
2. Tim Mather, Shahedlatif, Cloud Security and Privacy.

*Latest editions of all the suggested books are recommended.

BCA – Semester VI
CRYPTOGRAPHY AND NETWORK SECURITY

Course Code: BCA 613   **L-4, T-1, P-0, C-5**

Objective:
- Upon completion of this course, you should be able to define information security
- Recount the history of computer security and how it evolved into information security
- Define key terms and critical concepts of information security
- Enumerate the phases of the security systems development life cycle
- Describe the information security roles of professionals within an organization

Course Content

Unit - I
Introduction to Security: Attacks, Services & Mechanisms, Security. Conventional Encryption Model, Classical Encryption Techniques, Steganography, Modern Techniques: Simplified DES, Block Cipher Principles, DES Standard, DES Strength, Differential & Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher Modes of Operation.   **(Lecture 08)**

Unit - II
Conventional Encryption Algorithms: Triples DES, Blowfish, International Data Encryption Algorithm, RC5, Placement of Encryption Function, Key Distribution.   **(Lecture 08)**

Unit - III
Public Key Encryption: Public,Key Cryptography: Principles of Public, Key Cryptosystems, RSA Algorithm, Key Management, Fermat's &Euler's Theorem, Primality Test, The Chinese Remainder Theorem.   **(Lecture 08)**

Unit - IV
Message Authentication & Hash Functions: Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Function, MD5 Message Digest Algorithm, Secure Hash Algorithm (SHA), Digital Signatures.   **(Lecture 08)**

Unit - V
Network & System Security: Authentication Applications: Kerberos X.509, Directory Authentication Service, Electronic Mail Security, Pretty Good Privacy (PGP), S / Mime, Key Management.   **(Lecture 08)**

Learning Outcome
By the end of this course a student should be able to:

- Identify some of the factors driving the need for network security
- Identify and classify particular examples of attacks
- Define the terms vulnerability, threat and attack
- Identify physical points of vulnerability in simple networks
- Compare and contrast symmetric and asymmetric encryption systems and their vulnerability to attack, and explain the characteristics of hybrid systems.

Text Books:
1. William Stallings, "Cryptography and Network Security: Principles and Practice", Prentice Hall, New Jersey.
2. AtulKahate, "Cryptography and Network Security", TMH.

Reference Books:
1. Johannes A. Buchmann, "Introduction to cryptography", Springer, Verlag.

*Latest editions of all the suggested books are recommended.

BCA – Semester VI
PYTHON PROGRAMMING

Course Code: BCA 614   **L-4, T-1, P-0, C-5**

Objective: The student after completing this course should have gained:

- Execute Python code in a variety of environments
- Use correct Python syntax in Python programs
- Use the correct Python control flow construct
- Write Python programs using various collection data types
- Write home grown Python functions
- Use many of the standard Python modules such as os, sys, math, and time
- Trap various errors via the Python Exception Handling model
- Use the IO model in Python to read and write disk files
- Create their own classes and use existing Python classs
- Understand and use the Object Oriented paradigm in Python programs
- Use the Python Regular Expression capabilities for data verification

Course Content

Unit - I
Python Introduction: The Python Language, The Python Standard Library and Extension Modules, Python Implementation, Python Development and Versions, Installation from Source Code and Binaries, The Python Interpreter.

Core Python Language and Built—ins: Lexical Structure, Data Type, Variable, Expression and Operators, Numeric Operations, Sequence Operations, Dictionary Operations, The print statement, Conditional Statements, Looping, Control flow Statements.   **(Lecture 08)**

Unit - II
Functions: Defining a function, calling a function, Types of functions, Function Arguments, Anonymous functions. **Lists and Tuple**: Introduction to List and Tuple, Accessing List and Tuple, Operations, working with List and Tuple, Function and Methods. **Dictionaries:** Working with dictionaries, properties and functions. **Module:** Importing Module, Math Module, Random Module, Package, Composition and The Distribution Utility (disutil).   **(Lecture 08)**

Unit - III
OOPs Concept: Class and Object, Attribute, Inheritance, Overloading and Overriding, Data Hiding, Metaclasses, **Exceptions:** try Statement, Exception Propagation, Except Clause, Try ?Finally Clause, User Defined Exception, The raise statement. **Core Built—ins:** Built—in Types, Built—in functions, The sys Module, The getopt Module, The copy Module, The bisect Module, The UserList, UserDict and UserString Module. Strings and Regular Expression. **File and Text I/O Operations:** The OS Module, Filesystem Operations, File Objects, Auxiliary Module for File I/O, The StringIO and cStringIO Modules, Compressed File, Text Input and Output, Opening and Closing File, Reading data form keyboard, Reading and Writing a File, Copy the content from one file to another file.
                                                                (Lecture 08)

Unit - IV
CGI: Introduction, Architecture, CGI environment variable, Get and Post Method, Cookies, File Upload. **Database:**Introduction**,** Connection, Executing Queries, Transactions.
Time Operations: The time Module, The sched Module, The calendar Module, The mx.DateTime Module. **Controlling Execution:**Dynamic Execution and the exec statement, Restricted Execution, Internal Type, Garbage Collection.**Thread and Process:**Introduction**,** Starting a Thread, Queue Module, Threading module, Synchronization thread, Multithreaded Priority Queue.   **(Lecture 08)**

Unit - V
Networking and Web Programming: URL Access, Email Protocols, The HTTP and FTP Protocols, Network News, Telnet, The Socket Module, TheSocketServer Module, Event— Driven Socket Program.
MIME and Network Encoding: Encoding Binary data as a Text, MIME and Email Format Handling.   **(Lecture 08)**

Learning Outcome
By the end of this course a student should be able to:

- Be fluent in the use of procedural statements — assignments, conditional statements, loops, method calls — and arrays. Be able to design, code, and test small Python programs that meet requirements expressed in English. This includes a basic understanding of top-down design.
- Understand the concepts of object-oriented programming as used in Python: classes, subclasses, properties, inheritance, and overriding.
- Have knowledge of basic searching and sorting algorithms. Have knowledge of the basics of vector computation.

Text books:
1. "Python in a Nutshell" by Alex Martelli, Oreilly Publication.
2. "Think Python" by Allen Downey, Green Tea Press

Reference Books:
1. Core Python Programming by Wesley J. Chun, Pearson Education
2. An Introduction to Python by Guido Van Russom, Fred L.Drake, Network Theory Limited.
3. Beginning Python: From Novice To Professional By Magnus Lie Hetland, Second Edition Apress
4. Programming in Python by Mark Summerfield, Pearson Education

*Latest editions of all the suggested books are recommended.

BCA – Semester VI
COMPUTER ETHICS AND CYBER LAWS

Course Code: BCA 615   **L-4, T-1, P-0, C-5**

Objective: The course is designed by keeping the perspectives as:
- Acquaint student with contemporary and possible future moral problems that arise due to computerization
- Give a deeper understanding of nature of moral choices
- Help to understand social, economic, legal and cognitive effects of technology
- To identify ethical conflicts and think through the implications of possible solutions to ethical conflicts

Course Content

Unit - I
Computer Ethics: Introduction to Computer Ethics, Technology and ethics, Computer Ethics and Morality, Ethical Decision Making in Computing, Computer Crime, types of Computer Crime, Computer Criminals, Computer Fraud, Hackers and Hacking.
(Lecture 08)

Unit - II
Cyber terrorism, Cyber Laws, Investigation and Ethics: Information Security and Law, Cyber Law Issues in E—Business Management, Overview of Indian IT Act, Surveillance Technology.
(Lecture 08)

Unit - III
Intellectual Property Right (IPR), Ethical Issues in Intellectual property rights, Basic procedural steps for creation of IPR, Copy Right, Patents, Registration, Trademark, License, Data privacy and protection, Domain Name, Software piracy, Plagiarism, Issues in ethical hacking.
(Lecture 08)

