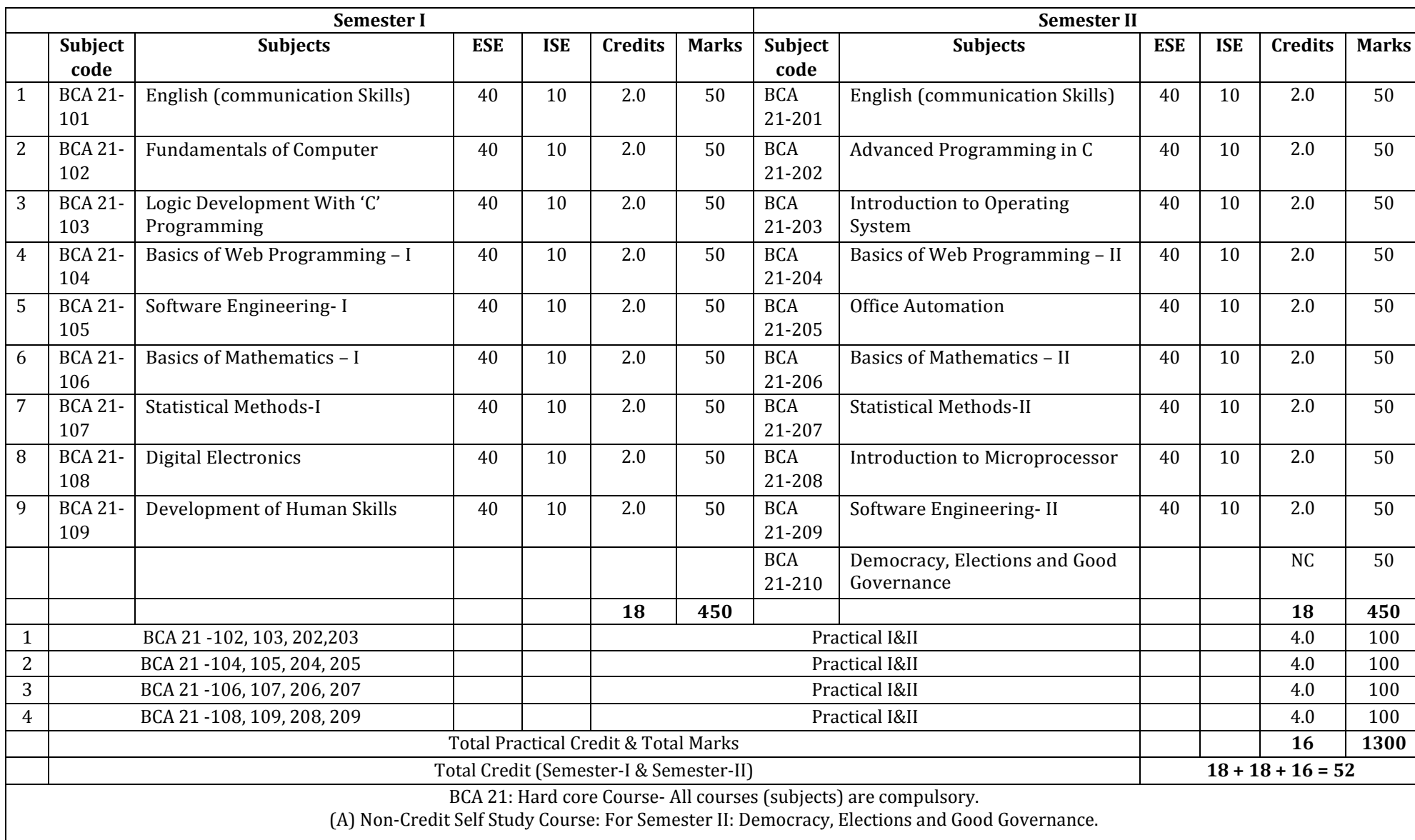




(Affiliated to P. A. H. Solapur University, Solapur)

BCA-I Syllabus Semester-I & II (CBCS)

Under the Faculty of Science and Technology (w. e .from July 2021-22)





Hirachand Nemchand College of Commerce (Autonomous), Solapur

Dept. of Management Studies

(Affiliated to P. A. H. Solapur University, Solapur)



BCA-I Ordinance

Bachelor of Computer Applications (BCA)

Bachelor of Computer Applications (B. C. A.) is a degree programme started in our college from 2003, for the students who want to pursue career in computer field. It provides sound academic base from which an advanced career in computer field can be built, keeping pace with the industry requirements.

The programme also carries out the required analysis and synthesis involved in computer systems, information systems and computer applications.

Objectives of the course:

This is a three years bachelor degree course in computer applications aimed at developing computer professional versatile in use of computers mostly in business world. The emphasis is to have generality of developing professionals as programmer, system analysts, database administrators, documentation officer etc.

Duration:

1. The course shall be a fulltime course.
2. The duration of course shall be three years.
3. The course shall be run on self-supporting basis.

Total First Year Intake: 60 seats.

Medium:

The medium of instruction and examination will be only in English.

Details of Internal examination:

Sr. No.	Internal Criteria	Internal Marks (10)
1	Class Assignment	2
2	Home Assignment	2
3	Mid Test	3
4	Attendance	3
	Total	10

- a) Marks of Lab course and mini project will be given by the concerned college on the basis of evaluation by the internal teacher.
- b) Original Report and Viva-Voce:

Project Report will be assessed by the internal teacher at the end of sixth semester out of 70 marks and there will be viva-voce examination of 80 marks. The panel of examiners will consist of one internal and one external appointed by university.

Standard of Passing:

A candidate must obtain minimum 40% marks for passing in each university examination paper, internal examination, Lab course, Major Project.

- i. Class will be awarded on the basis of marks obtained by the candidate in all the six semester examination.
- ii. Candidate who has secure 40% marks in each head of internal credit and semester examination shall be declared to have passed in the paper.
- iii. A candidate who fails in any particular theory papers shall be allowed to reappear for that theory paper. However, his/her internal credit marks shall be carrying forwarded.



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Course		Examination			Credits
Semester I					
Code	Subject Name	ESE	ISE	Total	
BCA 21-101	English (communication Skills)	40	10	50	2.0
BCA 21-102	Fundamentals of Computer	40	10	50	2.0
BCA 21-103	Logic Development With ‘C’ Programming	40	10	50	2.0
BCA 21-104	Basics of Web Programming – I	40	10	50	2.0
BCA 21-105	Software Engineering- I	40	10	50	2.0
BCA 21-106	Basics of Mathematics – I	40	10	50	2.0
BCA 21-107	Statistical Methods-I	40	10	50	2.0
BCA 21-108	Digital Electronics	40	10	50	2.0
BCA 21-109	Development of Human Skills	40	10	50	2.0
		360	90	450	18
Semester II					
BCA 21-201	English (communication Skills)	40	10	50	2.0
BCA 21-202	Advanced Programming in C	40	10	50	2.0
BCA 21-203	Introduction to Operating System	40	10	50	2.0
BCA 21-204	Basics of Web Programming – II	40	10	50	2.0
BCA 21-205	OfficeAutomation	40	10	50	2.0
BCA 21-206	Basics of Mathematics – II	40	10	50	2.0
BCA 21-207	StatisticalMethods-II	40	10	50	2.0
BCA 21-208	Introduction to Microprocessor	40	10	50	2.0
BCA 21-209	Software Engineering- II	40	10	50	2.0
BCA 21-210	Democracy, Elections and Good Governance	---	---	50	NC
		360	20	450	18
BCA 21 -102, 103, 202,203	Practical I&II	80	20	100	4.0
BCA 21 -104, 105, 204, 205	Practical I&II	80	20	100	4.0
BCA 21 -106, 107, 206, 207	Practical I&II	80	20	100	4.0
BCA 21 -108, 109, 208, 209	Practical I&II	80	20	100	4.0
		320	80	400	16

Semester :	I	Semester Exam				
Code: BCA 21-101	English (Business Communication)	ESE*	ISE*	Total	L/W*	Credits
Subject Title		40	10	50	3	2
Course Objectives	1. To focus on grammar and vocabulary development 2. To improve student’s spoken English 3. To focus on oral and written communication skills					
Course Outcomes	<ul style="list-style-type: none">Students will be able to learn and develop their vocabulary and spoken EnglishStudents will be able to enhance their communication skills					
Module 1	Grammar and Vocabulary					
<ul style="list-style-type: none">Word Formation – Prefixes and Suffixes 1. Parts of Speech: Noun, Pro noun, Verb, Adjective, Adverb, Preposition, Conjunction, Interjection, Examples and exercises						
Module 2	Communication and Other Skills					
<ul style="list-style-type: none">What is Communication? Communicating Effectively<ul style="list-style-type: none">Definition of communicationSignificance of Good CommunicationObjectives of CommunicationPrinciples of CommunicationNarration, DescriptionIntrapersonal skills (Soft Skills)						
Module 3	Speaking Techniques					
Nature, scope and limitations of communication • Barriers to communication • Overcoming the barriers • Downward communication • Upward Communication • Horizontal communication • Grapevine communication. <ul style="list-style-type: none">Techniques to develop effective word accent- Word Stress, Primary & Secondary Stress; Weak Forms; Developing Voice Quality; Rhythm in connected speech; Developing a correct tone-Tonic Syllable, Types of Tones, Tone Group						
Module 4	Business Communication					
<ul style="list-style-type: none">Meaning, Stages of Communication; Nature of Technical Communication- Aspects, Forms, General Vs Technical Communication; Technical Communication Skills- Listening, Speaking, Reading, Writing. Modern Office Communication- * Electronic communication * Telephone * EPBAX*Teleconferencing * Answering machine *E-mail *Voicemail * Fax * Internet * Video conferencing.						
Recommended Books	1.Literary Voyage – A compulsory English Textbook for BA/ B.Com/ B.Sc I (Macmillian Education) 2.Effective Technical Communication- M Ashraf Rizvi (Mc Graw Hill) (ISBN: 978-93-5260-610-8) 3. Soft Skills: Know Yourself and Know the World.- Dr. K Alex - S. Chand & Company Pvt. Ltd., New Delhi Books (ISBN :978-81-219-3192-2)					

Semester :	I	Semester Exam			L/W*	Credits
Code: BCA 21-102	Fundamentals of Computers	ESE*	ISE*	Total		
Subject Title		40	10	50	3	2
Course Objectives	1. An introduction to the fundamentals of hardware, software and programming. 2. Introduce the fundamentals of computing devices and reinforce computer vocabulary, particularly with respect to personal use of computer hardware and software, the Internet, networking and mobile computing.					
Course Outcomes	1. Describe the usage of computers and why computers are essential components in business and society. 2. Utilize the Internet Web resources and evaluate on-line e-business system. 3. Solve common business problems using appropriate Information Technology applications and systems. 4. Identify categories of programs, system software and applications. Organize and work with files and folders. 5. Describe various types of networks network standards and communication software.					
Module 1	Computer Fundamentals					
<ul style="list-style-type: none">• Introduction to Computer• Characteristics of computer• Concepts of hardware and software, Firmware• Evolution of computer and Generations• Classification and types of computers• Limitation of computer• Applications of computers in various fields.• Structure of computer: Block diagram of computer:• Basic Units of computer- I) Input unit Keyboard, Mouse Light pen Joystick Scanner Graphic Pad MICR OMR Bar Code reader Digitizer Touch Screen. II) CPU- ALU Memory unit Memory Concepts Semiconductor memory Magnetic memory- RAM, ROM, EPROM, EEPROM Secondary Storage Devices- Magnetic Tape Magnetic Disk (Floppy disk and Hard Disk) Compact Disk III) control unit IV) output unit VDU Printers- Dot Matrix Daisywheel Ink Jet Laser, Line , Plotters						

<p>Computer Memory: Introduction to- Motherboard, SMPS, Math co-processor, Expansion slots ,Serial and parallel ports.</p>	
Module 2	Computer Communication and Networks
<ul style="list-style-type: none"> • Concepts of computer communication • Communication components • Computer network • Network Topologies • Communication Channels • Protocols LAN, WAN,MAN 	
Module 3	Introduction to internet
<p>Overview of modem, Bluetooth and router devices Buying & selling goods over the internet.</p> <ul style="list-style-type: none"> • Email : 1. Parts of email 2. Email software 3. Web-based email 4. Email address 5. Listservs • Protecting the computer A. Viruses B. Virus protection software C. Updating the software D. Scanning files • Search Engine • Online Storage : Drive <p>Blogs, Social Media, Chat room</p>	
Recommended Books	<p>1.Computer Fundamental , P.K. Sinha</p> <p>2.Computer Fundamental V. Rajaraman</p> <p>3. Computer Today Donaid N. Sanders</p>

Semester:	I	Semester Exam			L/W*	Credits
Code: BCA 21-103	Logic Development	ESE*	ISE*	Total		
Subject Title	With 'C' Programming	40	10	50	3	2
Course Objectives	<ul style="list-style-type: none"> The course aims to provide exposure to problem-solving through programming. It aims to train the student to the basic concepts of the C-programming language. This course involves a lab component which is designed to give the student hands-on experience with the concepts. 					
Course Outcomes	<ul style="list-style-type: none"> Given a computational problem, identify and abstract the programming task involved. Approach the programming tasks using techniques learned and write pseudo-code. Choose the right data representation formats based on the requirements of the problem. Write the program on a computer, edit, compile, debug, correct, recompile and run it. Identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the task. 					
Module 1	Programming Methodology					
Definition of Problem:- Problem solving steps, Introduction to programming planning tools, Need of programming planning tools, Definition of Logic Types of logic- 1) Sequence logic 2) Selection logic 3) Iteration logic Algorithm:- Definition, Characteristics or features of algorithm, Examples of algorithm to solve problem. Flowchart:- Definition, characteristics or features of flowchart, Symbols used in flowchart, Examples that converts algorithms to flowchart Pseudo Code:- Definition, characteristics or features of pseudo code. Examples of pseudo code that implements sequence logic, Selection logic and iteration logic						
Module 2	Introduction to 'C'					
Introduction to 'C':- History or evolution of 'C' language Features or characteristics of 'C' language, Structure of 'C' program, Compilation & execution of program. 'C' Fundamentals:- 'C' tokens [Keywords, Identifier, Special symbols ('C' character sets), Variables, Constants] Data types- Primitive, Derived, User defined, Operators- Arithmetic, logical, assignment, relational, bitwise, conditional, increment, decrement, sizeof, comma, operator etc. <ul style="list-style-type: none"> Type casting or type conversion Use of 'typedef' and 'enum' Precedence and associativity of operator. Header files and its use. Data input and output operations:- Introduction to input and output operations, Introduction to stdio.h header file, stdio.h header file functions- printf(), scanf(), getchar(), putchar() Different format codes or format specifier with their use Different back slash (escape sequence) character constants with their use						
Module 3	Control Statements					
Introduction to control statement						

Types of control statements-

- 1) Selective or Decision making:- if statement, switch statement, Conditional (ternary) operator
- 2) Iterative or looping statement:- While loop, do-while loop, for loop
- 3) Unconditional branching (jump) Statement:- break statement, continue statement, goto statement

Arrays:

Introduction & definition of array

Types of array- 1) One dimensional array 2) Two dimensional array 3) Multi-dimensional array

Declaration & initialization of array

Memory allocation view for all types of array.

Character array (string):- Declaration, operation on string and inbuilt String functions.

Module 4	Preprocessor directives
	<ul style="list-style-type: none">• Concept, introduction to preprocessor directives• Format of preprocessor directives• File inclusion directives (#include)• Macros:- Macro substitution directives (#define) , nested macros, parameterized macros• use of #error and #pragma directives• use of conditional compilation(#if/#ifdef/#else/#elif/#endif)• Predefined macros (_DATE_ / _TIME_ / _FILE_ / _LINE_ / _STDC_)• Preprocessor operators.• Macro continuation (\)
Recommended Books	<ol style="list-style-type: none">1) Programming in ANSI-C – E. Balgurusamy2) The C programming Language - Ritchie and Kernighan.3) Let Us C - Y.C. Kanetkar.4) A structure Programming Approach using 'C'- Behrouz A. Forouzan, RichardF. Gilberg

Semester :	I	Semester Exam			L/W*	Credits
Code: BCA 21-104	Basics of Web Programming – I	ESE*	ISE*	Total		
Subject Title			40	10	50	3
Course Objectives	<ul style="list-style-type: none">Skill development in web programming including mark-up and scripting languages. Introduction to structure and object oriented programming design.Course includes use of XHTML and JavaScript programming languages.Understand the principles of creating an effective web page, including an in-depth consideration of information architecture.Become familiar with graphic design principles that relate to web design and learn how to implement theories into practice.Develop skills in analyzing the usability of a web site.Understand how to plan and conduct user research related to web usability.Learn the language of the web: HTML and CSS.					
Course Outcomes	<ul style="list-style-type: none">Structure and implement HTML/CSS.Apply intermediate and advanced web development practices.Implement basic JavaScript.					
Module 1	Overview of HTML & HTML5					
<ul style="list-style-type: none">Introduction to Web technologyRequirement for InternetOverview of basic HTML5Structure of HTML5 DOCTYPE ElementCreating and opening HTML fileSingular and paired tags, Text form Lists, Image, Image Map, Table,Tags-Section, Article, aside, header, foot figure etc.Input tag - (Type, Auto focus, placeholder, required etc. attributes.) : Form, get and post methodGraphics and Media tags in HTML5						
Module 2	CSS					
<ul style="list-style-type: none">Introduction to CSSUse of CSSTypes of CSS, Selectors, Properties, Values.CSS Properties- Background, Text, Fonts, Link, List, Table, Box Model, Border, Margin, Padding, Display, Positioning, Floating, Opacity, Media type, Backgrounds and Borders Image, Values and Replaced Content, Text Effects, 2D/3D Transformations, Animations, Multiple Column LayoutUser Interface						

Module 3	JavaScript
<ul style="list-style-type: none"> • Introduction to JavaScript • JavaScript Variables, Data types, Operators, Built in functions in JavaScript • Control structure in JavaScript : <ul style="list-style-type: none"> • If-else • Loops : For, While, do While <p>Accepting input through form controls and processing : text, select, radio, check boxes, file control, clickable buttons</p>	
Recommended Books	<ol style="list-style-type: none"> 1) HTML5 Black Book- Kogent Learning Solutions IncDreamtech. 2) Beginning JavaScript and CSS Development with jQuery- Richard York. 3) Beginning HTML and CSS-Rob Larsen. 4) HTML_&_CSS_The_Complete_Reference-Thomas A. Powell. (Fifth Edition). 5) W3schools.com 6) HTML5 Black Book- Kogent Learning Solutions IncDreamtech. 7) Beginning JavaScript and CSS Development with jQuery- Richard York. 8) Beginning HTML and CSS-Rob Larsen. 9) HTML_&_CSS_The_Complete_Reference-Thomas A. Powell. (Fifth Edition). 10) W3schools.com 11) HTML5 Black Book- Kogent Learning Solutions IncDreamtech. 12) Beginning JavaScript and CSS Development with jQuery- Richard York.

Semester :	I	Semester Exam			L/W*	Credits
Code: BCA 21-105	Software Engineering I	ESE*	ISE*	Total		
Subject Title		40	10	50	3	2
Course Objectives	<ol style="list-style-type: none"> To introduce the fundamental concepts of software engineering process, product and project. To develop appropriate knowledge of requirements specification and design solutions for the given problem. To introduce the different testing strategies and techniques 					
Course Outcomes	<ol style="list-style-type: none"> Analyze the various aspects of software requirement engineering. Understand the importance of establishing the boundaries of a system and the concept of various models. Understand and analyze the decisions about the system architectural design process 					
Module 1	System concepts					
<ul style="list-style-type: none"> Definition of system Elements of system System concepts Types of system <ul style="list-style-type: none"> Deterministic & probabilistic system Open & closed system Transaction processing system Management information system Decision support system Executive information system 						
System Analysis and Role of System Analyst						
Module 2	Software Engineering					
<ul style="list-style-type: none"> Definition of software engineering Characteristics of software Qualities of software 						
Module 3	System Development life cycle					
<p>What is System Development life cycle? SDLC Models-</p> <ul style="list-style-type: none"> Classical model Spiral model Waterfall model Prototyping Model RAD model Requirement Analysis: Requirement Anticipation Requirement investigation Requirement specifications Feasibility study 						

Module 4	Fact finding techniques
	<ul style="list-style-type: none"> • Need of fact finding techniques Fact finding techniques- • Interviews • Questionnaire • Record reviews • Observation
Recommended Books	1) Analysis and Design of Information Systems by James Senn. System analysis and design by Elias Awad 3)Software Engineering by Pressman 4)System Analysis and Design by Parthsarty / Khalkar 5)Practical guide to structure System Design by Miller/Page/jones. 6)Analysis and Design of Information Systems by James Senn. 7)System analysis and design by Elias Awad

Semester :	I	Semester Exam			L/W*	Credits
Code: BCA 21-106	Basics of Mathematics – I	ESE*	ISE*	Total		
Subject Title		40	10	50	3	2
Course Objectives	<ul style="list-style-type: none">To enable professional undergraduate students to understand the importance of mathematics in computer science					
Course Outcomes	<ul style="list-style-type: none">At the end of the syllabus, students will come to understand the importance of mathematics in computer science.					
Module 1	Basics of Matrices					
Definition, order, types of matrices: square matrix, rectangular matrix, diagonal matrix, scalar matrix, upper triangular matrix, lower triangular matrix, symmetric matrix, skew symmetric matrix, identity matrix, row matrix, column matrix, transpose of a matrix, inverse of a matrix Algebra of matrices: addition, subtraction, scalar multiplication, matrix multiplication.						
Module 2	Sets and Relations					
Definition:Set, Subset, power set, disjoint sets Operations on sets :Union, Intersection , Complement , Difference , Symmetric difference Algebraic properties of set operations: Commutative laws , Distributive laws, Associative laws , DeMorgan’s laws , Cardinality of set. Relation :Definition of Cartesian product , relation Types of relation: void, universal, identity, reflexive, symmetric, transitive, equivalence, anti-symmetric, partial ordering, asymmetric, Matrix representation of relation, Graphical representation (digraph) of relation, In- degree and out-degree of a vertex Transitive closure: Warshall’s algorithm						
Module 3	Elementary logic					
Propositional Calculus: Proposition- Simple statement, Compound statement, Logical connectives, Disjunction, Conjunction , Negation , Implication, Double implication, Converse, inverse and contra positive of conditional statement,truth tables, tautology, Contradiction & neither, commutative laws, associative laws, distributive laws, Demorgan’s laws, logical equivalence.						
Recommended Books	1. Introductory Methods of Numerical Analysis-S.S. Sastry(Prentice Hall) 2. Computer Oriented Numerical Methods. – Rajaraman 3. Elements of Discrete Mathematics- C.L.Liu 4. Discrete Mathematical structure for Computer Science-Alan Doerr and K.Leveessuer 5. Discrete mathematics & its applications- K. Rosen					

Semester :	I	Semester Exam			L/W*	Credits
Code: BCA 21-107	Statistical Methods-I	ESE*	ISE*	Total		
Subject Title		40	10	50	3	2
Course Objectives	1.To develop the students ability to deal with numerical and quantitative issues in business 2.To enable the use of statistical, graphical and algebraic techniques wherever relevant.					
Course Outcomes	1.Describe and discuss the key terminology, concepts tools and techniques used in statistical analysis 2.Critically evaluate the underlying assumptions of analysis tools 3.Understand and critically discuss the issues surrounding sampling and significance					
Module 1	Population and Sample					
Concept of Statistical population with illustration, Concept of Sample with illustration, Methods of sampling - SRSWR, SRSWOR, Stratified, Systematic (description only) Data condensation and Graphical methods: Raw data, Attribute, Variables, Discrete and Continuous Variable, General principles of classification of raw data, Construction of frequency dist, Cumulative frequency dist Graphical representation of frequency dist- Histogram, Ogives, Numerical problems.						
Module 2	Measures of Central Tendency					
Concept of Central Tendency, Objects of Central Tendency, Criteria for good Measures of Central Tendency, A.M. – def., formula for computation for ungrouped & grouped data, combined A.M., effect of change of origin & scale, merits & demerits, Median- def., formula for computation for ungrouped & grouped data, graphical methods, merits & demerits, Mode- def., formula for computation for ungrouped & grouped data, graphical methods, merits & demerits, Empirical Relation between mean ,mode & median, Numerical Problems. Measures of dispersion: Concept of dispersion, Absolute & Relative measures of dispersion, Range- def., formula for computation for ungrouped & grouped data, coeff. of range, merits & demerits, Variance & S.D.- def., formula for computation for ungrouped & grouped data, combined variance, C.V., effect of change of origin & scale, merits & demerits, Numerical problems.						
Module 3	Correlation					
Bivariate data, scattered diagram. Concept of correlation, types of correlation, cause & effect Relation. Karl Pearson’s coeff. of correlation (r), limit of r (- 1≤ r ≤ 1) Interpretation of r, basic assumptions on which r is based. Numerical problems. Regression for ungrouped data-Concept of regression, Derivation of lines of regression by least square principle. Properties of regression coeff. Numerical problems.						
Recommended Books	1. Fundamentals of Mathematical Statistics- Kapoor& Gupta. 2. Modern elementary Statistics – J.E.Freund 3. Statistical Methods – J.Medhi. 4. Fundamentals of Statistics-S.C.Gupta.					

Semester :	I	Semester Exam			L/W*	Credits
Code: BCA 21-108	Digital Electronics	ESE*	ISE*	Total		
Subject Title			40	10	50	3
Course Objectives	1. Learn and understand the basics of digital electronics, Boolean algebra 2. Able to design the simple logic circuits and test/verify the functionality of the logic circuits.					
Course Outcomes	At the end of the course, the students will be able to 1. Distinguish between analog and digital systems. 2. Identify the various digital ICs and understand their operation. 3. Apply Boolean laws and K-map to simplify the digital circuits.					
Module 1	Number Systems and Arithmetic					
<ul style="list-style-type: none">Decimal Number SystemBinary Number SystemOctal number SystemHexadecimal number system.Decimal to Binary conversionBinary to Decimal conversionHexadecimal to binary conversionBinary to Hexadecimal conversionHexadecimal to decimal conversionBinary Arithmetic : Binary addition, subtraction, multiplication & division, Binary subtraction using 2's complement method						
Module 2	Digital circuit design					
<ul style="list-style-type: none">Introduction to digital circuit designCircuit design using logic gates- (OR,AND,NOT,NOR,NAND,XOR,XNOR)Converter<ul style="list-style-type: none">✓ Binary to gray converter,✓ Gray to Binary converterDecimal to BCD encoderCircuit design using state table/K-map-Design of Half adder, Full adderDesign of full subtractorDesign of BCD to seven segment decoderConcept of excitation tableDesign of 3 bit synchronous up counter3 bit random sequence generator						
Module 3	Combinational Circuit					
<ul style="list-style-type: none">Multiplexer Different typesDe-multiplexerDifferent typesEncoder, Decoder and segment decoderBasic cell of static and dynamic RAMAssociative memory						

- Cache memory organization and Virtual memory organization

**Recommended
Books**

- 1) Digital principle & applications- Malvino Leech
 - 2) Fundamental of Digital electronics : R.P. Jain ,
 - 3) Digital design : M. Morris Mano, Prentice-Hall of India
 - 4) Digital Electronics- C.F. Strangio
- Modern Digital electronics- R.P. Jain

Semester :	I	Semester Exam			L/W*	Credits
Code: BCA 21-109	Development of Human Skills	ESE*	ISE*	Total		
Subject Title		40	10	50	3	2
Course Objectives	1. To enhance human skills 2. To improve the personality traits and develop attitude 3. To improve oral and written communication skills					
Course Outcomes	1. Students will be able to learn and develop human skills and overall personality 2. Students will be able to learn the soft skills necessary in the workplace					
Module 1	Verbal Communication					
Verbal Communication: Principles oral communication and Group Discussion- concept, importance, characteristics. Public Speaking (Addressing Small Groups and Making Presentation) Interview Preparation: Types of Job Interview, Preparing for the Interviews, Attending the Interview, Interview Process, Employers Expectations, General Etiquette, Dressing Sense, Postures & Gestures and some examples of interviews. Presentation Skills						
Module 2	Personality & Attitude					
Personality: Introduction, Definition, Theories on personality, Determinants of personality, Personality Structure. Attitudes & Values: Attitudes- Concept, Formation of attitude, Functions of attitude, SWOT Analysis, Attitudes-Values & OB.						
Module 3	Writing Skills					
Writing Skills: Principles of writing skills • Writing emails : (Inquiry, Invitation, Thank you, Request for permission, Sponsorship, Job Acceptance and Job Refusal) • Letter writing: Types, parts, layout of letters, Writing job application letter and resume • Story Writing , Dialogue Writing and Blogging (Fashion, Travel, Culture and Personal blog)						
Module 4	Team Building and Teamwork					
Meaning, Aspects of Team building, skills needed for teamwork, Process of team building, characteristics of effective team, Role of a team leader, Role of the team members, Inter-group collaboration.						
Recommended Books	1. Soft Skills: Know Yourself and Know the World.- Dr. K Alex - S. Chand & Company Pvt. Ltd., New Delhi Books (ISBN :978-81-219-3192-2) 2. Managing Soft Skills for Personality Development – B.N. Ghosh – McGraw Hill Education (India) Pvt. Ltd. New Delhi (ISBN : 978-0-07-107813-9) 3. Business Communication (Skills, Concept and Application) Third Edition – P.D. Chaturvedi, Mukesh Chaturvedi – Pearson India Education Services Pvt. Ltd. (ISBN : 978-81-317-7558-5) 4. Organisational Behaviour- Ashwathappa (Himalaya Publishing House) (ISBN: 978-93-5051-588-4) 5.Effective Technical Communication- M Ashraf Rizvi (Mc Graw Hill) (ISBN: 978-93-5260-610-8)					

Semester :	II	Semester Exam				
Code: BCA 21-201	English (Business Communication)	ESE*	ISE*	Total	L/W*	Credits
Subject Title		40	10	50	3	2
Course Objectives	4. To focus on grammar and vocabulary development 5. To improve student’s Business Communication skills 6. To focus on Verbal & Non-verbal communication skills					
Course Outcomes	• Students will be able to learn and develop their vocabulary and spoken English • Students will be able to improve in the professional skills					
Module 1	Grammar and Vocabulary- II					
• Synonyms and Antonyms • Tenses						
Module 2	Communication and Other Skills					
• Describing Process, Making Presentations • Letter Writing (Formal/Informal) • Interpersonal Intelligence (Soft Skills)						
Module 3	Speeches					
• Finding out about the environment; Preparing for the text; Speaker’s Appearance and Personality; Practicing Delivery of Speech; Commemorative Speeches (Welcome & Introduction, Inaugural Speech, Vote of thanks, Farewell and Send-off, Condolence)						
Module 4	Verbal & Non-Verbal Communication					
• Verbal Communication: Principles oral communication ; Medias of Oral Communication • Non-Verbal Communication: Uses of Non-verbal Communication; Methods- Non-verbal aspects of written communication, Body language, Para language						
Recommended Books	1. Literary Voyage – A compulsory English Textbook for BA/ B.Com/ B.Sc I Year (Macmillian Education) 2.Effective Technical Communication- M Ashraf Rizvi (Mc Graw Hill) (ISBN: 978-93-5260-610-8) 3. Soft Skills: Know Yourself and Know the World.- Dr. K Alex - S. Chand & Company Pvt. Ltd., New Delhi Books (ISBN :978-81-219-3192-2) 4.Managerial Communication – Urmila Rai and S. M.Rai, Himalaya Publishing House (ISBN-10: 9350247992, ISBN-13: 978-93-5024-799-0) 5.Communication – C. S. Rayudu, Himalaya Publishing House (ISBN Number : 978-93-5051-953-0)					

Semester	II	Semester Exam			L/W*	Credits
Code: BCA 21-202	Advanced Programming in ‘C’	ESE*	ISE*	Total		
Subject Title		40	10	50	3	2
Course Objectives	<ul style="list-style-type: none">Utilize the best of the inbuilt functions for various input and output operations.Implement the concept of arrays.Implement problem solving skills using pointer concept of the programming languages.Work efficiently with files using the programming languages.					
Course Outcomes	<ul style="list-style-type: none">After Completion of this course the student would be able toImplement Programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor.Write programs that perform operations using derived data types.					
Module 1	Functions					
Introduction & definition of function, □ Need or use of function.						
Types of Functions:- Inbuilt/Predefined/Library functions, User defined function, Steps to add or include user defined function in program <ul style="list-style-type: none">➤ Function declaration (Prototyping)➤ Function calling➤ Function definition (Function Implementation)						
Types of Function depending on its signature & return type- <ul style="list-style-type: none">Function with argument without return valueFunction with argument with return valueFunction without argument with return valueFunction without argument without return valueDefinition, characteristics & importance of local & global variableRecursion of function:- Introduction & definition of storage Classes:- auto, extern, static, register						
Module 2	Pointer					
<ul style="list-style-type: none">Definition and declaration, Operation on pointerPointer initialization, Pointer and functionPointer and array, Pointer of pointerGeneric pointerCall by value and Call by referenceDynamic memory allocation :- malloc(), calloc(), realloc(), free()Pointer to stringTraversing string through its pointer						
Module 3	Structure and Union					
<ul style="list-style-type: none">Definition and declaration, Array of structuresPassing structure to function, Pointer to structureNested structure, self referential structurePassing entire structure to user defined functionSize of and type def.						

- Memory allocation view for all types of array.
- Character array (string):- Declaration, operation on string and inbuilt String functions.

Union:-

- Concept of union
- Declaration, definition of union
- Accessing union members
- Difference between Structures & unions

Module 4	File Handling
<ul style="list-style-type: none"> • Standard input- get char(), getch(), getche() • Standard output- put char(), putch(), putche(), • Formatted input- scanf(), sscanf(), fsclose() • fopen(), fgetc(), fputc(), getw(), putw(), feof(), fgets(), fputs(), fprintf(), fscanf(), ftell(), rewind(), fclose() etc. • File opening mode- open, modify, write, append, Text and binary mode. • Introduction to Command line arguments 	
Module 5	C Programming: Using Linux Tools and Libraries
<ul style="list-style-type: none"> • How to use professional tools and libraries to write and build C programs within the Linux operating system. 	
Recommended Books	1) Programming in ANSI-C – E. Balgurusamy 2) The C programming Language - Ritchie and Kernighan. 3) Let Us C - Y.C. Kanetkar

Semester :	II	Semester Exam			L/W*	Credits
Code: BCA 21-203	Introduction to Operating System	ESE*	ISE*	Total		
Subject Title			40	10	50	3
Course Objectives	<ul style="list-style-type: none">• Students will learn how Operating System is Important for Computer System.• To make aware of different types of Operating System and their services.• To learn different process scheduling algorithms and synchronization techniques to achieve better performance of a computer system.• To know virtual memory concepts. To learn secondary memory management.					
Course Outcomes	<ul style="list-style-type: none">• Understands the different services provided by Operating System at different level.• They learn real life applications of Operating System in every field.• Understands the use of different process scheduling algorithm and synchronization techniques to avoid deadlock.• They will learn different memory management techniques like paging, segmentation and demand paging etc.					
Module 1	Introduction					
What is mean by O.S.? <ul style="list-style-type: none">• Types of O.S. (Batch, Parallel, Multiprogramming, Time Sharing, Distributed, Real time)• Structure of O.S.• System Architecture: Monolithic and Layered Systems• System Components• Services provided by O.S. System Generalization and virtual machine						
Module 2	Process Management					
<ul style="list-style-type: none">• Concepts-Process, System calls• Operations on Process• Cooperating Process and threads• Interprocess Communication• Process Scheduling:<ul style="list-style-type: none">➤ Basic Concept.➤ Scheduling criteria• Scheduling Algorithms: FCFS, SJF, Round Robin, Priority Scheduling, Multilevel Queue Scheduling.						
Module 3	Process Synchronization					
<ul style="list-style-type: none">• Critical section problem• Semaphores• Critical Regions• Classic Problems of Synchronization						

Module 4	Deadlocks Prevention, avoidance, detection and recovery
	<ul style="list-style-type: none"> • Definition and concept of Deadlock • Handling Deadlocks • Deadlock Prevention • Deadlock Avoidance • Deadlock Avoidance Algorithm: <ul style="list-style-type: none"> ➤ Mutual exclusion ➤ Resource allocation graph (RAG) ➤ Bankers • Deadlock Detection and recovery
Recommended Books	<ol style="list-style-type: none"> 1. System programming and O.S.By D.M. Dhamdhere. 2. Modern O.S. By Andrews Tanenbaum. 3. Operating System Concepts BySiberchatz and calvin.

Semester :	II	Semester Exam			L/W*	Credits
Code: BCA 21-204	Basics of Web Programming II	ESE*	ISE*	Total		
Subject Title			40	10	50	3
Course Objectives	The main objective of the course is present the basic web technology concepts that are required for developing web applications. The key technology components are descriptive languages, server side program elements and client side program elements. In addition the course gives specific contents that are beneficial for developing web-based solutions, like relational data-base communication basics and information security principles and approaches.					
Course Outcomes	The student will learn about the basics of computer networks and HTTP protocol. They will understand and know how to use descriptive languages like HTML and XML. They will also know how to use web programming languages (like PHP and JavaScript) and be capable of construction less demanding web application on their own.					
Module 1	Advance Java Script Concepts					
<ul style="list-style-type: none">• DOM, Math, Array, History, Navigator, Location, Windows, String, Date, Document objects, user defined function,• Validation in JavaScript• Event & event handling in JavaScript.• Handling Runtime CSS and other Form Control Properites						
Module 2	JQuery					
<ul style="list-style-type: none">• Introduction to JQuery• Need of JQuery• Adding jQuery to Your Web Pages• jQuery Syntax, jQuery Selectors, jQuery Event Methods,• jQuery Effects - Hide and Show, Fading, Sliding, Animation						
Module 3	Handling HTML Elements in JQuery					
<ul style="list-style-type: none">• jQuery Callback Functions,• jQuery – Chaining,• jQuery – Get and Set Content and Attributes,• jQuery - Add Elements, Add Several New Elements,• jQuery - Remove Elements,• jQuery - Get and Set CSS Classes,• jQuery - css() Method,• jQuery - The noConflict() Method• JQuery – AJAX Introduction• JQuery – AJAX load() <p>JQuery – AJAX get() and post()</p>						

Module 4 - Introduction to Bootstrap,

- Content Delivery Network
- Embedding Bootstrap, Mobile -First
- Container Types: Fixed width Container , Fluid Container
- Bootstrap Grid System- Column Sizes
- The column are displayed either one after the other or one below the other as the display size grows and shrinks.
- Tables in BS:
- Inserting images in BS
- BS Jumbotron
- Bootstrap Well : used to create headings
- BS alerts: Displays messages
- Buttons: BS Button Groups, BS Justified Button Groups :
- BS Glyph icons:
- BS Badges and Labels:
- BS Progress Bar
- BS Pagination – BS Pager Pagination :
- BS List Groups: List Groups , Mouse over effect to list items
- BS Panels
- Drop Down Menu
- Drop up menu
- BS Collapsible- Collapse in, Collapsible Panel

Recommended Books

- 1) HTML5 Black Book- Kogent Learning Solutions IncDreamtech.
- 2) Beginning JavaScript and CSS Development with jQuery- Richard York.
- 3) Beginning HTML and CSS-Rob Larsen.
- 4) HTML_&_CSS_The_Complete_Reference-Thomas A. Powell. (Fifth Edition).
- 5) W3schools.com
- 6) Bootstrap Reference Guide: Bootstrap 4 and 3 Cheat Sheets Collection (Bootstrap 4 Tutorial)

Semester :	II	Semester Exam			L/W*	Credits
Code: BCA 21-205	Office Automation	ESE*	ISE*	Total		
Subject Title		40	10	50	3	2
Course Objectives	1. Office tools course would enable the students in crafting professional word documents, excel 2. spread sheets, power point presentations using the Microsoft suite of office tools. To familiarize 3. the students in preparation of documents and presentations with office automation tools.					
Course Outcomes	1. to perform documentation 2. to perform accounting operations 3. to perform presentation skills					
Module 1	Introduction to Computer & Windows					
Introduction to Computer: Applications of Computer – Advantages of Computer – Terms related to Computer - Characteristics of Computer: Speed, Storage, Versatility and Diligence – Hardware & Software.						
Windows: Desktop icons and their functions: My computer, My documents, Network neighborhood, Recycle Bin, Quick launch tool bar, System tray, Start menu, Task bar, Dialog Boxes: List Box, Spin Control Box, Slide, Drop-down list, Radio button, Check box, Text box, Task Bar - System Tray - Quick launch tool bar - Start button - Parts of Windows -Title bar-Menu bar - Scroll barStatus bar, Maximize, Minimize, close and Resize & Moving a Window, Keyboard Accelerators: Key board short keys or hotkeys.						
Module 2	MS Word					
MS Word: Working with Documents -Opening & Saving files, Editing text documents, Inserting, Deleting, Cut, Copy, Paste, Undo, Redo, Find, Search, Replace, Formatting page & setting Margins, Converting files to different formats, Importing & Exporting documents, Sending files to others, Using Tool bars, Ruler, Using Icons, using help.						
Formatting Documents: Setting Font styles, Font selection- style, size, colouretc, Type face - Bold, Italic, Underline, Case settings, Highlighting, Special symbols, Setting Paragraph style, Alignments, Indents, Line Space, Margins, Bullets &Numbering.						
Setting Page style: Formatting Page, Page tab, Margins, Layout settings, Paper tray, Border & Shading, Columns, Header & footer, Setting Footnotes & end notes – Shortcut Keys; Inserting manual page break, Column break and line break, Creating sections & frames, Anchoring & Wrapping, Setting Document styles, Table of Contents, Index, Page Numbering, date & Time, Author etc., Creating Master Documents, Web page.						
Creating Tables: Table settings, Borders, Alignments, Insertion, deletion, Merging, Splitting, Sorting, and Formula.						
Drawing: Inserting Clip Arts, Pictures/Files etc.						
Tools: Word Completion, Spell Checks, Mail merge, Templates, Creating contents for books, Creating Letter/Faxes, Creating Web pages, Using Wizards, TrackingChanges, Security, Digital Signature. Printing Documents – Shortcut keys.						

Module 3	MS Excel
<p>MS Excel: Spread Sheet & its Applications, Opening Spreadsheet, Menus - main menu, Formula Editing, Formatting, Toolbars, Using Icons, Using help, Shortcuts, Spreadsheet types. Working with Spreadsheets- opening, Saving files, setting Margins, Converting files to different formats (importing, exporting, sending files to others), Spread sheet addressing - Rows, Columns & Cells, Referring Cells & Selecting Cells – Shortcut Keys. Entering & Deleting Data: Entering data, Cut, Copy, Paste, Undo, Redo, Filling Continuous rows, columns, Highlighting values, Find, Search & replace, Inserting Data, Insert Cells, Column, rows & sheets, Symbols, Data from external files, Frames, Clipart, Pictures, Files etc, Inserting Functions, Manual breaks. Setting Formula: finding total in a column or row, Mathematical operations (Addition, Subtraction, Multiplication, Division, Exponentiation), using other Formulae. Formatting Spreadsheets: Labelling columns & rows, Formatting- Cell, row, column & Sheet, Category - Alignment, Font, Border & Shading, Hiding/ Locking Cells, Anchoring objects, Formatting layout for Graphics, Clipart etc., Worksheet Row & Column Headers, Sheet Name, Row height & Column width, Visibility - Row, Column, Sheet, Security, Sheet Formatting & style, Sheet background, Colours etc, Borders & Shading – Shortcut keys. Working with sheets: Sorting, Filtering, Validation, Consolidation, and Subtotal. Creating Charts: Drawing. Printing. Using Tools – Error checking, Formula Auditing, Creating & Using Templates, Pivot Tables, Tracking Changes, Security, Customization.</p>	
Module 4	MS Power point
<p>MS Power point: Presentation – Opening new presentation, Different presentation templates, setting backgrounds, selecting presentation layouts. Creating a presentation: Setting Presentation style, Adding text to the Presentation. Formatting a Presentation: Adding style, Colour, gradient fills, Arranging objects, Adding Header & Footer, Slide Background, Slide layout. Adding Graphics to the Presentation- Inserting pictures, movies, tables etc into presentation, Drawing Pictures using draw. Adding Effects to the Presentation: Setting Animation & transition effect. Printing Handouts, Generating Standalone Presentation viewer. MS Access: Introduction, Planning a Database, Starting Access, Access Screen, Creating a New Database, Creating Tables, Working with Forms, Creating queries, Finding Information in Databases, Creating Reports, Types of Reports, Printing & Print Preview – Importing data from other databases viz. MS Excel etc.</p>	
Recommended Books	<ol style="list-style-type: none"> 1. Fundamentals of Mathematical Statistics- Kapoor & Gupta. 2. Modern elementary Statistics – J.E.Freund 3. Statistical Methods – J.Medhi. 4. Fundamentals of Statistics-S.C.Gupta. 5. Fundamentals of applied Statistics-Gupta & Kapoor. 6. Business Statistics – S. Shah 7. Programmed Statistics - B.L.Agarwal.

Semester :	II	Semester Exam			L/W*	Credits
Code: BCA 21-206	Basics of Mathematics - II	ESE*	ISE*	Total		
Subject Title		40	10	50	3	2
Course Objectives	The Mathematics program promotes mathematical skills and knowledge for their intrinsic beauty, effectiveness in developing proficiency in analytical reasoning, and utility in modeling and solving real world problems.					
Course Outcomes	1. Students will effectively communicate topics in the mathematical sciences. 2. Students will formulate, analyze, and solve a wide variety of problems in the mathematical sciences. 3. Students will engage in a lifelong learning process via the ability to self-educate. 4. Students will demonstrate proficiency with the topical content and techniques included in the courses in the mathematical sciences.					
Module 1	Graph					
Definition and elementary results, Types of graph: Simple graph, Multi-graph, pseudo graph, complete graph, Null graph, Regular graph, Bipartite graph, weighted graph, degree of a vertex, total degree of a graph, shaking hand lemma and elementary results, Adjacency and incidence matrix .						
Module 2	Euler and Hamiltonian Graph					
Walk, trail , path, circuit, length of a path, Euler trail and Euler’s circuit, Euler’s graph, Hamiltonian Path and Hamiltonian Circuit, Hamiltonian Graph, travelling sales man problem, Chinese Postman problem						
Module 3	Derived graphs and Tree					
Sub graphs, Vertex deleted & edge deleted sub graphs, Vertex disjoint & edge disjoint sub graphs, Operations on graphs- Union, Intersection, Ring sum of two graphs, complement of a graph. Tree: Definition and elementary results, Spanning Trees, Shortest spanning tree , Kruskal’s algorithm for shortest spanning tree.						
Recommended Books	1.Elements of Discrete Mathematics- C.L.Liu 2. Discrete Mathematical structure for Computer Science-Alan Doerr and K.Levessuer 3. Elements of graph theory- Bhave&Raghunathan 4. Discrete mathematics & its applications- K. Rosen					

Semester :	II	Semester Exam			L/W*	Credits
Code: BCA 21-207	Statistical Methods-II	ESE*	ISE*	Total		
Subject Title		40	10	50	3	2
Course Objectives	1. To have a proper understanding of Statistical applications in Economics and Management 2. Demonstrate the ability to perform complex data management and analysis.					
Course Outcomes	1. Discuss critically the uses and limitations of statistical analysis 2. Solve a range of problems using the techniques covered 3. Conduct basic statistical analysis of data.					
Module 1	Permutations & Combinations					
<p>Principles of counting, Permutations of n dissimilar objects taken r at a time (with without repetitions), Permutations of n objects not all of which r different, Combinations of n objects taken r at a time, Combinations with restriction on selection (excluding or including a particular object in the group), Numerical problems.</p> <p>Probability: Random expt. – Sample space (finite, infinite, countable), Events-Types of events, Probability – Classical def., axioms of probability, probability of an event, Theorems of probability (with proof)-</p> <p>i) $0 \leq P(A) \leq 1$,</p> <p>ii) $P(A) + P(A') = 1$,</p> <p>iii) $P(\Phi) = 0$</p> <p>iv) $P(A) \leq P(B)$ when A is subset of B</p> <p>Addition law of probability (Statement only). Concept & def. of conditional probability, multiplication law of probability(Statement only), Concept & def. of conditional probability, multiplication theorem, Concept & def. of independence of two events, Numerical problems.</p>						
Module 2	Discrete random variable					
<p>Def. of r.v., discrete r.v., Def. of p.m.f., c.d.f. & properties of c.d.f., Def. of expectation & variance, theorems on expectation, Numerical problems.</p> <p>Standard Discrete Distribution:</p> <p>Binomial distribution- Def., mean, variance(only state), illustration of real life situations, additive property (statement only).</p> <p>Poisson distribution-</p> <p>mean, variance(only State), illustration of real life situation, additive property(Statement only), Numerical Problems.</p> <p>Geometric distribution –</p> <p>Def.,mean, variance(only State), illustration of real life situation, Numerical problems.</p>						
Module 3	Continuous r.v.					
<p>Def.-continuous r.v., p.d.f., c.d.f., statement of properties of c.d.f. Def. of mean & variance, Numerical problems.</p> <p>Uniform distributions-Def., mean, variance(only State),Numerical Problems</p> <p>Normal Distribution-</p> <p>Definition, identification of parameters, nature of probability curve, s.n.v., properties of normal distribution, distribution of $aX+b$, $aX+bY+c$ when X & Y are independent, Numerical Problems.</p>						

<p>Recommended Books</p>	<p>8. Fundamentals of Mathematical Statistics- Kapoor& Gupta.</p> <p>9. Modern elementary Statistics – J.E.Freund</p> <p>10. Statistical Methods – J.Medhi.</p> <p>11. Fundamentals of Statistics-S.C.Gupta.</p> <p>12. Fundamentals of applied Statistics-Gupta &Kapoor.</p> <p>13. Business Statistics – S. Shah</p> <p>14. Programmed Statistics - B.L.Agarwal.</p>
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Semester :	II	Semester Exam			L/W*	Credits
Code: BCA 21-208	Introduction to Microprocessor	ESE*	ISE*	Total		
Subject Title		40	10	50	3	2
Course Objectives	1. The objective of this course is to become familiar with the architecture 2. instruction set of an Intel microprocessor 3. Understand the architecture of 8085					
Course Outcomes	1. Recall and apply a basic concept of digital fundamentals to Microprocessor based personal computer system. 2. Identify a detailed s/w & h/w structure of the Microprocessor.					
Module 1	Fundamental of Microprocessor					
<ul style="list-style-type: none"> • Introduction to microprocessor • Basic system bus architecture • Intel 8085 microprocessor features • Concept of T state • Machine cycle • Instruction cycle • Types of microprocessor(According to bus and application) 						
Module 2	8 bit microprocessor					
<ul style="list-style-type: none"> • Introduction • Types of 8 bit microprocessor • Pin function of 8085 microprocessor • Internal architecture of 8085 microprocessor • Applications • Brief introduction to 8086 microprocessor <ol style="list-style-type: none"> 1. 8086 Overview 2. 8086 Functional Units 3. 8086 Pin Configuration 4. 8086 Instruction Sets 						
Module 3	Instruction set					
<ul style="list-style-type: none"> • Introduction • Classification of instruction set • Format of instructions • Addressing modes <p>Assembly language programming of 8085(addition, subtraction,division, multiplication, orders)</p>						
Module 4	Interfacing					
<ul style="list-style-type: none"> • Concept of interfacing • Types of interfacing • Concept of I/O mapping • I/O memory mapping techniques 						

- PPI[8285]
- Programmable timer[8253]
- DMA (Dynamic Memory Allocation)

**Recommended
Books**

- 1) Microprocessor Architecture, Programming, and Applications with the 8085-
Ramesh S. Gaonkar
- 2) Microprocessor and principles- S.P. Chowdhury, SunetraChowdhury
- 3) Advanced Microprocessor and principles- K.M. Bhurhand, A.K. Ray

Semester :	II	Semester Exam			L/W*	Credits
Code: BCA 21-209	Software Engineering - II	ESE*	ISE*	Total		
Subject Title		40	10	50	3	2
Course Objectives	<ul style="list-style-type: none">• Extract and analyze software requirements specifications for different projects• Develop some basic level of software architecture/design• Understand the importance of the stages in the software life cycle.• Understand the various process models.					
Course Outcomes	<ul style="list-style-type: none">• Learn developing methodology of software project• Understand tools and techniques of software engineering• Verify and validate the problem of software programming• Maintain the quality of software project					
Module 1	System Analysis and System Design Tools					
<ul style="list-style-type: none">• Flow chart• Decision tables & Decision Trees• Structure charting Techniques (HIPO)• Entity relation Analysis (ERD)• Normalization : 1NF, 2NF, 3NF• Input output design• Data flow Diagram (Physical, Logical), structured chart• Data Dictionary: Features of Data Dictionary, Process specification Methods						
Module 2	Configuration and Construction of the System					
<ul style="list-style-type: none">• Collection of system statistics• Setting Sub-system Boundaries• Fractional Approach, Incremental Approach						
Module 3	Software Testing, Implementation and maintenance					
<ul style="list-style-type: none">• Need of Testing, White Box, Black Box testing• Changeover, Pilot, Parallel						
Module 4	UML					
<ul style="list-style-type: none">• UML — Overview• A Conceptual Model of UML• Object-Oriented Concepts• OO Analysis and Design• Role of UML in OO Design• UML — Building Blocks : Things, Relationships, UML Diagrams						
Case studies						
Pay Roll, Library System, Inventory Management System, College Admission System						

Recommended Books	1) Analysis and Design of Information Systems by James Senn. 2) System analysis and design by Elias Awad 3) Software Engineering by Pressman 4) System Analysis and Design by Parthsarty / Khalkar 5) Practical guide to structure System Design by Miller/Page/jones
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**Glossary :*

1. **ESE** : End Semester Examination (Final Paper)
2. **ISE** : In Semester Examination (Internal Assessment)
3. **L/W** : Lectures per Week

Nature of Question Paper for Semester Pattern

BCA Model Question Paper

Time: - 2 hrs.

Total Marks-40

- Instructions:**
1. All questions are compulsory.
 2. Draw neat diagrams and give equations wherever necessary.
 3. Figures to the right indicate full marks.
 4. Use of logarithmic table and calculator is allowed.

Q. No.1) Multiple choice questions

(08)

1) -----

a)

b)

c)

d)

2)

3)

4)

5)

6)

7)

8)

Q.No.2) Answer any four of the following

(08)

i)

ii)

iii)

iv)

v)

vi)

Q.No.3 Write short notes on any two of the following

(08)

i)

ii)

iii)

Q. No.4) Answer any Two of the following

(08)

i)

ii)

iii)

Q.No.5) Answer any one of the following

(08)

i)

ii)