

BABA MASTNATH UNIVERSITY

Faculty of Management & Commerce

Department of Computer Science & Applications

New Scheme of Examination & Syllabus

Bachelor of Computer Applications (BCA)

(Duration :03 Years Graduate Course under

Choice Based Credit Systems (CBCS)



From the academic session

2022-23

Grand Total Credits = 146

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ACADEMIC SESSION:2022-23 (CBCS)

MINIMUM COURSE CURRICULUM FOR B.C.A.UNDER CHOICE BASED CREDIT SYSTEM

Majority of Indian higher education institutions have been following marks or percentage based evaluation system, which obstructs the flexibility for the students to study the subjects/courses of their choice and their mobility to different institutions. There is need to allow the flexibility in education system, so that students depending upon their interests and aims can choose inter- disciplinary, intra-disciplinary and skill-based courses. This can only be possible when choice based credit system (CBCS), an internationally acknowledged system, is adopted. The choice based credit system not only offers opportunities and avenues to learn core subjects but also exploring additional avenues of learning beyond the core subjects for holistic development of an individual. The CBCS will undoubtedly facilitate us bench mark our courses with best international academic practices. The CBCS has more advantages than disadvantages.

FEATURES OF CHOICE BASED CREDIT SYSTEM (CBCS)

- Shift in focus from the teacher-centric to student-centric education.
- Student may undertake as many credits as they can cope with (without repeating all courses in a given semester if they fail in one/more courses).
- CBCS allows students to choose inter-disciplinary, intra-disciplinary courses, skill oriented papers (even from other disciplines according to their learning needs, interests (and aptitude) and more flexibility for students).
- CBCS makes education broad-based and at par with global standards. One can take credits by combining unique combinations. For example, Physics with Economics, Microbiology with Chemistry or Environment Science etc.
- CBCS offers flexibility for students to study at different times and at different institutions to complete one course (ease mobility of students).

CHOICE BASED CREDIT SYSTEM (CBCS):

The CBCS provides an opportunity for the students to choose courses from the prescribed courses comprising core, elective/minor or skill based courses. The courses can be evaluated following the grading system, which is considered to be better than the conventional marks system. Therefore, it is necessary to introduce uniform grading system in the entire higher education in India. This will benefit the students to move across institutions within India to begin with and across countries. The uniform grading system will also enable potential employers in assessing the performance of the candidates. In order to bring uniformity in evaluation system and computation of the Cumulative Grade Point Average (CGPA) based on student's performance in examinations, the UGC has formulated the guidelines to be followed.

OUTLINE OF CHOICE BASED CREDIT SYSTEM:

1. **Core Course:** A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course.
2. **Elective Course:** Generally a course which can be chosen from a pool of courses and which may be very specific or specialized or advanced or supportive to the discipline/ subject of study or which provides an extended scope or which enables an exposure to some other discipline/subject/domain or nurtures the candidate's proficiency/skill is called an Elective Course.

Discipline Specific Elective (DSE) Course: Elective courses may be offered by the main discipline/subject of study is referred to as Discipline Specific Elective. The University/Institute may also offer discipline related Elective courses of interdisciplinary nature (to be offered by main discipline/subject of study).

Dissertation/Project: An elective course designed to acquire special/advanced knowledge, such as supplement study/support study to a project work, and a candidate studies such a course on his own with an advisory support by a teacher/faculty member is called dissertation/project.

Generic Elective (GE) Course: An elective course chosen generally from an unrelated discipline/subject, with an intention to seek exposure is called a Generic Elective.

P.S.: A core course offered in a discipline/subject may be treated as an elective by other discipline/subject and vice versa and such electives may also be referred to as Generic Elective.

3. **Ability Enhancement Courses (AEC):** The Ability Enhancement (AE) Courses may be of two kinds: Ability Enhancement Compulsory Courses (AECC) and Skill Enhancement Courses (SEC). "AECC" courses are the courses based upon the content that leads to Knowledge enhancement; i. Environmental Science and ii. English/MIL Communication. These are mandatory for all disciplines. SEC courses are value-based and/or skill-based and are aimed at providing hands-on-training, competencies, skills, etc.

Ability Enhancement Compulsory Courses (AECC): Environmental Science, English Communication/MIL Communication.

Skill Enhancement Courses (SEC): These courses may be chosen from a pool of courses designed to provide value-based and/or skill-based knowledge.

INTRODUCING RESEARCH COMPONENT IN UNDER-GRADUATE COURSES

Project work/Dissertation is considered as a special course involving application of knowledge in solving / analyzing /exploring a real life situation / difficult problem. A Project/Dissertation work would be of 6 credits. A Project/Dissertation work may be given in lieu of a discipline specific elective paper.

APPLYING CBCS:

1. The CBCS may be applied in Universities subject to the condition that all the stakeholders agree to common minimum syllabi of the core papers and at least follow common minimum curriculum as fixed by the UGC. The

- allowed deviation from the syllabi being 20 % at the maximum.
2. The UGC may be allow Universities to finally design their own syllabi for the core and elective papers subject to point no. 1.
 3. Credit score earned by a student for any elective paper has to be included in the student's overall score.
 4. For the introduction of AE Courses, they may be divided into two categories:
 - a) AE Compulsory Courses: The universities participating in CBCS system may have common curriculum for these papers. There may be one paper each in the 1st two semesters viz. (i) English/MIL Communication, (ii) Environmental Science.
 - b) Skill Enhancement Courses: The universities may decide the papers they may want to offer from a common pool of papers decided by UGC or the universities may choose such papers themselves in addition to the list suggested by UGC. The universities may offer one paper per semester for these courses.
 5. The university/Institute may plan the number of seats per elective paper as per the facility and infrastructure available.
 6. An undergraduate Program degree in Science disciplines may be awarded if a student completes 4 core papers each in three disciplines of choice, 2 Ability Enhancement Compulsory Courses (AECC), minimum 4 Skill Enhancement Courses (SEC) and 2 papers each from a list of Discipline Specific Elective papers based on three disciplines of choice selected above, respectively.
 7. Wherever a University requires that an applicant for a particular M.A./M.Sc./Technical/Professional course should have studied a specific discipline at the undergraduate level, it is suggested that obtaining 24 credits in the concerned discipline at the undergraduate level may be deemed sufficient to satisfy such a requirement for admission to the M.A./M.Sc./Technical/Professional course.

DETAILS OF COURSE UNDER BCA

COURSE	CREDITS	
	THEORY + PRACTICAL	THEORY + TUTORIAL
I.Core Course(CORE) (15 Papers)	15 X 04 =60	---
CORE COURSE PRACTICAL (14 Papers)	14 X 01 = 14	---
II.Elective Course		
A.1 Discipline Specific Elective (DSE) (04 Papers)	04 X 04 = 16	---
A.2 Discipline Specific Elective (DSE) (04 Papers)Tutorial	---	04 X 02 = 08

B.1 Generic Elective(GE)/Interdisciplinary (04 Papers)	04 X 04 = 16	---
B.1 Generic Elective(GE)/Interdisciplinary (03 Papers)	03 X 02 = 06	---
B.2 Generic Elective(GE) Practical (02 Papers)	02 X 03 = 06	---
B.2 Generic Elective(GE) Tutorial (01 Paper)	---	01 X 02 = 02
III.Ability Enhancement Courses	---	---
1.Ability Enhancement Compulsory Courses (AECC) (02 Papers)	02 X 04 = 08	---
2.Skill Enhancement Courses (SEC) (02 Papers)	02 X 04 = 08	---
TOTAL CREDITS	136	10
GRAND TOTAL CREDITS	136 + 10 = 146	

PROPOSED SCHEME FOR CHOICE BASED CREDIT SYSTEM IN BCA

Semester	Core Course (C) (15 Papers)	Ability Enhancement Compulsory Courses (AECC) (02 Papers)	Skill Enhancement Courses (SEC) (02 Papers)	Discipline Specific Elective (DSE) (04 Papers)	Generic Elective(GE)/ Interdisciplinary (09 Papers)
I	C-1	Introduction to Environmentology(AECC-1)	----	DSE-1	GE-1
	C-2				
II	C-3	Interpersonal Skills & Personality Development(AECC-2)	----	DSE-2	----
	C-4				
	C-5				
III	C-6	----	----	----	GE-2
	C-7				GE-3
	C-8				
IV	C-9	----	SEC-1	DSE-3	GE-4
	C-10				

V	C-11	----	SEC-2	DSE-4	GE-5
	C-12				
	C-13				
VI	C-14	----	----	----	GE-6
	C-15				GE-7
					GE-8
					GE-9

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ACADEMIC SESSION:2022-23 (CBCS)

NAME OF PROGRAMME : BACHELOR OF COMPUTER APPLICATIONS (BCA)

DURATION : 03 (THREE) YEARS

ELIGIBILITY FOR ADMISSION TO THREE YEARS BACHELOR OF COMPUTER APPLICATIONS (BCA) PROGRAMME :

10 + 2 IN ANY Stream from a recognized Board.

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PROGRAMME OUTCOMES (POs)

- PO 1.** Capable of demonstrating comprehensive disciplinary knowledge gained during course of study.
- PO 2.** Ability to communicate effectively on general and scientific topics with the scientific community and with society at large.
- PO 3.** Capability of applying knowledge to solve scientific and other problems.
- PO 4.** Capable to learn and work effectively as an individual, and as a member or leader in diverse teams, in multidisciplinary settings.
- PO 5.** Ability of critical thinking, analytical reasoning and research based knowledge including design of experiments, analysis and interpretation of data to provide conclusions.
- PO 6.** Ability to use and learn techniques, skills and modern tools for scientific practise.
- PO 7.** Ability to apply reasoning to access the different issues related to society and the consequent responsibilities relevant to the professional scientific practices.
- PO 8.** Aptitude to apply knowledge and skills that are necessary for participating in learning activities throughout the life.
- PO 9.** Ability to design and develop modern systems which are environmentally sensitive and to understand the importance of sustainable development.
- PO 10.** Apply ethical principles and professional responsibilities in scientific practices.
- PO 11.** Ability to demonstrate knowledge and understanding of the scientific principles and apply these to manage projects.

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PROGRAMME SPECIFIC OUTCOMES (PSOs)

The objective of the curriculum designed for BCA course is to nurture the technical aptitude of students for professional competency in the IT industry.

- PSO 1.**Develop proficiency for solving real world problems with the application of programming and supplementary computing skills.
- PSO 2.**Promote exposure to hardware as well as software knowledge with the inclusion of course content targeted to administer technical expertise for employment in the IT industry.
- PSO 3.**Explicit course content is targeted to inculcate programming skills using both conventional and contemporary programming languages as well as to develop potential for realizing web oriented and other commercial/non-commercial applications.
- PSO 4.**Judicious structuring of the course curriculum has been aimed in order to strengthen competitive ability as per the trending industry requirements.
- PSO 5.**Encourage skillful expertise for employment in Commercial/ Government sectors or pursuance of higher studies aimed towards innovational research leading to the progressive growth of the society and the nation.

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COURSE/PAPER CODE	COURSE/PAPER TITLE	CREDITS	TEACHING HOUR/WEEK			EXAMINATIONS		
			LECTURE(L)	TUTORIAL(T)	PRACTICAL(P)	INTERNAL ASSESSMENT(IA)	SEMESTER ENDING EXAMINATION(SEE)	TOTAL
BCA-22110	INTRODUCTION TO PC SOFTWARE(C-1)	4	4	-	-	20	80	100
BCA-22111	INTRODUCTION TO ENVIRONMENTOLOGY(AECC-1)	4	4	-	-	20	80	100
BCA-22112	BASICS OF C LANGUAGE(C-2)	4	4	-	-	20	80	100
BCA-22113	DISCIPLINE SPECIFIC ELECTIVE(DSE-1)	4	4	2	-	20	80	100
BCA-22114	GENERIC ELECTIVE(GE-1)	4	4	-	-	20	80	100
BCA-22115	LAB ON C-LANGUAGE(BCA-22112)	2	-	-	4	20	80	100
BCA-22116	LAB ON PC (BCA-22110)	2	-	-	4	20	80	100
TOTAL		24	20	2	8	140	560	700

TOTAL CREDIT OF 1ST SEMESTER=24+02=26

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COURSE/PAPER CODE	COURSE/PAPER TITLE	CREDITS	TEACHING HOUR/WEEK			EXAMINATIONS		
			LECTURE(L)	TUTORIAL(T)	PRACTICAL(P)	INTERNAL ASSESSMENT(IA)	SEMESTER ENDING EXAMINATION(SEE)	TOTAL
BCA-22120	DATA STRUCTURES-I(C-3)	4	4	-	-	20	80	100
BCA-22121	INTRODUCTION TO OPERATING SYSTEMS(C-4)	4	4	-	-	20	80	100
BCA-22122	DISCIPLINE SPECIFIC ELECTIVE (DSE-2)	4	4	2	-	20	80	100
BCA-22123	LOGICAL ORGANIZATION OF COMPUTERS-I(C-5)	4	4	-	-	20	80	100
BCA-22124	INTERPERSONAL SKILLS & PERSONALITY DEVELOPMENT(AECC-2)	4	4	-	-	20	80	100
BCA-22125	LAB ON DATA STRUCTURES (BCA-22120)	2	-	-	4	20	80	100
BCA-22126	LAB ON OPERATING SYSTEMS (BCA-22121)	2	-	-	4	20	80	100
TOTAL		24	20	2	8	140	560	700

TOTAL CREDIT OF IIND SEMESTER=24+02=26

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COURSE/PAPER CODE	COURSE/PAPER TITLE	CREDITS	TEACHING HOUR/WEEK			EXAMINATIONS		
			LECTURE(L)	TUTORIAL(T)	PRACTICAL(P)	INTERNAL ASSESSMENT(IA)	SEMESTER ENDING EXAMINATION(SEE)	TOTAL
BCA-22210	DATA STRUCTURES-II(C-6)	4	4	-	-	20	80	100
BCA-22211	GENERIC ELECTIVE (GE-2)	4	4	-	-	20	80	100
BCA-22212	INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS(C-7)	4	4	-	-	20	80	100
BCA-22213	LOGICAL ORGANIZATION OF COMPUTERS-II(C-8)	4	4	-	-	20	80	100
BCA-22214	GENERIC ELECTIVE (GE-3)	4	4	-	-	20	80	100
BCA-22215	LAB ON WEB TECHNOLOGIES (BCA-22211)	2	-	-	24	20	80	100
BCA-22216	LAB ON OBJECT ORIENTED (BCA-22214)	2	-	-	4	20	80	100
BCA-22217	LAB ON DATA STRUCTURES-II (BCA-22210)	2	-	-	4	20	80	100
TOTAL		26	20	-	12	160	640	800

TOTAL CREDIT OF IIIRD SEMESTER=26

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COURSE/PAPER CODE	COURSE/PAPER TITLE	CREDITS	TEACHING HOUR/WEEK			EXAMINATIONS		
			LECTURE(L)	TUTORIAL(T)	PRACTICAL(P)	INTERNAL ASSESSMENT(IA)	SEMESTER ENDING EXAMINATION(SEE)	TOTAL
BCA-22220	BASICS OF NETWORKS (C-9)	4	4	-	-	20	80	100
BCA-22221	INTRODUCTION TO .NET (C-10)	4	4	-	-	20	80	100
BCA-22222	GENERIC ELECTIVE (GE-4)	4	4	2	-	20	80	100
BCA-22223	INTRODUCTION TO JAVA PROGRAMMING(SEC-1)	4	4	-	-	20	80	100
BCA-22224	DISCIPLINE SPECIFIC ELECTIVE (DSE-3)	4	4	2	-	20	80	100
BCA-22225	LAB ON PHP (BCA-22222)	2	-	-	4	20	80	100
BCA-22226	LAB ON JAVA (BCA-22223)	2	-	-	4	20	80	100
BCA-22227	LAB ON BASICS OF NETWORKS(BCA-22220)	2	-	-	4	20	80	100
TOTAL		26	20	4	12	160	640	800

TOTAL CREDIT OF IVTH SEMESTER=26+04=30

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COURSE/PAPER CODE	COURSE/PAPER TITLE	CREDITS	TEACHING HOUR/WEEK			EXAMINATIONS		
			LECTURE(L)	TUTORIAL(T)	PRACTICAL(P)	INTERNAL ASSESSMENT(IA)	SEMESTER ENDING EXAMINATION(SEE)	TOTAL
BCA-22310	INTRODUCTION TO PYTHON (SEC-2)	4	4	-	-	20	80	100
BCA-22311	INTRODUCTION TO SOFTWARE ENGINEERING (C-11)	4	4	-	-	20	80	100
BCA-22312	DATA WAREHOUSING & DATA MINING(C-12)	4	4	-	-	20	80	100
BCA-22313	DISCIPLINE SPECIFIC ELECTIVE (DSE-4)	4	4	2	-	20	80	100
BCA-22314	INTERACTIVE COMPUTER GRAPHICS (C-13)	4	4	-	-	20	80	100
BCA-22315	LAB ON PYTHON (BCA-22310)	2	-	-	4	20	80	100
BCA-22316	MINOR PROJECT(GE-05)	2	-	-	4	20	80	100
BCA-22317	LAB ON SOFTWARE ENGINEERING (BCA-22311)	2	-	-	4	20	80	100
TOTAL		26	20	2	12	160	640	800

TOTAL CREDIT OF VTH SEMESTER=26+02=28

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COURSE/PAPER CODE	COURSE/PAPER TITLE	CREDITS	TEACHING HOUR/WEEK			EXAMINATIONS		
			LECTURE(L)	TUTORIAL(T)	PRACTICAL(P)	INTERNAL ASSESSMENT(IA)	SEMESTER ENDING EXAMINATION(SEE)	TOTAL
BCA-22320	GENERIC ELECTIVE (GE-6)	2	2	-	-	15	50	65
BCA-22321	INTRODUCTION TO ARTIFICIAL INTELLIGENCE(C-14)	4	4	-	-	20	80	100
BCA-22322	GENERIC ELECTIVE (GE-7)	2	2	-	-	15	50	65
BCA-22323	GENERIC ELECTIVE (GE-8)	2	2	-	-	15	50	65
BCA-22324	INFORMATION & CYBER SECURITY (C-15)	4	4	-	-	20	80	100
BCA-22325	LAB ON DATA ANALYTICS USING R (BCA-22320)	2	-	-	4	20	80	100
BCA-22326	MAJOR PROJECT(GE-09)	2	-	-	4	20	80	100
BCA-22327	LAB ON ARTIFICIAL INTELLIGENCE(BCA-22321)	2	-	-	4	20	80	100
TOTAL		20	14	-	12	145	550	695

TOTAL CREDIT OF VITH SEMESTER=20

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LIST OF ELECTIVES

GENERIC ELECTIVES(GE)

BCA-22114. GENERIC ELECTIVE – 1

- (i)MATHMATICAL FOUNDATION OF COMPUTER SCIENCE.
- (ii)COMPUTER ORIENTED NUMERICAL METHODS.
- (iii)DIGITAL ELECTRONICS.

BCA-22211. GENERIC ELECTIVE – 2

- (i)INTRODUCTION TO WEB TECHNOLOGIES.
- (ii)RELATIONAL DATABASE MANAGEMENT SYSTEM.
- (iii)SYSTEM ADMINISTRATION & MAINTENANCE.

BCA-22214. GENERIC ELECTIVE – 3

- (i)OBJECT ORIENTED PROGRAMMING USING C++.
- (ii)THEORY OF COMPUTATION.
- (iii)OPEN SOURCE SOFTWARE.

BCA-22222. GENERIC ELECTIVE – 4

- (i)HYPERTEXT PREPROCESSOR (PHP) LANGUAGE.
- (ii)MULTIMEDIA TECHNOLOGIES.
- (iii)OFFICE AUTOMATION-1.

BCA-22316. GENERIC ELECTIVE – 5

MINOR PROJECT..

BCA-22320. GENERIC ELECTIVE – 6

(i)DATA ANALYTICS USING R.

(ii)OFFICE AUTOMATION-II.

(iii)SOFT SKILLS.

BCA-22322. GENERIC ELECTIVE – 7

(i)INTRODUCTION TO INTERNET.

(ii)PRINCIPLES OF ACCOUNTING.

(iii)IT ACT & CYBER LAWS.

BCA-22323. GENERIC ELECTIVE – 8

(i)E-COMMERCE.

(ii)VISUAL BASIC.

(iii)LINUX & SHELL PROGRAMMING.

BCA-22326. GENERIC ELECTIVE – 9

MAJOR PROJECT

DISCIPLINE SPECIFIC ELECTIVES(DSE)

BCA-22113. DISCIPLINE SPECIFIC ELECTIVE-1

(i)FUNDAMENTALS OF COMPUTER & PROGRAMMING.

(ii)TIME MANAGEMENT.

(iii)INFORMATION SECURITY.

BCA-22122. DISCIPLINE SPECIFIC ELECTIVE-2

(i)INTRODUCTION TO MANAGEMENT INFORMATION SYSTEM.

(ii)INFORMATION RETRIEVAL SYSTEM.

(iii)SIMULATION & MODELLING

BCA-22224. DISCIPLINE SPECIFIC ELECTIVE-3

(i)MOBILE APPLICATION DEVELOPMENT.

(ii)STATISTICAL PACKAGE FOR SOCIAL SCIENCES(SPSS).

(iii)PRINCIPLES OF BIG DATA.

BCA-22314. DISCIPLINE SPECIFIC ELECTIVE-4

(i)CLOUD COMPUTING

(ii)PROGRAMMING IN XML.

(iii)GRPHICAL USER INTERFACE(GUI) PROGRAMMING.

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List of Open Electives For the Undergraduate Students from other departments.

COURSE/PAPER CODE	COURSE/PAPER TITLE	CRE DITS	SEMESTER
BCA-22313	(i) CLOUD COMPUTING	4	V
	(ii) PROGRAMMING IN XML	4	V
BCA-22322	(i) INTRODUCTION TO INTERNET	4	VI
	(ii) IT ACT & CYBER LAWS	4	VI

SEMESTER-I

BCA-22110. INTRODUCTION TO PC SOFTWARE(C-1)

Credits: 04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT - I

MS-Windows: Operating system-Definition & functions, basics of Windows. Basic components of windows, icons, types of icons, taskbar, activating windows, using desktop, title bar, running applications, exploring computer, managing files and folders, copying and moving files and folders. Control panel – display properties, adding and removing software and hardware, setting date and time, screensaver and appearance. Using windows accessories.

UNIT - II

Documentation Using MS-Word - Introduction to word processing interface, Toolbars, Menus, Creating & Editing Document, Formatting Document, Finding and replacing text, Format painter, Header and footer, Drop cap, Auto-text, Autocorrect, Spelling and Grammar Tool, Document Dictionary, Page Formatting, Bookmark, Previewing and printing document, Advance Features of MS-Word-Mail Merge, Macros, Tables, File Management, Printing, Styles, linking and embedding object, Template.

UNIT - III

Electronic Spread Sheet using MS-Excel - Introduction to MS-Excel, Cell, cell address, Creating & Editing Worksheet, Formatting and Essential Operations, Moving and copying data in excel, Header and footer, Formulas and Functions, Charts, Cell referencing, Page setup, Macros, Advance features of MS-Excel-Pivot table & Pivot Chart, Linking and Consolidation, Database Management using Excel-Sorting, Filtering, Validation, What if analysis with Goal Seek, Conditional formatting.

UNIT - IV

Presentation using MS-PowerPoint: Presentations, Creating, Manipulating & Enhancing Slides, Organizational Charts, Excel Charts, Word Art, Layering art Objects, Animations and Sounds, Inserting Animated Pictures or Accessing through Object, Inserting Recorded Sound Effect or In-Built Sound Effect.

Suggested Readings:

1. Microsoft Office – Complete Reference – BPB Publication
2. Learn Microsoft Office – Russell A. Stultz – BPB Publication
3. Courter, G Marquis (1999). Microsoft Office 2000: Professional Edition. BPB.
4. Koers, D (2001). Microsoft Office XP Fast and Easy. PHI.
5. Nelson, S L and Kelly, J (2002). Office XP: The Complete Reference. Tata McGraw-Hill.

Note: Latest and additional good books may be suggested and added from time to time.

BCA-22111 INTRODUCTION TO ENVIRONMENTOLOGY(AECC-1)

Credits: 04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT - I

Multidisciplinary nature of environment Studies: Definition, Scope and Importance, Need for Public Awareness; Concept, Structure and Function of an ecosystem; Producer, Consumers and Decomposition, Energy Flow in the ecosystem, Ecological Succession, Food Chains, Food Webs and Ecological Pyramids; Introduction, characteristics, features, Structure and Functions of different ecosystems such as Forest Ecosystem, Grassland Ecosystem, Dessert Ecosystem, Aquatic Ecosystem (Pond, Stream, Lake, River, Ocean, Estuaries); Biodiversity: Introduction, Definition: Generic, Species and Ecosystem diversity. Bio-geographical classification of India, Ecosystem and Biodiversity services: Ecological, Economic, Social, Consumptive use, Social Ethical, aesthetic and option Values; Biodiversity at global, national and local level, India as a mega-diversity nation, Global Hot-Spot of Biodiversity. Threats to biodiversity: habitat loss, Poaching of Wildlife, Man-Wildlife Conflicts, Biological Invasions, Endangered and endemic species of India, Conservation of Biodiversity: In-Situ and Ex-situ conservation of biodiversity.

UNIT - II

Renewable and non-renewable resources, Natural Resources and associated problems, Forest resources: use and over-exploitation, Deforestation, Case studies, Timber extraction, Mining, Dams and their effects on forests and tribal people; Water resources: Use and Over Utilization of Surface and ground water, Floods, Droughts conflicts over water, Dams benefits and problems; Minerals, resources: use and exploitation, environmental effects of extracting and mineral resources: World food problems; changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity; Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies; Land resources: land as a resources, Land degradation, man induced landslides, soil erosion and desertification.

UNIT - III

Definition of Environment Pollution: Cause, effects and control measures of Air Pollution, Soil Pollution, Noise Pollution, Nuclear hazards and human health risk; Soil Waste Management: Cause, effects and control measures of urban and industrial waste: Pollution case studies; Disaster Management: Floods, Earthquake, Cyclone and Landslides; Climate Change, Global Warming, Acid Rain, Ozone Layer Depletion; Different Laws related to environment: Environment Protection Act,

Air (Prevention and Control of Pollution) Act, Water (Prevention and Control) Act, Wildlife Protection Act, Forest Conservation Act; International Agreements: Montreal & Kyoto Protocol & Nature reserves, Tribal Populations and Human Health.

UNIT - IV

Concept of Sustainability & Sustainable development, Water conservation, Rain Water Harvesting, Watersheds management, Resettlement and rehabilitation of Project affected persons; Case Studies; Environment ethics: role of Indian and other religions and cultures in environment conservation, Environment Communication and Public awareness, case studies (e.g. CNG vehicles in Delhi); Human Population growth: Impact on environment, Human health & welfare, Environmental Movements: Chipko, Silent Valley, Bishnois of Rajasthan.

Field Work: Visit to a Local area of document environmental assets- River/Forest/Grassland/Mountain; Study of Simple ecosystem-Ponds, River, Hill Slopes etc; Study of common Plants, Insects, birds; Visit to a local Polluted Site- Urban/Rural/Industrial/Agriculture.

Suggested Readings:

1. Dr. D. D. Mishra, Fundamental Concepts in Environmental Studies, S. Chand Publications, New Delhi, 2008.
2. ErachBharucha, Environmental Studies for Undergraduates Courses, University Granted Commission and BharatiVidyapeeth Institute of Environmental Education and Research, Pune, University Press Pvt. Ltd., 2013.
3. Dr. S.V.S. Rana, Essentials of Ecology and Environmental Sciences, PHI Learning Pvt. Ltd. Delhi, 2013.
4. Anil Kumar, Environmental Chemistry, De.Wiley Eastern Ltd, 2007.
5. T.G. Miller, Environment Science, Wadsworth Publishing Co., 2010.
6. P.D. Sharma, Ecology and Environment, Rastogi Publications, 2011.

BCA-22112 BASICS OF C LANGUAGE(C-2)

Credits: 04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT - I

Overview of C: History of C, Importance of C, Elements of C: C character set, identifiers and keywords, Data types, Constants and Variables, Assignment statement, Symbolic constant, Structure of a C Program, printf(), scanf() Functions, Operators & Expression: Arithmetic, relational, logical, bitwise, unary, assignment, shorthand assignment operators, conditional operators and increment and decrement operators, Arithmetic expressions, evaluation of arithmetic expression, type casting and conversion, operator hierarchy & associativity.

UNIT-II

Decision making & branching: Decision making with IF statement, IF-ELSE statement, Nested IF statement, ELSE-IF ladder, switch statement, goto statement. Decision making & looping: For, while, and do-while loop, jumps in loops, break, continue statement, Nested loops.

UNIT-III

Functions: Standard Mathematical functions, Input/output: Unformatted & formatted I/O function in C, Input functions viz. getch(), getche(), getchar(), gets(), output functions viz., putchar(), puts(), string manipulation functions. User defined functions: Introduction/Definition, prototype, Local and global variables, passing parameters, recursion.

UNIT-IV

Arrays, strings and pointers: Definition, types, initialization, processing an array, passing arrays to functions, Array of Strings. String constant and variables, Declaration and initialization of string, Input/output of string data, Introduction to pointers. Storage classes in C: auto, extern, register and static storage class, their scope, storage, & lifetime. Algorithm development, Flowcharting and Development of efficient program in C.

Suggested Readings:

1. Gottfried, Byron S., Programming with C, Tata McGraw Hill
2. Gill Nasib Singh: Computing Fundamentals and Programming in C, Khanna Books Publishing Co., New Delhi.
3. Balagurusamy, E., Programming in ANSI C, 4E, Tata McGraw-Hill
4. Jeri R. Hanly & Elliot P. Koffman, Problem Solving and Program Design in C, Addison Wesley.
5. Yashwant Kanetker, Let us C, BPB.
6. Rajaraman, V., Computer Programming in C, PHI.
7. Yashwant Kanetker, Working with C, BPB.

BCA-22113 (i)FUNDAMENTALS OF COMPUTER & PROGRAMMING(DSE-1)

Credits: 04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT - I

Computer Fundamentals: Generations of Computers, Definition, Block Diagram along with its components, characteristics & classification of computers, Limitations of Computers, Human-Being VS Computer, Applications of computers in various fields. Memory: Concept of primary & secondary memory, RAM, ROM, types of ROM, Cache Memory, flash memory, Secondary storage devices: Sequential & direct access devices viz. magnetic tape, magnetic disk, optical disks i.e. CD, DVD, virtual memory.

UNIT-II

Computer hardware & software: I/O devices, definition of software, relationship between hardware and software, types of software. Overview of operating system: Definition, functions of operating system, concept of multiprocessing, multitasking, multithreading, multiprocessing, time-sharing, real time, single-user & multi-user operating system. Computer Virus: Definition, types of viruses, Characteristics of viruses, anti-virus software.

UNIT-III

Computer Languages: Analogy with natural language, machine language, assembly language, high-level languages, forth generation languages, compiler, interpreter, assembler, Linker, Loader, characteristics of a good programming language, Planning the Computer Program: Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation. Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming, Advantages and disadvantages of Structured programming.

UNIT-IV

Overview of Networking: An introduction to computer networking, Network types (LAN, WAN, MAN), Network topologies, Modes of data transmission, Forms of data transmission, Transmission channels(media), Introduction to internet and its uses, Applications of internet, Hardware and Software requirements for internet, Intranet, Applications of intranet.

Suggested Readings:

1. Gill Nasib Singh: Computing Fundamentals and Programming in C, Khanna Books Publishing Co., New Delhi.
2. Balagurusamy E, Computing Fundamentals and C Programming, Tata McGraw Hill.
3. Norton, Peter, Introduction to Computer, McGraw-Hill
4. Leon, Alexis & Leon, Mathews, Introduction to Computers, Leon Tech World
5. Rajaraman, V., Fundamentals of Computers, PHI
6. Ram, B., Computer Fundamentals, Architecture & Organization, New Age International (P) Ltd.
6. Chhillar, Rajender Singh: Application of IT to Business, Ramesh Publishers, Jaipur.

BCA-22113 (ii) TIME MANAGEMENT (DSE-1)

Credits: 04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT - I

The Psychology of Time Management: The Four D's of Effectiveness, A Few Myths About Managing Your Time, The Law of Control, Visualize Yourself as You Want to Be, Determine Your Values: Meaning and Purpose, Analyze Yourself, Your Vision and Mission: Think Before Acting, Keep the End in Mind, Examine Your Methodology.

UNIT - II

Project Forward Look Backward: Long Time Perspective, Make Better Decisions in the Present, Time Management Techniques, Planning for Goal Achievement, Create a PERT Chart, Set Clear Goals for Everyone, Create Your Daily

“To-Do” List: The ABCDE Method, The Pareto Principle, Plan Your Work and Work Your Plan, The Not-To-Do List.

UNIT - III

Set Clear Priorities: The Pareto Principle, The Law of Three, Stay on Track: Lifestyle Principle, The Important vs. the Urgent, Develop Good Work Habits, Define Your Key Result Areas, Clarity Is Essential, Multiply Your Value, Delegation: Delegation Is Learnable, To Whom, What, Why to delegate, Key Steps of Delegation. Practice Single-Handling, Avoid Multitasking, Dumb and Dumber.

UNIT - IV

Overcome Procrastination: Causes, The Eight Factor, Mental Programming, The Salami Slice Method, Develop a Sense of Urgency, Art of Anticipating: Parking Meter Syndrome, False Deadline Strategy, The Pack-Rat Approach, Plugging Time Leaks, Power tools for Time Management.

Suggested Readings:

1. Brain Tracy, Time Management, American Management Association.
2. Marc Mancini, Time Management, McGraw Hill.

BCA-22113 (iii) INFORMATION SECURITY(DSE-1)

Credits: 04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT - I

Introduction: History of Information Security, CNSS Security Model, Components of Information Security, Approaches to Information Security and Implementation, Security Systems Development Life Cycle, Security Professionals and the Organization.

UNIT - II

The Need for Security: Introduction, Business Needs First: Threats and Attacks, Legal, Ethical, and Professional Issues in Information Security, Law and Ethics in Information Security: Relevant Laws, International Laws and Legal Bodies.

UNIT - III

Risk Management: An Overview of Risk Management, Risk Identification, Risk Assessment, Risk Control Strategies: Selecting a Risk Control Strategy, Quantitative versus Qualitative Risk Control Practices.

UNIT - IV

Planning for Security – Introduction to Information Security Planning and Governance, Information Security Policy, Standards, and Practices, Security Education, Training, and Awareness Program.

Suggested Readings:

1. Michael E. Whitman & Herbert J. Mattord, Principles of Information Security, Course Technology, Cengage Learning.
2. Steve G Watkins, An Introduction to Information Security and ISO 27001:2013 – A Pocket Guide.

BCA-22114 (i)MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE(GE-1)

Credits: 04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT - I

Basic Statistics: Measure of Central Tendency, Preparing frequency distribution table, Mean, Mode, Median, Measure of Dispersion: Range, Variance and Standard Deviations, Correlation and Regression.

UNIT-II

Algorithm: Algorithms, merits and demerits, Exponentiation, How to compute fast exponentiation. Linear Search, Binary Search, "Big Oh" notation, Worst case, Advantage of logarithmic algorithms over linear algorithms, complexity.

Graph Theory: Graphs, Types of graphs, degree of vertex, sub graph, isomorphic and homeomorphic graphs, Adjacent and incidence matrices, Path Circuit ; Eulerian, Hamiltonian path circuit.

UNIT-III

Tree: Trees, Minimum distance trees, Minimum weight and Minimum distance spanning trees.

Recursion: Recursively defined function. Merge sort, Insertion sort, Bubble sort, and Decimal to Binary.

UNIT-IV

Recurrence Relations: LHRR, LHRRWCCs, DCRR. Recursive procedures.

Number Theory: Principle of Mathematical induction, GCD, Euclidean algorithm, Fibonacci numbers, congruences and equivalence relations, public key encryption schemes.

Suggested Readings:

1. Gupta S.P. and Kapoor, V.K., Fundamentals of Applied statistics, Sultan Chand & Sons, 1996.
2. Gupta S.P. and Kapoor, V.K., Fundamentals of Mathematical statistics, Sultan Chand and Sons, 1995.
3. Graybill, Introduction to Statistics, McGraw.
4. Anderson, Statistical Modelling, McGraw.
5. Babu Ram : Discrete Mathematics

BCA-22114 (ii)COMPUTER ORIENTED NUMERICAL METHODS(GE-1)

Credits: 04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT - I

Computer Arithmetic: Floating point representation of numbers, Arithmetic Operations with normalized floating- point numbers and their consequences, significant figure.

Error in Number Representation: inherent error, truncation, absolute, relative, percentage and round off errors.

Iterative Methods: Bisection, False position, Newton-Raphson method. Iteration method, discussion of convergence.

UNIT - II

Solution of Simultaneous Linear Equations & Ordinary Differential Equations: Gauss Elimination method, pivoting, Ill-conditioned equation, refinement of solutions. Gauss-Seidel iterative method, Euler method, Euler modified method, Taylor-series method, Runge-Kutta methods, Predictor-Corrector methods.

UNIT - III

Interpolation and Approximation: Polynomial Interpolation: Newton, Lagranges, Difference tables, Approximation of functions by Taylor Series.

UNIT - IV

Numerical Differentiation and Integration: Differentiation formula based on polynomial fit, pitfalls in differentiation, Trapezoidal & Simpson Rules, Gaussian Quadrature.

Suggested Readings:

1. V. Rajaraman, Computer Oriented Numerical Methods, Prentice Hall, India, 1993.
2. S.S. Sastry, Introductory Methods of Numerical Analysis, 2012.
3. H.C. Saxena, Finite Differences and Numerical Analysis, 2010.
4. Modes A, Numerical Analysis for Computer Science.
5. M. K. Jain, S. R. K. Iyengar and R. K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Publication, 2007.

BCA-22114 (iii)DIGITAL ELECTRONICS(GE-1)

Credits: 04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT – I

Information Representation: Number Systems, Binary Arithmetic Operations, Fixed-point and Floating point representation of numbers, BCD Codes, Error detecting and correcting codes, Character Representation – ASCII, EBCDIC, Unicode, Binary Logic: Boolean Algebra, Boolean Theorems, Boolean Functions Truth Tables, Canonical and Standard forms of Boolean functions , Simplification of Boolean Functions - