SRI DHARMASTHALA MANJUNATHESHWARA COLLEGE,
(AUTONOMOUS)
UJIRE – 574 240
(Re-accredited by NAAC at 'A' Grade with CGPA 3.61 out of 4)

B.SC. COMPUTER APPLICATIONS

SYLLABUS OF BACHELORS DEGREE IN
BUSINESS ADMINISTRATION

CHOICE BASED CREDIT SYSTEM – 2019-20 ONWARDS
APPROVED BY THE BOS MEETING

HELD ON 18-06-19

APPROVED BY THE ACADEMIC COUNCIL MEETING

HELD ON 10-10-2019

SRI DHARMASTHALA MANJUNATHESHWARA COLLEGE,
(AUTONOMOUS)
UJIRE – 574 240
(Re-accredited by NAAC at 'A' Grade with CGPA 3.61 out of 4)

Revised Curriculum Structure and Scheme of Examination

B.SC. COMPUTER APPLICATIONS
(Vocational) Degree Programme

Choice Based Credit System (CBCS), 2019-2020 onwards

SDM College (Autonomous) Ujire

SDM COLLEGE UJIRE, (AUTONOMOUS)
B.Sc. - Computer Applications (Vocational) Degree Programme Curriculum and Scheme of Examination

T- Theory **P** - Practical, **CC-** Co-Curricular**, EC** – Extra-curricular

I/II/III/IV Semesters

Courses Group	Courses	No.of Courses T/P	Instruction hrs/week	Duration of Exam(hrs)	Marks			Credits
					IA	Exam	Total	
Group 1	**2 Optionals* of 3 credits each**	**2T**	**2x4**	**2x3**	**2x30**	**2x120**	**2x150**	**2x3**
	Computer Application	**1T**	**4**	**3**	**20**	**80**	**100**	**2**
		1P	**3**	**3**	**10**	**40**	**50**	**1**
Group 2	One course from 4 Electives	1T	1 x 2	1 x 2	1 x 10	1 x 40	1 x 50	1x1 =1
Group 3	2 Foundation Languages	2L	2 x 4	2 x 3	2 x 20	2 x 80	2 x 100	2 x 2 =4
	Elective Foundation	1T	1 x 2	1 x 2	1 x 10	1 x 40	1 x50	1x1 =1
Group 4	EC & CC	1T	1 x 2	1 x 2	1 x 50	-	1 x50	1x1=1
						Total Semester Credits		16

Group 2: ElectiveCourses:
i)DisciplineSupportive   ii). Expanded scope Iii) Skill development iv) AnotherDiscipline/Domain

V/VI Semester

Courses Group	Particulars	No. of courses T/P	Instruction hrs/week	Duration of Exam(hrs)	Marks			Credits
					IA	Exam	Total	
Group I	2 Optional* of 3 credits each	2T	2 x 3	2 x 3	2 x30	2 x 120	2 x 150	2 x 3
		2T	2 x 3	2 x 3	2 x 30	2 x 120	2 x 150	2 x 3
	Computer Application	2T	2 x 3	2 x 3	2 x 20	2 x 80	2 x 100	2x2
		2P	2 x 3	2 x3	2 x 10	2 x40	2 x50	2x1

SDM COLLEGE UJIRE, (AUTONOMOUS)
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Curriculum and Scheme of Examination

I SEMESTER

Group	Course Code	Course	Instruction Hours/ Week	Duration of Exams. (Hrs)	Marks & Credits			
					IA	Exam	Total	Credits
I	BASCAC131/ BSCCAC131	Information Technology	4	3	20	80	100	2
	BASCAP132/ BSCCAP132	Office AutomationLab	3	3	10	40	50	1
II	BASCACE133/ BSCCACE133	E1: Computer Networks	2	2	10	40	50	1
	BASCACE134/ BSCCACE134	E2: Open Source Software						
		Total	09	08	40	160	200	4

II SEMESTER

Group	Course Code	Course	Instruction Hours/ Week	Duration of exams (Hrs)	Marks & Credits			
					IA	Exam	Total	Credits
I	BASCAC181/ BSCCAC181	Problem Solving with C	4	3	20	80	100	2
	BASCAP182/ BSCCAP182	C Programming Lab	3	3	10	40	50	1
II	BASCACE183/ BSCCACE183	E1: Data Mining with R	2	2	10	40	50	1
	BASCACE184/ BSCCACE184	E2: Business Statistics with R						
		Total	09	08	40	160	200	4

III SEMESTER

Group	Course Code	Course	Instruction Hours/ Week	Duration of Exams (Hrs)	Marks & Credits			
					IA	Exam	Total	Credits
I	BASCAC231/ BSCCAC231	Operating System	4	3	20	80	100	2
	BASCAP232/ BSCCAP232	OS Lab	3	3	10	40	50	1
II	BASCACE233/ BSCCACE233	E1: Python Programming	2	2	10	40	50	1
	BASCACE234/ BSCCACE234	E2: Multimedia Applications						
		Total	09	08	40	160	200	4

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IV SEMESTER

Courses Group	Course Code	Course	Instruction Hours /Week	Duration of exams (Hrs)	IA	Exam	Total	Credits
I	BASCAC281/ BSCCAC281	DBMS	4	3	20	80	100	2
	BASCAP282/ BSCCAP282	DBMS Lab	3	3	10	40	50	1
II	BASCAOE283/ BSCCAOE283	E1: IT Fundamentals	2	2	10	40	50	1
	BASCAOE284/ BSCCAOE284	E2: Internet Technologies						
		Total	09	08	40	160	200	4

V SEMESTER

Group	Course Code	Course	Instruction Hours /Week	Duration of exams (Hrs)	IA	Exam	Total	Credits
I	BASCAC331/ BSCCAC331	Java Programming	03	3	20	80	100	2
	BASCAC332/ BSCCAC332	E1: Computer Graphics and Animation	03	3	20	80	100	2
	BASCACE333/ BSCCACE333	E2: Android Application						
	BASCACE334/ BSCCACE334	E3: Programming for Analytics						
	BASCAP335 BSCCAP335	Java Lab	03	3	10	40	50	1
	BASCAP336/ BSCCAP336	E1: Computer Graphics and Animation Lab	03	3	10	40	50	1
	BASCAP337/ BSCCAP337	E2: Android Application Lab						
	BASCAP338/ BSCCAP338	E3: Programming for AnalyticsLab						
		Total	12	12	60	240	300	6

VI SEMESTER

Courses Group	Course Code	Course	Instruction Hours /Week	Duration of exams (Hrs)	Marks & Credits			
					IA	Exam	Total	Credits
I	BASCAC381/ BSCCAC381	VB.NET Programming	03	3	20	80	100	2
	BASCAC382/ BSCCAC382	**E1:** Web Application development	03	3	20	80	100	2
	BASCAC383/ BSCCAC383	**E2:** Networking Essentials						
	BASCAP384/ BSCCAP384	VB.Net Lab	03	3	10	40	50	1
	BASCAP385/ BSCCAP385	E1: Web Application Development Lab	03	3	10	40	50	1
	BASCAP386/ BSCCAP386	E2: Computer Networks Lab						
		Total	12	12	60	240	300	6

Total Marks :1800
Total   number   of   Credits: 36

Common Scheme of Practical Examinations for I -VISemesters

The practical examination in the concerned subject specified in the I Semester to IV Semester shall be conducted for 40 marks. There shall be two main components: problem solving and viva-voce components. There shall be two main problems from the single domain/multiple domain subjects chosen for practical components. And Viva- Voce component shall have to access both the problem solving/Analytical skill and the programmingskills.

Sl.No.		Details	Allocated Marks for one Problem	2 Problems
I.		**Problem Solving Components:**		
	i.	Problem solving with Programs Detail Descriptions	**05**	**10**
	ii.	Compiling Code and Debugging	**05**	**10**
	iii.	Execution and Testing	**05**	**10**
	iv.	Record	--	**05**
II.		**Viva- Voce Examination:**		
	ii	Viva - Voce (Question and Answer)	--	**05**
		Total Marks		**40**

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SDM COLLEGE UJIRE, (AUTONOMOUS)
B.A/B.Sc- Computer Applications (Vocational) Degree Programme
Curriculum and Scheme of Examination

</div>

Preamble:

Due to globalization of education and economy, UGC has long back identified the necessity to align higher education with the emerging needs of the economy so as to make the current Indian Higher Education System more relevant and career-oriented with focus on quality and excellence and also to ensure that the graduates of higher education system have adequate knowledge and skills for employment and entrepreneurship. It is envisaged that professionally qualified graduates with a sound knowledge of their core disciplines and expertise in a concerned skill will have more openings in service, industry and self-employment sectors. Demand and scope for such professionally trained graduates are visible in the applied fields of almost all basic/core disciplines and faculties in the current changing global scenario and is likely to increase in the future. The higher education system has to incorporate the requirements of various industries in its curriculum, in an innovative and flexible manner while developing a holistic and well-groomed graduate. The scheme was designed to ensure that graduates who pass out after completing these courses would have knowledge, skills and aptitude for gainful employment in the wage sector in general and self-employment inparticular.

The UGC initiated a major programme of vocationalisation at undergraduate level during VIII Plan (1994-95). The scheme was designed to ensure that graduates who pass out after completing these courses would have knowledge, skills and aptitude for gainful employment in the wage sector in general and self-employment in particular.

The objective of Computer Applications vocational Programme is to provide students with an education that will prepare them to develop a career in the field of computer Science and Applications.

Programme Objectives:

PO1: Impart both basic and advanced learning to students in the discipline of Arts/Science specifically with the application of software technology for professional requirements, merging core academic domains and ComputerApplications

PO2: To impart central knowledge and skills to the students in emerging areas of core domains along with computing skills for effective domain enrichment

PO3: To groom students with desired competence in core areas with computing leverage.

PO4: To strengthen theoretical and applied aspects of core area domains for preparing the students for higher education and research.

PO5: To equip the students with necessary skill sets pertaining to computing principles, software technologies and general practices in software solutions essential for gaining appropriate employment, becoming entrepreneurs and creating appropriate knowledge.

PO6: To impart demonstratable knowledge, skills and values in order to support students' eventual progression to higher learning and gainful career with resilient value system.

Programme Outcome

The Arts/Science graduates should be able to:

Po1: Apply the knowledge of Core domains and computers to obtain constructive solutions to complex real world problems in all fields.

Po2: Understand the concepts of key areas in computer science and apply latest technologies for computer applications in other domains

Po3: Design solutions for Scientific, socio-economic and business problems and plan case study, processes to meet the specifications with consideration for sustainabledevelopment.

Po4: Use modern computing models and tools to conduct investigations of complex scientific, economic, business and management problems including analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

Po5: Understand digital ethics - what can be made possible by digital technology and what is ethically desirable, in order to be successful leaders in the scientific and other fields.

Po6: Use digital edge in order to function effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings, communicate effectively with the business community & IT professionals and with society atlarge.

Po7: Demonstrate knowledge and understanding of Science/Arts domains along with Software engineering principles and apply these to one's own work, as a member and leader in a team.

Po8: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcome

After completion of Bachelor of Arts/Bachelor of Science with Computer Applications (Vocational) Programme, students are able to:

PSO1: Gain foundation and incremental knowledge in different areas of their core domains

PSO2: Develop basic understanding of conceptual and functional knowledge of software commonly used in academic and professional environments.

PSO3: Acquire the skills of applying principles and techniques of Computers and Software technologies in modelling solutions to problems in their fields ofactivities

PSO4: Develop right attitude for working effectively and efficiently in their work environment with computing edge.

PSO5: Work in teams with enhanced communication, inter-personal skills and be capable of making decisions at personal and professional level.

PSO6: Provide technical support and computing leverages for improved communication in Office and works management.

PSO7: Position themselves as potential candidates for employment in the functional areas of their fields/ career domains.

PSO8: Pursue their career in industry, teaching and research with an inclination towards lifelong learning and acquiring contemporary knowledge and skills

Prospects of Higher Education:

After completion of Bachelor of Arts/Bachelor of Science with Computer Applications (Vocational) Programme, students are able to pursue (indicative):

Master of Arts (M.A)/Master of Science (M.Sc), Master of Computer Applications (MCA), M.Sc (Computer Science), M.Sc (I.T), Master of Business Administration (MBA), Master of Business Administration (M.B.A-IT), Post graduate Diploma in Computer Applications (PGDCA), Certificate course in Multimedia and Animation, Cisco Certified Network Associate (CCNA), Mobile App Development, Web Programming/application development (PHP Frameworks, Ruby, and Python), User Interface (UI)/User Experience (UX) Development Frameworks (HTML, CSS, Bootstrap etc.), Project Management Professional Certification (PMP), Database administration (DBA), Software Quality Testing (SQT), Digital Marketing (Digital Technology Platforms), DevOps, Amazon Web Services (AWS), Advanced Java Frameworks etc.

Career Prospects:

After completion of Bachelor of Arts/Bachelor of Science with Computer Applications (Vocational) Programme, students are able to pursue the following careers (indicative):

Humanities Graduates (with necessary Domain Knowledge/Skills and field specialization)
Indian Administrative Services, Indian Police Services, Indian Foreign Services, Indian Revenue Services, Indian Postal Services, Karnataka Administrative Service, Teacher, Artist, Counseling, Travel Agent, lawyer, Editor, Curator, Interpreter and/or Translator, Genealogist, Advertising Manager, Journalist, Foreign Correspondent, Human Resources Specialist, Linguist, Advertising Sales Manager, Archivist, Numismatist, Epigraphist, Museologist, Lobbyist, Research Assistant, Political Analyst, Diplomat,

Intelligence Specialist, Public Relations Officer, Broadcasting and Production Executive, Copywriting Executive, Risk Advisory Associate/Analyst/Research Assistant/Policy Maker with Banking Firms/Research Firms/Financial Consultancies/Government Ministries or Insurance/Accountancy Firms, Proposal Manager, Communications Director, Content Strategist, Content Marketing Manager, Instructional Designer, Technical Writer, Content Manager, Proposal Writer, Web Content Specialist, Sign Language Interpreter, Web Content Editor, Publications Editor, Interpreter or Translator, Content Writer, Proofreader, News Reporter, Development Coordinator(Non-profit Organization), Data analysts, Case workers, Human Resource Executive, Event Manager, Entrepreneur, BPO / KPO Executive, Web Developer, Hardware Technician, Software Engineer, Software Developer, Computer Programmer, Computer Operator, Mobile Application Developer, CAD Application Support Technician, Graphics Designer, Computer-Laboratory Technician, logo designer, graphics designer, game designer, multimedia designer, 3D art director, gaming artist, animation film maker, Computer Hardware Engineer, Computer Network Architect, Computer Programmer, Computer Systems Analyst, Cryptographer, Data Scientist, Database Administrator, Economist, Information Security Analyst, Teacher, Mathematician, Multimedia Artist or Animator, Remote Sensing Scientist or Technologist, Software Quality Assurance Engineer & Tester, Statisticianetc.

Science Graduates (with necessary Domain Knowledge/Skills and field specialization)

Astronomer, Audio and Video Equipment Technician, Aviation Inspector, Chemical Technician, Chemist, Electrician, Film and Video Editor, Food Science Technician, Food Scientist or Technologist, Forensic Science Technician, Nuclear Monitoring Technician, Nuclear Power Reactor Operator, Occupational Health & Safety Specialist, Physicist, Pilot, Power Distributor & Dispatcher, Power Plant Operator, Precision Instrument & Equipment Repairer, Ship & Boat Captain, Sound Engineering Technician, Environmental Science and Protection Technician, Research Assistant, Quality control technician, Dietician, Civil service administrator, Technical sales executive, Conservation officer, Meteorologist, Actuary, Human Resource Executive, Event Manager, Entrepreneur, BPO / KPO Executive, Web Developer, Hardware Technician, Software Engineer, Software Developer, Computer Programmer, Computer Operator, Mobile Application Developer, CAD Application Support Technician, Graphics Designer, Computer-Laboratory Technician, logo designer, graphics designer, game designer, multimedia designer, 3D art director, gaming artist, animation film maker, Computer Hardware Engineer, Computer Network Architect, Computer Programmer, Computer Systems Analyst, Cryptographer, Data Scientist, Database Administrator, Economist, Information Security Analyst, Teacher, Mathematician, Multimedia Artist or Animator, Remote Sensing Scientist or Technologist, Software Quality Assurance Engineer & Tester, Statistician, Competitive intelligence analyst, Market research analyst, Cyber security specialist, Natural resource manager, Industrial consultant.

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B.Sc. - Computer Applications (Vocational) Degree Programme
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I SEMESTER

Group	Course Code	Course	Instruction Hours/ Week	Duration of Exams. (Hrs)	Marks & Credits			
					IA	Exam	Total	Credits
I	BASCAC131/ BSCCAC131	Information Technology	4	3	20	80	100	2
	BASCAP132/ BSCCAP132	Office Automation Lab	3	3	10	40	50	1
II	BASCACE133/ BSCCACE133	E1: Computer Networks	2	2	10	40	50	1
	BASCACE134/ BSCCACE134	E2: Open Source Software						
		Total	09	08	40	160	200	4

GROUP-I	BASCAC131/	**48 hours**
COURSE-1	**BSCCAC131: Information Technology**	

Theory/Week: 4Hrs   **I.A:20**
Credits: 2   **Exam: 80**

Course Objectives:
CO1: To make the students understand and learn the basics of computer for its effective use in day to day life.

Course Outcomes:
After completion of the course, students are expected to:
Co1: Be able to apply knowledge of computing analyze a problem, and identify and define the computing requirements appropriate to its solution
Co2: Be able to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
Co3: Be able to effectively integrate IT based solutions into the user environment

UNIT I	12 Hrs.

Introduction to Computers: Introduction, Characteristics computers, Evolution computers Generation of Computers, Classification of computers, the computer system, Application of computers. **Number system:** Introduction, Number system, Conversion between number bases, Arithmetic system, signed and unsigned numbers, concept of overflow, Binary coding. **Computer Architecture:** Introduction, Central processing unit, main memory unit, interconnection of units, cache, communication between various units of a computer system. **Primary memory:** Introduction, memory representation, memory hierarchy, Random access memory, Types of RAM, Read-only memory, Types of ROM.

UNIT II	12 Hrs.

Secondary Storage: Introduction, classification, magnetic tape, magnetic disk, Optical disk, Magneto-optical disk, Memory stick, Universal serial bus, Mass storage devices. **Input devices**: Introduction, Types of input devices, Optical character recognition, Optical Mark Recognition, Magnetic ink character recognition, Bar code reader, **Output devices**: Introduction, Types of output, Classification of output devices, Terminals.

UNIT III	12 Hrs.

Computer Program: Introduction, algorithm, flowchart. **Computer languages**: Introduction, Evolution of programming languages, classification of programming languages, generation of programming languages, Features of a good programming language, selection of a programming language. **Computer software:** Introduction, software definition, relationship between software and hardware, software categories, terminology software **Network basics:** Computer networks, Network topologies, Network devices.

UNIT IV	12 Hrs.

Internet basics: Introduction, Evolution, Basic internet terms, getting connected to internet, internet Applications, **Working with Application Software, Productivity software:** Word processing program, Spreadsheet program, presentation program, Database and **DBMS:** working with database, RDBMS

Text Books:
1. ITL Education Solutions Limited, **Introduction to Information Technology**, Pearson Education India; 2 edition,2012.
2. Peter Norton, **Introduction to Computers**, 7th edition, Tata McGraw Hill Publication, 2017 (Unit - IV).

Reference Books:
1. S.S. Shrivastava, **MS-Office,** Laxmi Publications; Firstedition,2015
2. Dinesh Maidasani, **Learning Computer Fundamentals, MS Office and Internet &Web Technology**, Laxmi Publications; Thirdedition,2015
3. Vikas Gupta, **Comdex Linux and Open Office Course Kit: Revised and Upgraded,** Dreamtech Press,2010.

Practical-I	BASCAP132/	**36 hours**
	BSCCAP132: OFFICE AUTOMATIONLAB	
Practical/Week: 3 Hrs **Credits: 1**	Exercises in MS-Office package	**I.A:10** **Exam:40**

GROUP-II	BASCACE133/	**24 hours**
COURSE-1	**BSCCACE133-E1: Computer Networks**	

Theory/Week: 2 Hrs   **I.A:10**
Credits: 1   **Exam: 40**

Course Objectives:
CO1: Introduce basics of data communications and network architecture, network layer control and protocols
CO2: Familiarize Internetworking technologies and Web technologies
Course outcomes:
Upon successful completion of the course the student will be able to:
Co1: understand basics, components of Network, Internet and Web technology;
Co2: explain basics of Internet technology, such as http and the World Wide Web, HTML, and JavaScripts;
Co3: design WWW pages to serve as front-end to client/server, Internet applications;

UNITI	**12 Hrs.**

Computer Networks: Introduction to computer network, data communication, components of data communication, data transmission mode, data communication measurement, LAN, MAN, WAN, wireless LAN, internet, intranet, extranet. Network Models: Client/ server network and Peer-to-peer network, OSI, TCP/IP, layers and functionalities. Transmission Media: Introduction, Guided Media: Twisted pair, Coaxial cable, Optical fiber. Unguided media: Microwave, Radio frequency propagation, Satellite.
LAN Topologies: Ring, bus, star, mesh and tree topologies.

UNITII	**12 Hrs.**

Network Devices: NIC, repeaters, hub, bridge, switch, gateway and router. Internet Terms: Web page, Home page, website, internet browsers, URL, Hypertext, ISP, Web server, download and upload, online and offline. Internet Applications: www, telnet, ftp, e-mail, social networks, search engines, Video Conferencing, E-Commerce, M-Commerce, VOIP, blogs. Introduction to Web Design: Introduction to hypertext markup language (html) Document type definition, creating web pages, lists, hyperlinks, tables, web forms, inserting images, frames, hosting options and domain name registration. Customized Features: Cascading style sheet (CSS) for text formatting and other manipulations. JavaScript Fundamentals: Data types and variables, functions, methods and events, controlling program flow, JavaScript object model, built-in objects and operators.

Text Books:
1. Andrew S. Tanenbaum, David J. Wetherall, **Computer Networks**, PHI,2011
2. D.R. Brooks, **An Introduction to HTML and Javascript for Scientists and Engineers**, Springer ,2011

Reference Books:
1. A. Forouzan, **Data Communication and Networking**, TMH, 2017
2. **HTML A Beginner's Guide**, Tata McGraw-Hill Education,2009
3. J. A. Ramalho, **Learn Advanced HTML 4.0 with DHTML**, BPB Publications,2017

GROUP-II	BASCACE134/	**24hours**

COURSE-2   BSCCACE134-E2: Open Source Software

Theory/Week: 2 Hrs   **I.A:10**

Credits: 1   **Exam: 40**

Course Objectives:

CO1: Introduce concepts, strategies, and methodologies related to open source software development.

CO2: Explain the business, economy, societal and intellectual property issues of Open source software.

Course outcomes:

Upon successful completion of the course the student will be able to:

Co1: Be familiar with open source software products and development tools currently available on the market.

Co2: Be able to utilize open source software for developing a variety of software applications, particularly Web applications.

UNITI   12 Hrs.

The philosophy of OSS, commercial software vs OSS, free softwarevsfreeware.   The Linux operating system, GPL, LGPL and otherlicenses.

UNITII   12 Hrs.

Category of OSS Application Software, Study of Commercial Application software vs OSS, Open Office, GAMBAS, GIMP etc. Software Development Using Open Source and Free Software Licenses: Introduction, Models of Open Source and Free Software Development, Forking, Choosing an Open Source or Free Software License, Drafting Open Source Licenses

Text Books:

1. Andrew St. Laurent, **Understanding Open Source and Free Software Licensing** – O'Reilly Media, 2004

Reference Books:

1. P. Rizwan Ahmed, **Open Source software**, Margham Publications,2015
2. Ashish Gavande, **Understanding Free and Open Source,** 2017

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II SEMESTER

Group	Course Code	Course	Instruction Hours/ Week	Duration of exams (Hrs)	Marks & Credits			
					IA	Exam	Total	Credits
I	BASCAC181/ BSCCAC181	Problem Solving with C	4	3	20	80	100	2
	BASCAP182/ BSCCAP182	C Programming Lab	3	3	10	40	50	1
II	BASCACE183/ BSCCACE183	E1: Data Mining with R	2	2	10	40	50	1
	BASCACE184/ BSCCACE184	E2: Business Statistics with R						
		Total	09	08	40	160	200	4

GROUP-I COURSE-2	**BASCAC181/BSCCAC181**: Problem SolvingwithC	**48hours**
Theory/Week: 4 Hrs		**I.A:20**
Credits: 2		**Exam:80**

Course Objectives:

CO1: To develop understanding about programming principles/concepts - functional, logic and also learn skills of problem solving and implementation of solution

Course outcomes:

After completion of the course, students are expected to:

Co1: apply programming knowledge to create solutions to challenging problems, including specifying, designing, implementing and validating solutions for new problems

UNIT I	12 Hrs.

Introduction: Overview of C Program, Importance of C-Program, Basic structure of a C-program, Execution Style of C-Program. **Constants, Variables & Data types**: Features of C language, Character set, C token, Keywords & identifiers, Constants, Variables, data types, Declaration of variables, assigning values to variables, defining symbolic constants. **Operators and Expression**: Arithmetic, Relational, logical, assignment, increment & decrement, conditional, bit wise & special operators, evaluation of expressions, Precedence of arithmetic operators, type conversions in expressions, operator precedence & Associativity, built in mathematical functions. **Managing Input and Output operations**: Reading & writing a character, Formatted input and output.

UNIT II	12 Hrs.

Decision Making and Branching: Decision making with if statement, simple if statement, the if else statement, nesting of if … else statements, the else if ladder, the switch statement, the ?: operator, the go to statement. **Decision making and looping**: The while statement, the do statement, for statement, exit, break, jumps in loops. **Arrays**: Declaration, initialization & access of one dimensional & two-dimensional arrays. Programs using one and two dimensional arrays. : Adding multiplying, transposing matrices, sorting and searchingarrays.

UNIT III	12 Hrs.

Handling of character strings: Declaring & initializing string variables, reading strings from terminal, writing strings to screen, Arithmetic operations on characters, putting strings together, comparison of two strings, string handling functions, table of strings. **User defined functions**: Need for user defined functions, Declaring, defining and calling C functions return values & their types, Categories of functions: With/without arguments, with/without return values, recursion, functions with arrays, the scope, visibility & lifetime of variables.

UNIT IV	12 Hrs.

Structures and union: Structure definition, giving values to members, structure initialization, comparison of structure variables, arrays of structures, arrays within structures, structures within structures, structures & functions, unions, size of structures, bit fields. **Pointers**: Understanding pointers, accessing the address of a variable, declaring & initializing pointers, accessing a variable through its pointer, pointer expression, pointer increments & scale factor, pointers & arrays, Passing pointer variables as function arguments. **The Pre-processor**: Macro substitution, file inclusion, compiler control directives, command line arguments & illustrative programs. **File Management in C:** Introduction, defining and opening a file, closing a file, I/O operations on files, error handling during I/O operations.

Text Books:

1. E. Balagurusamy, **Programming in ANSI C**, McGraw Hill Education India Private Limited;Seventh edition, (2017
2. .M. T. Somashekara, D. S. Guru, K. S. Manjunatha, **Problem Solving with C**, PHI Learning Pvt. Ltd.; Second edition,2018

Reference Books:

1. Hanly, **Problem Solving and Program Design in C**, Pearson Education India; 7 edition,2013
2. Satish Jain, **Programming & Problem Solving Through C Language**, BPB Publications,2012

Practical-II	**BASCAP182/BSCCAP182:** C Programming Lab	**36 hours**
Practical/Week: 3 Hrs **Credits: 1**	Exercises in C language	**I.A:10** **Exam:40**

GROUP-II
COURSE-3   **BASCACE183/BSCCACE183-E1: Data MiningwithR**   **24 hours**

Theory/Week: 2   **I.A:10**
Hrs, Credits: 1   **Exam: 40**

CourseObjectives:

CO1: Introduce basic concepts of Data Mining, its technics and application tasks
CO2: Demonstrate powerful tools for data preparation and data cleansing
CO3: Present technics for visually finding patterns in data
CO4: Enable working with complex data sets and understand how to process data sets
CO5: Help to get know how about object-oriented programming in R
CO6: Provide skills to explore statistical measures in graphs

Course outcomes:

Upon successful completion of the course the student will gain:

Co1: Understanding about basic concepts of Data Mining and its application
Co2: Ability to identify the characteristics of datasets
Co3: Ability to select and implement data mining techniques in R suitable for the applications under consideration.
Co4: Ability to recognize and implement various ways of selecting suitable model parameter for different machine learning techniques.

UNITI   **12 Hrs.**

Introduction to Data Mining and R: A brief introduction to Data Mining, Main tasks and objectives, Illustrative case studies, A brief introduction to R and Rstudio, Basic concepts of the R language. Data Munging: Presentation of the first case study, Importing data into R, Data summarization, Examples and exercises in R. Data Visualization and Reporting: Data visualization, Examples and exercises in R, Reporting, Dynamic reports and presentations in R using knitr.

UNITII   **12 Hrs.**

Predictive Analytics: Introduction to predictive modelling, Classification and regression tasks, Evaluation metrics, Linear discriminants and linear regression, classification and regression trees, Support vector machines, Ensembles and Random forests, Model evaluation strategies, Reliability of estimates. Model Evaluation and Selection: Experimental methods for performance estimation, Cross validation, Holdout, Bootstrap, The performance Estimation package, Illustrations in R, Statistical significance of the observed differences, Illustrative case studies and hands on practice

Text Books:

1. G. K. Gupta, **Introduction to Data Mining with Case Studies**, 3rd Edition, PHI Yanchang Zhao,2016
2. Yonghua Cen, **Data Mining Applications with R**, 1st Edition, Academic Press,2013
3. Pang-Ning Tan, Michael Steinbach,Vipin Kumar, **Introduction to Data Mining**, Pearson, 2013

Reference Books:

1. M Ramakrishna Murthy, **Introduction to Data Mining and Soft ComputingTechniques,** Laxmi Publications Pvt Ltd, 2017.
2. Paul Teetor, **R Cookbook: Proven Recipes for Data Analysis, Statistics, and Graphics**, O'reilly Cookbooks,2011
3. Garrett Grolemund, Hadley Wickham, **Hands-On Programming with R: Write Your Own Functions and Simulations**, 1st Edition, O'reilly **,**2014

GROUP-II
COURSE-4   **BASCACE184/ BSCCACE184-E2: Business StatisticswithR**   **24 hours**
Theory/Week: 2 Hrs   **I.A:10**
Credits: 1   **Exam: 40**
Course Objectives:
CO1: Introduce basic programming concepts of R with reference to Statistical Data Analysis
CO2: Demonstrate powerful tools for data preparation and data cleansing
CO3: Present technics for visually finding patterns in data
CO4: Enable working with complex data sets and understand how to process data sets
CO5: Help to get know how about object-oriented programming in R
CO6: Provide skills to explore statistical measures in graphs
Course outcomes:
Upon successful completion of the course the student will gain:
Co1: Understanding about basic concepts of Data Mining and its application
Co2: Ability to identify the characteristics of datasets
Co3: Ability to select and implement data mining techniques in R suitable for the applications
under consideration.
Co4: Ability to recognize and implement various ways of selecting suitable model parameter for
different machine learning techniques.

UNITI	**12 Hrs.**

Introduction, how to run R, R Sessions and Functions, Basic Math, Variables, Data Types, Vectors, Conclusion, Advanced Data Structures, Data Frames, Lists, Matrices, Arrays, Classes. R Programming Structures, Control Statements, Loops, – Looping Over Nonvector Sets,- If-Else, Arithmetic and Boolean Operators and values, Default Values for Argument, Return Values, Deciding Whether to explicitly call return- Returning Complex Objects, Functions are Objective, No Pointers in R, Recursion. Doing Math and Simulation in R, Math Function, Extended Example Calculating Probability- Cumulative Sums and Products-Minima and Maxima- Calculus, Functions Fir Statistical Distribution, Sorting, Linear Algebra Operation on Vectors and Matrices, Extended Example: Vector cross Product- Extended Example: Finding Stationary Distribution of Markov Chains, Set Operation, Input /output, Accessing the Keyboard and Monitor, Reading and writerFiles

UNITII	**12 Hrs**

Graphics, Creating Graphs, The Workhorse of R Base Graphics, the plot() Function – Customizing Graphs, Saving Graphs to Files. Probability Distributions, Normal Distribution- Binomial Distribution- Poisson Distributions Other Distribution, Basic Statistics, Correlation and Covariance, T-Tests,-ANOVA. Linear Models, Simple Linear Regression, -Multiple Regression Generalized Linear Models, Logistic Regression, – Poisson Regression- other Generalized Linear Models-Survival Analysis, Nonlinear Models, Splines- Decision- Random Forests,

Text Books:
1. A K Verma, **The Art of R Programming**, CengageLearning
2. Lander, R for Everyone, Addison-Wesley Professional. ,2017
3. Mark van der Loo, Edwin de Jonge, **Learning RStudio for R Statistical Computing**, Packt Publishing Limited,2012

Reference Books:
1. Paul Teetor, **R Cookbook: Proven Recipes for Data Analysis, Statistics, and Graphics**, O'reilly Cookbooks,2011
2. Garrett Grolemund, Hadley Wickham, **Hands-On Programming with R: Write Your Own Functions and Simulations**, 1st Edition, O'reilly **,2014**

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III SEMESTER

Group	Course Code	Course	Instruction Hours/ Week	Duration of Exams (Hrs)	Marks & Credits			
					IA	Exam	Total	Credits
I	BASCAC231/ BSCCAC231	Operating System	4	3	20	80	100	2
	BASCAP232/ BSCCAP232	OS Lab	3	3	10	40	50	1
II	BASCACE233/ BSCCACE233	E1: Python Programming	2	2	10	40	50	1
	BASCACE234/ BSCCACE234	E2: Multimedia Applications						
		Total	09	08	40	160	200	4

GROUP-I COURSE-3	**BASCAC231/BSCCAC231:OperatingSystem**	**36hours**

Theory/Week: 4Hrs   **I.A:20**
Credits: 2   **Exam:80**

Course Objectives:
CO1: To make students understand the purpose, role, structure, functions, application of operating systems
CO2: Understand services provided by operating systems
Course Outcomes:
After completion of the course, students are expected to:
Co1: Analyze the structure of OS and basic architectural components involved in design
Co2: Analyze the various resource management techniques
Co3: Interpret the mechanisms adopted for file sharing
Co4: conceptualize the components involved in designing a contemporary OS
Co5: be familiar with various types of operatingsystems

UNIT I	**12 Hrs.**

Introduction: Operating system, Mainframe systems, Desktop Systems, Multi-processor Systems, Distributed Systems, Cluster systems, Real Type Systems, Handheld Systems, Future Migration, Computing Environment. **Operating System Structures:** System Components, Operating System Services, System Calls, System Structures. **Process Management**: Process concept, Process Scheduling, Operations on process, Cooperative Process, Inter process Communication. **Threads:** Overview, MultithreadingModels.

UNIT II	**12 Hrs.**

CPU Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms, multiple processor scheduling. **Process Synchronization:** Background, the critical section Problems, Synchronization, Semaphore, Classic problems synchronization hardware, Critical region Monitor, Semaphore. **Deadlocks**: System model, deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection.

UNIT III	**12 Hrs.**

Memory Management: Background, Swapping, contiguous Memory allocations, Paging, segmentation, segmentation with paging, **Virtual Memory:** Background, demand paging, process creation, page replacement, allocation of frames and thrashing. **File Management**: File concept, Access methods, Directory structure, File system Mounting, File sharing,Protection.

UNIT IV	**12 Hrs.**

Linux: An introduction, reason for its popularity, Linux file system, login and logout.
Linux commands: Command format, Directory oriented command, wild card characters, File oriented commands, File Access Permissions, Process oriented commands, Background processing, Communication oriented commands, General purpose commands, Pipe and Filters related commands, vi editor, Shell programming, Systemadministration.

Text Books:
1. Silberschartz, Galvin and Gagne, **Operating Systems Concepts**, 8th Edition, John Wiley & sons, Pvt.Ltd.2008
2. 2. B Mohamed Ibrahim, **Linux: A Practical Approach**, Laxmi Publications; First edition,,2016

Reference Books:
1. Pramod Chandra P. Bhatt, **An Introduction to Operating Systems: Concepts andPractice (GNU/ Linux),** Prentice Hall India Learning Private Limited; Fourth edition,2013
2. Richard Blum, Christine Bresnahan, **Linux Command Line and Shell Scripting Bible**, Third edition, Wiley,2015.
3. Sobell, **Practical Guide to Linux Commands Editor**, Pearson Education India; 3 edition,2013.

Practical-III	**BASCAP232/BSCCAP232: OS Lab**	**36 hours**
Practical/Week: 3 Hrs Credits: 1	Lab Exercises in Linux OS	**I.A:10 Exam:20**

GROUP-II **COURSE-5**	**BASCACE233/** **BSCCACE233-E1: Python Programming**	**24hours**

Theory/Week: 2 Hrs   **I.A:10**
Credits: 1   **Exam: 40**
Course Objectives:
CO1: Introduce programming using the Python programming language with emphasis common algorithms and programming principles utilizing standard library distributed with Python.
Course outcomes:
Upon successful completion of the course the student will:
Co1: Be skilled at creating, debugging and testing a software application using the Python programming language.

UNITI   **12 Hrs.**

Planning the Computer Program: Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation. Techniques of Problem Solving: Flowcharting, decision table, algorithms, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming. Overview of Programming: Structure of a Python Program, Elements of Python Introduction to Python: Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators (Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator). Creating Python Programs: Input and Output Statements, Control statements (Branching, Looping, Conditional Statement, Exit function, Difference between break, continue and pass.), Defining Functions, default arguments, Errors and Exceptions.

UNITII   **12 Hrs.**

Iteration and Recursion: Conditional execution, Alternative execution, Nested conditionals, The return statement, Recursion, Stack diagrams for recursive functions, Multiple assignment, The while statement, Tables, Two-dimensional tables. Strings and Lists: String as a compound data type, Length, Traversal and the for loop, String slices, String comparison, A find function, Looping and counting, List values, Accessing elements, List length, List membership, Lists and for loops, List operations, List deletion. Cloning lists, Nested lists. Object Oriented Programming: Introduction to Classes, Objects and Methods, Standard Libraries. Data Structures: Arrays, list, set, stacks and queues. Searching and Sorting: Linear and Binary Search, Bubble, Selection and Insertionsorting.

Text Books:
1. Ch Satynarayana, M Radhika Mani, ands B N Jagadeesh, Python Programming,Universities Press,2018.
2. Timothy A Budd, **Exploring Python**, TMH,2009
3. Allen Downey, Jeffrey Elkner, Chris Meyers, **How to think like a computer scientist: learning with Python,** 1st Edition – Freely available online,2015

Reference Books:
1. Yuxi (Hayden) Liu, **Python Machine Learning by Example**, Packt Publishing Limited,2017
2. Narasimha Karumanchi, **Data Structures and Algorithmic Thinking with Python: Data Structure and Algorithmic Puzzles**, Career Monk Publications,2015

GROUP-II COURSE-6	**BASCACE234/** **BSCCACE234**-E2: Multimedia and Applications	**24hours**
Theory/Week: 2 Hrs **Credits: 1**		**I.A:10** **Exam: 40**

Course Objectives:

CO1: Introduce basic knowledge and skills needed for development of multimedia systems and applications using available hardware and software tools.

Course outcomes:

Upon successful completion of the course the student will gain:

Co1: knowledge in the field of multimedia in practice and independently continue to expand knowledge in this field.

UNITI	**12 Hrs.**

Multimedia: Introduction to multimedia, components, uses of multimedia, multimedia applications, virtual reality. Text: Fonts & Faces, Using Text in Multimedia, Font Editing & Design Tools, Hypermedia & Hypertext. Images: Still Images – bitmaps, vector drawing, 3D drawing & rendering, natural light & colors, computerized colors, color palettes, image file formats. Sound: Digital Audio, MIDI Audio, MIDI vs Digital Audio, Audio FileFormats.

UNITII	**12 Hrs.**

Video: How video works, analog video, digital video, video file formats, video shooting and editing. Animation: Principle of animations, animation techniques, animation file formats. Internet and Multimedia: www and HTML, multimedia on the web – web servers, web browsers, web page makers and site builders. Making Multimedia: Stages of a multimedia project, Requirements to make good multimedia, Multimedia Hardware - Macintosh and Windows production Platforms, Hardware peripherals - Connections, Memory and storage devices, Multimedia software and Authoringtools

Text Books:
1. Tay Vaughan, **Multimedia: Making it work**, TMH, Eighth edition,2006
2. Ralf Steinmetz and Klara Naharstedt, **Multimedia: Computing, Communications Applications**, Pearson,2012

Reference Books:
1. Keyes, **Multimedia Handbook**, TMH,1997
2. K. Andleigh and K. Thakkar, **Multimedia System Design**, PHI,1996

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IV SEMESTER

Courses Group	Course Code	Course	Instruction Hours /Week	Duration of exams (Hrs)	Marks & Credits			
					IA	Exam	Total	Credits
I	BASCAC281/ BSCCAC281	DBMS	4	3	20	80	100	2
	BASCAP282/ BSCCAP282	DBMS Lab	3	3	10	40	50	1
II	BASCAOE283/ BSCCAOE283	E1: IT Fundamentals	2	2	10	40	50	1
	BASCAOE284/ BSCCAOE284	E2: Internet Technologies						
4		Total	09	08	40	160	200	4

GROUP-I
COURSE- 4   **BASCAC281/BSCCAC281:DBMSConcepts**   **48hours**
Theory/Week: 4 Hrs   **I.A:20**
Credits: 2   **Exam:80**
Course Objectives:
  CO1: Learn and practice data modelling using the entity-relationship and developing database designs.
  CO2: Understand the use of Structured Query Language (SQL) and learn SQL syntax.
  CO3: Apply normalization techniques to normalize the database
  CO4: Understand the needs of database processing and learn techniques of developing program interfaces to a database
Course Outcomes:
After completion of the course, students are expected to:
  Co1: describe data models and schemas in DBMS
  Co2: understand the features of database management systems and Relational database.
  Co3: demonstrate an understanding of the relational data model and use SQL.
  Co4: understand the functional dependencies and design of the database and use SQL solutions to a broad range of query and data updateproblems.

| UNIT-I | 12Hrs. |

Database Systems: Database System Concepts and Architecture, Database Systems versus File Systems. Data Abstraction, Data independence, Schemas and Instances, Data models, Database Languages, Database Users, DBA. Structure of Database Systems.
Data Modelling: E-R model, Entity types, sets, Attributes, Keys, Relationships, Relationship Types, Roles, and Structural Constraints, Weak Entity sets, E-R Diagrams. Different types of database' models and their advantages and disadvantages.

| UNIT-II | 12Hrs. |

Basic structure of Oracle System: Database Structure and its manipulation in Oracle, Storage organization in Oracle Creation of Database: Creating, changing and dropping the tables. Integrity Constraints specification, maintaining reference integrity constraints, Data insertion, Deletion and modification. Querying the database: Information retrieval using SELECT statement, various features of SELECT statement, Aggregate functions, ORDER BY clause, working with expressions and sub queries handling of multiple tables. Views: Creation ofviews.

| UNIT-III | 12Hrs. |

PL/SQL Basics: Introduction, character set, reserve words, Block structure, Data types, Conditional statements, looping statements, procedures, functions.

| UNIT-IV | 12Hrs. |

Cursors: Implicit and explicit cursors, cursor attributes, triggers, packages. Exceptions SQL PLUS concepts: Reports and form design issues.

Text Books:
1. Silberschatz and Korth, **Database System Concepts**, 6th Edition, McGraw Hill Publication,2010
2. Elmasri and Navathe, **Fundamentals of Database Systems**, 7th edition, Pearson Education Asia Publication,2016
3. Ivan Bay Ross**, SQL, PL/SQL the Programming Language of Oracle,** 4th Edition, BPB Publications,2009

Reference Books:
1. P.S. Deshpande, **SQL & PL/SQL for Oracle 11g**, Black Book DreamtechPress,2011.
2. Michael Mclaughlin, **Oracle Database 11g PL/SQL Programming,** McGraw Hill Education; 1 edition, 2017.

Practical-IV	BASCAP282/BSCCAP282: DBMS Lab	36 hours
Practical/Week: 3 Hrs **Credits: 1**	Exercises in Oracle/MYSQL package	**I.A:10** **Exam:40**

GROUP-II
COURSE-7   **BASCAOE283/BSCCAOE283-E1:ITFundamentals**   **24 hours**
Theory/Week: 2 Hrs   **I.A:10**
Credits: 1   **Exam: 40**
Course Objectives:
CO1: Make students understand and learn the basics of computer for its effective use in day to day life.

Course outcomes:
Upon successful completion of the course the student will be able to :
Co1: apply knowledge of computing analyze a problem, and identify and define the computing requirements appropriate to its solution
Co2: design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
Co3: effectively integrate IT based solutions into the user environment.

UNIT-I   **12 Hrs.**
Introduction: Introduction to logical organization of computer, input and output devices (with connections and practical demo), keyboard, mouse, joystick, scanner, OCR, OMR, monitor, printer, plotter, primary memory, secondary memory, auxiliary memory. User Interface: Operating system as user interface, system tools, utility programs Database: Introduction to database, relational data model, Entity types, entity set, attribute and key, relationships, relation types, SQL queries: select, from, where,order.

UNIT-III   **12 Hrs.**
Networks: Definition of network, classification of network, LAN, MAN, WAN, distinction among the networks, Guided Media: Twisted pair, Coaxial cable, and Optical fiber. Unguided media: Microwave, Radio frequency propagation, Satellite, LAN Topologies: Ring, bus, star, mesh and tree topologies.
Internet Applications: Internet as a global network, Search Engine, Online education, Internet utilities – email, online banking, reservations etc. Use of Computers in Education and Research: Data analysis, Heterogeneous storage, e-Library, Google Scholar, Domain specific packages such as SPSS, SciLab, Mathematicaetc.

Text Books:
1. ITL Education Solutions Limited, **Introduction to Information Technology**, Pearson Education India; 2edition,2012.
2. Peter Norton, **Introductionto Computers**, 7th edition, Tata McGraw Hill Publication, 2017

Reference Books:
1. Anitha Goel, **Computer Fundamentals,** Pearson Education,2010
2. Sanjay Saxena, A First Course in Computers 2003 Edition, 3rd Edition, Vikas Publishing House Pvt Limited,2009

GROUP-II
COURSE-8   **BASCAOE284/BSCCAOE284-E2:InternetTechnologies**   **24hours**
Theory/Week: 2 Hrs   **I.A:10**
Credits: 1   **Exam: 40**
Course Objectives:
CO1: Introduce basics of Network, Internet and Web technology
CO2: Introduce World Wide Web, HTML, and JavaScripts
CO3: Provide basic skills for design of Web pages to serve as front-end to client/server, Internet applications
Course outcomes:
Co1: Be skilled, at a beginners' level, at analyzing and designing Internet applications; implement the design using the client/server model; testing and documenting the solutions developed.

UNIT-I   **12 Hrs.**
Computer Networks: Introduction to computer network, LAN, MAN, WAN, wireless LAN, internet, intranet, extranet. Network Models: Client/ server network and Peer-to-peer network, OSI, TCP/IP, layers and functionalities. Internet Applications: Internet as a global network, Search Engine, Online education, Internet utilities – email, online banking, reservations etc. Use of Computers in Education and Research: Data analysis, Heterogeneous storage, e-Library, Google Scholar, Domain specific packages such as SPSS, SciLab, Mathematica etc. Internet Terms: Web page, Home page, website, internet browsers, URL, Hypertext, ISP, Web server, download and upload, online and offline. Internet Applications: www, telnet, ftp, e-mail, social networks, search engines, Video Conferencing, e-Commerce, m-Commerce, VOIP,blogs.

UNIT-III   **12 Hrs.**
Introduction to Web Design: Introduction to hypertext markup language (html) Document type definition, creating web pages, lists, hyperlinks, tables, web forms, inserting images, frames, hosting options and domain name registration. Customized Features: Cascading Style Sheet (CSS) for text formatting and other manipulations. JavaScript Fundamentals: Data types and variables, functions, methods and events, controlling program flow, JavaScript object model, built-in objects and operators.

Text Books:
1. Andrew S. Tanenbaum, David J. Wetherall, **Computer Networks**, PHI,1999.
2. D.R. Brooks, **An Introduction to HTML and Javascript for Scientists and Engineers**, Springer,20007.
3. Laura Lemay, Rafe Colburn, Jennifer Kyrnin, **Mastering HTML, CSS & Javascript Web Publishing**, BPB,2016

Reference Books:
1. B. A. Forouzan, **Data Communication and Networking**, TMH,2007
2. Thomas Powell, **HTML & CSS: The Complete Reference**, Fifth Edition, McGraw Hill Education,2017
3. William Fischer, **HTML: QuickStart Guide - Creating an Effective Website (HTML, CSS, Javascript)**, Createspace Independent Publishing Platform,2016

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V SEMESTER

Group	Course Code	Course	Instruction Hours /Week	Duration of exams (Hrs)	Marks & Credits			
					IA	Exam	Total	Credits
I	BASCAC331/ BSCCAC331	Java Programming	03	3	20	80	100	2
	BASCAC332/ BSCCAC332	E1: Computer Graphics and Animation	03	3	20	80	100	2
	BASCACE333/ BSCCACE333	E2: Android Application						
	BASCACE334/ BSCCACE334	E3: Programming for Analytics						
	BASCAP335/ BSCCAPE335	Java Lab	03	3	10	40	50	1
	BASCAP336/ BSCCAP336	E1: Computer Graphics and Animation Lab	03	3	10	40	50	1
	BASCAP337/ BSCCAP337	E2: Android Application Lab						
	BASCAP338/ BSCCAP338	E3: Programming for Analytics Lab						
		Total	12	12	60	240	300	6

GROUP-I
COURSE- 5   **BASCAC331/BSCCAC331:JavaProgramming**   **36hours**
Theory/Week: 3   **I.A:20**
Hrs Credits: 2   **Exam:80**
Course Objectives:
 CO1: Introduce basic Java language syntax and semantics to write programs in JAVA.
 CO2: Enable understand the fundamentals of object-oriented programming in Java
 CO3: Create, Debug and test a software application using the Java programming language.
Course Outcomes:
On successful completion of this course the student should be able to:
 Co1: Create Java programs that solve simple business problems.
 Co2: Validate user input, perform a test plan to validate a Java program and Document a Java program.

UNIT-I	9Hrs.

Java Evolution: Java history, Java features, How Java differs from C and C++, Hardware and Software requirements, Java support systems, Java environment. **Overview of Java Language:** Introduction, Simple Java Program, More of Java, An application with two classes, Java program structure, Java Tokens, Java Statements, Implementing a Java Program, Java Virtual Machine, Command line arguments. **Constants, Variables and Data Types:** Introduction, Constants, variables, data types, Declaration of variables, giving values to variables, Scope of variables, Standard default values. **Operators:** Introduction, Arithmetic, Relational, Logical, Assignment, Increment & decrement, conditional, Bitwise operators, special operators: **Expressions:** Arithmetic expressions, Evaluation of expressions, Precedence of arithmetic operators, Type conversions in expressions, operator precedence and associatively, **Mathematicalfunctions**.

UNIT-II	9Hrs.

Decision making and branching: Introduction, Decision making with If statements, simple IF statement, Nesting of IF …….ELSE statements. ELSE…….if…….ladder, the switch statement, the ?: operator **Decision making and Looping:** Introduction, The while statement, THE Do statement, the For statement, Jumps in Loops, Labeled Loops. **Classes objects and methods:** Introduction, Defining a Class, Adding Variables Adding methods, Creating Objects, Accessing Class members, Constructors, Methods Overloading, Static Members, Nesting of Methods, Inheritance, Overriding Methods, Final variables and Methods, Final classes, Finalizer Methods, Abstract Methods and Classes, Visibility Control. Arrays, Strings and Vectors. **Arrays:** One - Dimensional Arrays, Creating an Array, Two Dimensional Arrays, Strings, Vectors, Wrapper Classes.

UNIT-III	9Hrs.

Interfaces: Multiple Inheritance: Introduction, Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interface Variables. **Packages:** putting classes together: Introduction, Java, API Packages, Using System Packages, Naming Conventions, Creating Packages, accessing a Package, using a Package, adding a class to a Package, Hidingclasses.

UNIT-IV	9Hrs.

Multithreaded Programming: Introduction, Creating Threads, Extending the Thread Class, Stopping and Blocking a Thread, Life Cycle of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the 'Runnable' Interface. **Managing Errors and Exceptions:** Introduction, Types of Errors, Exceptions, Syntax of Exception Handling Code, Multiple Catch Statements, Using Finally Statement, throwing our own Exceptions, Using Exceptions forDebugging

Text Books:
1. E Balaguruswamy, **Programming with Java A primer**, 5th edition, Tata McGraw Hill Publishing CompanyLimited,2017.

Reference Books:
 1. Yashavant Kanetkar, **Let us JAVA**, 3rd Edition, BPB, 2017.
 2. Herbert Schildt, **The Complete Reference Java,** Ninth edition, McGraw Hill Education,2017.

GROUP-I	**BASCAC332/**	**36hours**
COURSE- 6	**BSCCAC332-E1: Computer Graphics and Animation**	

Theory/Week: 3Hrs   **I.A:20**
Credits: 2   **Exam:80**
Course Objectives:
CO1: understand the structure of modern computer graphics systems, the basic principles of implementing graphics primitives, and familiarity with key algorithms
CO2: learn design and problem-solving skills with application packages
Course Outcomes:
Co1: Apply skills in computer graphics and animation in design and development of simpleprojects

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UNIT-I   **9Hrs**
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Introduction to Computer Graphics: Overview of Computer Graphics, Computer Graphics Application and Software, Description of some graphics devices, Input Devices for Operator Interaction, Active and Passive Graphics Devices, Display Technologies, Storage Tube Graphics Displays, Calligraphic Refresh Graphics Displays, Raster Refresh (Raster-Scan) Graphics Displays, Cathode Ray Tube Basics, Color CRT Raster Scan Basics, Video Basics, The Video Controller, RandomScan Display Processor, LCD Displays. **Scan Conversion:** Digital Differential Analyzer (DDA) algorithm, Bresenham's Line drawing algorithm. Bresenham's method of Circle drawing
Two-dimensional Transformations: Transformations and Matrices, Transformation Conventions, 2D Transformations, Homogeneous Coordinates and Matrix Representation of 2D Transformations, Translations and Homogeneous Coordinates, Rotation, Reflection, Scaling, Combined Transformation, Transformation of Points, Transformation of the Unit Square, Solid Body Transformations, Rotation about an Arbitrary Point, Reflection through an Arbitrary Line, A Geometric Interpretation of Homogeneous Coordinates, The Window-to-Viewport Transformations.
Three-dimensional Transformations: Three-dimensional Scaling, Three-dimensional Shearing, Three-dimensional Rotation, Three-dimensional Reflection, Three-dimensional Translation, Multiple Transformation, Rotation about an Arbitrary Axis in Space, **Computer Animation**: Principles of Animation, Key framing, Deformations, Character Animation, Physics-based Animation, Procedural Techniques, Groups of Objects. Image Manipulation and Storage: What is an Image? Digital image file formats, Image compression standard – JPEG, Image Processing – Digital image enhancement, contrast stretching, Histogram Equalization, Smoothing and Median Filtering.

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UNIT-II   **9Hrs**
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Photoshop: Getting started with Photoshop, Opening an Existing File, The Photoshop Program Window, Screen Modes, Saving Files, Reverting Files, Closing Files, Preferences, Working With Images: Vector and bitmap Images, Image Size, Image Resolution, Editing Images, Opening Files created in Illustrator or Freehand, color Modes, Setting a current Foreground and Background Colors, File Formats, Making Selection, The Grow and Similar Commands, Moving a Portion of an Image, Editing Selections, Copying a Selection in to another Image, Filling a Selection, Transforming selections, Painting, Drawing and Retouching Tools: The Painting Tools, The Drawing tools, The Retouching Tools., Layers Palette, Working with Layers, , Layer Effects Type, Creating Type, Type Tool, Moving the Text, Creating Paragraph Type, Resizing a bounding Box, Changing the Type settings, Converting the Point Type to Paragraph Type, Converting Type Layers to Standard Layers, Type Making Filters: The Filter Menu, Filter Gallery, Extract Filter, Liquify Filter, Vanishing Point Filter, Artistic Filters, Blur Filters, Brush Stroke Filters, Distort Filters, Noise Filters, Pixelate Filters, Lighting Effects, Difference Clouds, Sharpen Filters, Sketch Filters, Stylize Filters, OtherFilters

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UNIT-III   **9Hrs**
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Introduction to Illustrator: Introduction - Interface - window/palettes/menus Bitmap vs vector graphics, resolution/print theory, Drawing basics: New documents - document setup, Basic shapes -

rectangles/ellipses, Viewing - preview/outline, Object stacking order: Selecting and modifying shapes, Colour - fills and strokes, Selections - Selection and Direct select tools, Magic Wand and Lasso selections, Simple drawing - Shaper tool - 'predictive' drawing, Pencil tool - freehand drawing, Paintbrush and Blob brush tools, Eraser/Scissors/Knife, Curvature tool - simple, smooth, more accurate shapes, Drawing - pen tool - Drawing with the pen tool, Modify shapes - cut, join, align, Alignment/smart guides, Drawing using guides, drawing over a template. Transformations - Free transform tool, Cutting/joining paths, Fills and textures - Colour theory - RGB/CMYK, Colours - creating, editing, sharing Spot colours – Pantone, Creating Patterns Creating Gradients, Libraries - sharing/accessing various elements throughout Illustrator and CC Transformations - Free Transform tool, Scale, rotates, reflect and shear tools, repeating transformations, Editing - Grouping/Locking/Visibility, Isolation mode, Edit colours - edit colours throughout a graphic, Symbols - Symbols - updateable graphics, Modifying symbols, Layers, Introduction to layers, controlling layers - viewing/locking/printing, Saving and file formats - Saving - file types - ai, eps, pdf… Exporting - file types, Preferences, Configuring preferences - units, increments, grids/guides, interface.. New art boards, Artboard tool - rotating/ moving/ resizing, Styling Brushes art/ scatter/ calligraphic/ bristle/ pattern, Effects - Applying editable effects as bitmap or vector Type, Type characteristics - size/leading/tracking... Point and area type tools Importing type Threading text boxes Text wrap, Touch type tool - adjust individual letters Clipping masks- Masking objects - draw inside and ClippingMasks

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UNIT-IV   **9Hrs**
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Introduction to Flash: Introduction to 2D animation using Flash, Vector graphics, Flash layout & interface, Shapes & objects, Transformation tools, Colors, palettes, text, Frame, key frames, layering, Sounds & video, Shape tween, symbols, Motion tween, masking, Character design & character animation, Action script, Publishing & exporting flash files, Projectwork

Text Books:
1. Ashish Shah & Kiran Gurbani, **Computer Graphics and Animation,** Himalaya Publishing House,2018
2. Kogent Learning Solutions Inc., **Flash CS6 in Simple Steps**, Dreamtech Press,2013

Reference Books:
1. M.C. Trivedi, **Computer Graphics & Animation,** Jaico Publishing House,2009.
2. Saish Jain, **Photoshop CS6 Training Guide**, BPB Publications,2014
3. William Heldman, **Adobe Flash Professional CS6 Essentials**, John Wiley,2012

GROUP-I
COURSE- 7

BASCACE333/
BSCCACE333-E2: Android Programming

36hours

Theory/Week: 3 Hrs
Credits: 2

I.A:20
Exam: 80

Course Objectives
CO1: Understand practical approach to Android mobile application development
CO2: Writing simple GUI applications, using built-in widgets and components, working with the database to store data locally.
CO3: Explain different development tools for Android, design a graphical user interface, integrate an application with pre-existing third-party libraries, access location-based services
Course Outcomes:
After completion of the course, students are expected to:
Co1: Apply the skills for creating, deploying Android applications, with particular emphasis on software engineering topics including software architecture, software process, usability, and deployment.
Co2: use the knowledge of android architecture and the tools for developing android applications

UNIT-I	**9 Hrs.**

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.

UNIT-II	**9 Hrs.**

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, DisplayingNotifications.

UNIT-III	**9 Hrs.**

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.

UNIT-IV	**9 Hrs.**

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, 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 APKFiles.

Text Books:
1. Wei - Meng Lee, **Beginning Android 4 Application Development**, John Wiley & Sons, Inc.2016
2. Reto Meier, **Professional Android 4 Application Development**, John Wiley & Sons, Inc.2016
Reference Books:
1. John Horton, **Android Programming for Beginners**, Packt Publishing Limited2015
2. J. F. DiMarzio, **Beginning Android Programming with Android Studio**, 4ed, Wiley2016

GROUP-I
COURSE- 8

BASCACE334/
BSCCACE334-E3: Programming for Analytics

36hours

I.A:20
Exam: 80

Theory/Week: 3 Hrs
Credits: 2
Course Objectives
CO1: Introduce basics of Data Analytics
CO2: Demonstrate practical approaches to SQL, SAS, R and Python programming
CO3: Indicate advanced data analytics in the IT industries
Course Outcomes:
After completion of the course, students are expected to:
Co1: acquire basic data analytics skills for designing solutions to simple

UNIT-I **9 Hrs.**
Introduction: Database Management Systems: Definition, Characteristics of DBMS, Architecture & Security, Types of Data Models, Concepts and constraints of RDBMS, Introduction to Structured Query Language, MySql Installer, and Download sample Database, Loading Sample Database.

UNIT-II **9 Hrs.**
Introduction: Database Management Systems: Definition, Characteristics of DBMS, Architecture & Security, Types of Data Models, Concepts and constraints of RDBMS, Introduction to Structured Query Language, MySql Installer, download sample Database, Loading Sample Database.

UNIT-III **9 Hrs.**
Basics of SAS : Introduction to SAS, Installation of SAS university Edition, prerequisites for data analysis using SAS, SAS Architecture, Data Types, Formats and Informats, SAS coding- Data step and proc step, Libraries, Importing external data, Reading and Manipulating Data, Functions, Data Transformations, Conditional Statements.

UNIT-IV **9 Hrs.**
Python: Basics of Python: Installation of Anaconda Navigator, Data types – string, tuples, set, lists, dictionary, Arrays. Spyder, Importing and Exporting Files, Data Manipulation, Descriptive **Statistics and Documentation with Jupyter. R Programming:** Basics of R, Installation of R studio, Vectors, Matrices, Data types, importing files, Writing files, Merging Files, Data Manipulation, Creation and Deletion of New Variables, Sorting of Data, Functions, Graphical Presentation and DescriptiveStatistics.

Text Books:
1. Dye, **MYSQL in a nutshell**, O' Reilly,2008
2. Delwiche, Slaughter, **SAS: The little SAS Book.**, SAS Institute,2012
3. McKinney, **Python for Data Analysis**, O' Reilly,2017
4. Grolemund, **R : Hands-on Programming**, O' Reilly, 2014
5.
Reference Books:
1. DuBois, **MySQL cookbook**, O'Reilly,2014
2. Hemedinger, McDaniel, **SAS for dummies**, Wiley,2010
3. Madhavan**, Mastering Python for Data Science**, Packt,2015
4. Paul, **R Cookbook**, O' Reilly,2011

Practical-V	**BASCAP335/ BSCCAP335: Java Lab**	**36 hours**
Practical/Week: 3 Hrs **Credits: 1**	Exercises in Java language	**I.A:10** **Exam:40**

Practical-VI	**BASCAP336/ BSCCAP365 E1: Computer Graphics and AnimationLab /** **BASCAP337 / BSCCAP3367 E2: Android Application Lab /** **BASCAP 338/ BSCCAP 368 E3: Programming for Analytics Lab**	**36 hours**
Practical/Week: 3 Hrs **Credits: 1**	Exercises in any of the elective subject chosen	**I.A:10** **Exam:40**

SDM COLLEGE UJIRE, (AUTONOMOUS)
B.Sc. - Computer Applications (Vocational) Degree Programme
Curriculum and Scheme of Examination

VI SEMESTER

Courses Group	Course Code	Course	Instruction Hours /Week	Duration of exams (Hrs)	Marks & Credits			
					IA	Exam	Total	Credits
I	BASCAC381/ BSCCAC381	VB.NET Programming	03	3	20	80	100	2
	BASCAC382/ BSCCAC382	**E1:** Web Application Development	03	3	20	80	100	2
	BASCAC383/ BSCCAC383	**E2:** Networking Essentials						
	BASCAP384/ BSCCAP384	VB.Net Lab	03	3	10	40	50	1
	BASCAP385/ BSCCAP385	E1: WebApplication DevelopmentLab	03	3	10	40	50	1
	BASCAP386/ BSCCAP386	E2: Computer Networks Lab						
		Total	12	12	60	240	300	6

GROUP-I
COURSE- 9
Theory/Week: 3 Hrs
Credits: 2

BASCAC381/ BSCCAC381:VB.NETProgramming

36hours
I.A:20
Exam:80

Course Objectives:
CO1: Introduce basic concepts of object-oriented programming and programming with Windows
CO2: Demonstrate skills to develop modern software programs using Visual Basic.
Course Outcomes:
After completion of the course, students are expected to:
Co1: have ability to design and develop interactive applications using the object-oriented principles
Co2: be able to effectively develop applications with full functionality and a graphical user interface using Visual Basic
Co3: have the capability of analyzing and finding suitable and effective solutions to Windows based applications

UNIT-I	9Hrs.

Introduction: Introduction to .Net, .Net Architecture, Features of .Net, Advantages of .Net, .Net Base ClassLibrary,Overviewof.NetFramework,languagesandthe.NETFramework,Thestructureofa
.NET Application, Compilation and Execution of a .NET Application, .Net Framework Class Library, VB .Net Enhancements. **Introduction to Visual Basic.Net IDE:** Creating a project, Types of project in .Net, Exploring and coding a project, Solution explorer, toolbox, properties window, Output window, Object Browser.

UNIT-II	9Hrs.

Object Oriented Features: Classes and Objects, Access Specifiers: Private, Public and Protected, Building Classes, Reusability, Constructors, Destructor, Inheritance, Overloading, Overriding, Polymorphism. **VB.Net Programming Language:** Variables, Comments, Data Types, Working with Data Structures – Arrays, Array Lists, Enumerations, Constants, Structures; Introduction to procedures & functions, calling procedures, argument passing mechanisms, scope of variable. **Control Flow Statements:** Conditional statement, Loops, Nesting of Loops. Exception Handling (using: Try-catch, Multiple catch, Finally, Resume next)

UNIT-III	9Hrs.

GUI Programming: Introduction to Window Applications, Using Form – Common Controls, Properties, Methods and Events. Interacting with controls – Windows Form, Textbox, Rich Text Box, Label, Button, Listbox, Combobox, Checkbox, Picture Box, Radio Button, Panel, Scroll Bar, Timer, ListView, TreeView, Toolbar, Status Bar. Progress Bar, Date time Picker, Month Calender, Track Bar, Splitter, Link Label, Group Box, Tooltip, Menustrip, Check List Box. **Dialog Controls:** PageSetupDialog, PrintDialog, PrintPreviewDialog, PrintPreviewControl, PrintDocument, OpenFileDialog, SaveFileDialog. **Multiple Document Interface**: Creating and Using MDI applications, CreatingDialogBox, Adding and removing Controls atruntime.

UNIT-IV	9Hrs.

Error Handling in Windows Forms: Types of Validation: Data validation, Field Level validation, Using the Error Provider class: Public Properties of ErroProvider objects, Public methods of Error Provider class, Performing Data Validation in Controls, Handling Mouse Events, Handling Keyboard Events. **Working With Database:** Data Access with ADO.net, The ODBC architecture, OLE DB, ActiveX Data Objects (ADO), ADO Object Model, Connection Object, Recordset Object, ADO.NET Data Providers, Connected Data Access, Connecting to a SQL Server Data Provider : Using OLEDb Provider, Using Commands, Using Data Reader, Disconnected Data Sets, Data Adapters, Creating the Data Set manually, Using XML Data, Working with DataBase, Queries, Creating the Database, Adding, Deleting & Updating Records.

Text Book:
1. Steven Holzner**, Visual Basic.Net Programming Black Book,** Dreamtech Press, 2005
Reference Books:
1. Neetu, Pabreja, Dr. Kavita Narwal, **Learning Visual Basic.Net Programming (front end design tool),** Galgotia Publishing Company,2017.
2. Jeremy Shapiro, Visual **Basic(R).Net: The Complete Reference**, McGraw Hill Education; 1 edition, 2017.

GROUP-I COURSE- 10	**BASCAC382/** **BSCCAC382**-E1: Web Application Development	**36hours**
Theory/Week: 3 Hrs		**I.A:20**
Credits: 2		Exam: 80

Course Objectives:

CO1: Provide understanding of the tools and technologies necessary for Web application design and development.

CO2: Make understand client-side scripting like HTML, JavaScript and server-side scripting like servlets, ASPs and database interfacing.

Course Outcomes:

After completion of the course, students are expected to:

Co1: have a sound knowledge of Web Application Terminologies, Internet Tools and web services.

Co2: select and apply mark-up languages for processing, identifying, and presenting information in webpages.

Co3: use scripting languages and web services to add interactive components to web pages.

Co4: design and implement websites with good aesthetic sense of designing

Co5: design to be reusable the software components in a variety of different environments.

UNIT-I	**9 Hrs.**

Internet Basics, Introduction to HTML - List - Creating Table - Linking document Frames - Graphics to HTML Doc - Style sheet - Style sheet basic - Add style to document - Creating Style sheet rules - Style sheet properties - Font - Text - List - Color and background color - Box - Displayproperties.

UNIT-II	**9 Hrs.**

Introduction to JavaScript - Advantage of JavaScript - JavaScript Syntax – Data type - Variable - Array - Operator and Expression - Looping Constructor - Function - Dialog box.

UNIT-III	**9 Hrs.**

JavaScript document object model - Introduction - Object in HTML - Event Handling - Window Object - Document object - Browser Object - Form Object - Navigator object Screen object - Build in Object – User defined object - Cookies

UNIT-IV	**9 Hrs.**

ASP. NET Language Structure - Page Structure - Page event, Properties & Compiler Directives. HTML server controls - Anchor, Tables, Forms and Files. Basic Web server Controls- Label, Textbox, Button, Image, Links, Check & Radio button, Hyperlink. Data List Web Server Controls - Check box list, Radio button list, Drop down list, List box, Data grid, Repeater.

Text Books:

1. Laura Lemay, Rafe Colburn, Jennifer Kyrnin, **Mastering HTML, CSS & Javascript Web Publishing**, BPB Publications; First edition,2016.

Reference Books:

1. Kogent Learning Solutions Inc., **Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, ASP.NET, XML and Ajax, Black Book,** Dreamtech Press,2009.
2. DT Editorial Services, **HTML 5 Black Book (Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP, jQuery),** 2 Edition, Dreamtech Press,2016
3. Dani Akash, **JavaScript by Example,** Packt Publishing Limited,2017.
4. Satish Jain, **Web Designing and Development: Training Guide,** BPB Publication; First edition, 2015.
5. Hirdesh Bhardwaj, **Web Designing,** Pothi.com; 1 edition,2016.

GROUP-I
COURSE-11

BASCAC383/
BSCCAC383-E2: Data Communication and Computer
Networks

36hours

Theory/Week: 3 Hrs
Credits: 1

I.A:10
Exam: 40

Course Objectives:
CO1: Introduce basics of data communications and Signal transmission
CO2: Provide an overview of the principles and concepts of computer networks and its architecture
CO3: Explain principles and operations of various network layers
CO4: Familiarize with Network protocols and Network security
Course outcomes:
After completion of the course, students are expected to:
Co1: Understand basic computer network technology.
Co2: Explain Data Communications System and its components.
Co3: Identify the different types of network topologies and protocols.
Co4: Enumerate the layers of the OSI model and explain the function(s) of each layer
Co5: Identify the different types of network devices and their functions within a network
Co6: Display skills of subnetting and routing mechanisms.
Co7: Be familiar with the basic protocols of computer networks

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UNIT-I	9Hrs.

Data communications : components – Network criteria – physical structures – network models – categories of networks –interconnection of networks – inter network Protocols and standards : protocols-standards-standards organizations- internet standards Network models: Layered tasks – OSI model – layers in the OSI model – TCP/IP protocol suite.

UNIT-II	9Hrs.

Digital Transmission: Digital to digital conversion: Line coding – line coding schemes – block coding - analog to digital conversion – PCM - transmission modes: serial transmission – parallel transmission Analog Transmission: Digital to analog conversion: FSK-ASK-PSK Analog to Analog conversion: Amplitude modulation – Frequency modulation – phase modulation Multiplexing: Frequency division multiplexing – Time division multiplexing. Transmission Media Guided media: Twisted pair cable – coaxial cable – fiber optic cable Unguided media: radio waves - micro waves – infrared.

UNIT-III	9Hrs.

Error correction and detection: Introduction- block coding-linear block cods-cyclic codes-checksum. Data link Control: Protocols-simplest protocol- stop and wait protocol- stop and wait automatic repeat request-go back n automatic repeat request selective repeat-automatic repeat request-piggybacking. Multiple Access: Random access- Aloha-CSMA-CSMA/CD-CSMA/CA Controlled access: reservation, polling, token passing. Channelization: FDMA, TDMA, CDMA.
Wired LANs: Ethernet: IEEE standards, standard Ethernet- fast Ethernet. Wireless LANs: IEEE 802.11-arhitecture-MAC sublayer addressing mechanism, physical layer-Bluetooth: architecture-Bluetooth layers-radio layer-baseband layer-L2CAP-other upper layers. Network Layer: AddressingIPV4 addresses - IPV6 Addresses Internet Protocol: IPv4 –IPv6 Address mapping protocols: ARP –RARP.

UNIT-IV	9Hrs.

Routing protocols: Unicast routing protocols: distance vector routing, Link State routing Multicast Routing protocols Any two Transport Layer: Process to process delivery – UDP – TCP Congestion control and QOS: Data traffic – congestion – congestion control – quality of service – techniques to improve quality of service. Application layer & Network Security: DNS: Name space – domain name space – distribution of name space Electronic mail Architecture – File transfer: FTP, WWW and HTTP: Architecture – web documents – HTTP Network Security: Introduction - definitions – two categories - symmetric key cryptography – traditional ciphers – asymmetric key cryptography.

Text Book:
1. Behrouz A Forouzan, **Data Communication and Networking**, TMH,2017

Reference Book:
1. Andrew S. Tanenbaum, David J. Wetherall, **Computer Networks**, PHI,2011

Practical-VII	**BASCAP384 /** **BSCCAP384: VB.Net Lab**	**36 hours**
Practical/Week: 3 **Hrs Credits: 1**	Exercises in VB.Net	**I.A:10** **Exam:40**

Practical-VIII	**BASCAP385 /** **BSCCAP385- E1: Web Application Development Lab/** **BASCAP386 /** **BSCCAP386- E2: Computer Networks Lab**	**36 hours**
Practical/Week: 3 **Hrs Credits: 1**	Exercises in Elective course	**I.A:10** **Exam:40**