Unit - IV
Computer Reliability, Intelligent Machines: ROBOTs, ATMs, Kiosk, Impact on Society: Future Schools, Electronic Course, Virtual reality, Computer Games, Internet pornography, Electronic voting, Environmental problems.   **(Lecture 08)**

Unit - V
Ethics and the Internet: Technological and social changes, Democratic values in the Internet, Computer related Code of Ethics, Ethical Decision making progress, cases concerning Internet based ethics and code of conduct.   **(Lecture 08)**

Learning Outcome
By the end of this course a student should be able to:

- Identify ethical issues in different enterprise computing settings.
- Review real-life ethical cases and be able to develop ethical resolutions and policies.
- Understand laws and regulations related to ethics.
- Understand the consequences of ignoring and non-compliance with ethical imperatives.
- Learn about the best ethical practices and models.
- Develop a sound methodology in resolving ethical conflicts and crisis.

- Learn about the issues directly related to information technology environment and professionals.

Text Books:
1. M. David Ermann, Michele S. Shauf, "Computers, Ethics and Society", Oxford University Press.
2. Deborah G. Johnson, "Computer Ethics", Pearson Education.
3. Donald H. Sanders, "Computers in Society", McGraw,Hill Companies.

Reference Books:
1. Richard S. Rosenberg, "The Social Impact of Computers", Elsevier Academic Press.

*Latest editions of all the suggested books are recommended

BCA – Semester VI
PROJECT WORK

Course Code: BCA 653   **L-0, T-0, P-6, C-3**

Course Content

Project work to be carried out on either of the following categories:
1. Client Server Based (VB.Net/Java)
2. MIS Based (VB.Net/Java/C/C++)

Evaluation:
Project Guide/Supervisor of the project will be nominated by Head of Department and the Internal evaluation shall be done by three faculty members committee nominated by the Director of the college. The external evaluation will be done by the external examiner arranged by examination branch of the university.

BCA – Semester VI
C# LAB

Course Code: BCA 657   **L-0, T-0, P-6, C-3**

Course Content

1. The use of sequence, conditional and iteration construct.
2. Various operators like logical, arithmetical, relational, etc.
3. Overloading of various operators.
4. Use of Static Member functions, optional arguments.
5. Use of destructor and various types of constructor.
6. Various forms of Inheritance.
7. Use of Interface in multiple inheritance, virtual and override concept, delegates.
8. File operation.
9. Create windows based application with connected and disconnected architecture.
10. Simple web application using ASP Net.

Learning Outcome

By the end of this course a student should be able to:

- Contrast and compare major elements of the .NET Framework and explain how C# fits into the .NET platform.
- Analyze the basic structure of a C# application and be able to document, debug, compile, and run a simple application.
- Create, name, and assign values to variables.
- Use common statements to implement flow control, looping, and exception handling.
- Create methods (functions and subroutines) that can return values and take parameters.
- Create, initialize, and use arrays.
- Explain the basic concepts and terminology of object-oriented programming.
- Demonstrate use of common objects and reference types.
- Demonstrate ability to create a C# Windows and web application using Visual Studio.

BCA – Semester VI
ANDROID LAB

Course Code: BCA 658   **L-0, T-0, P-6, C-3**

Course Content

1. Creating Applications with Multiple Activities and a Simple Menu using ListView
2. Creating Activities For Menu Items and Parsing XML Files
3. Writing Multi-Threaded Applications
4. Using WebView and Using the Network
5. Graphics Support in Android
6. Preferences and Content Providers
7. Location Services and Google Maps in Android

Learning Outcome

By the end of this course a student should be able to:

- Describe the platforms upon which the Android operating system will run.
- Create a simple application that runs under the Android operating system.
- Access and work with the Android file system.
- Create an application that uses multimedia under the Android operating system.
- Access and work with databases under the Android operating system.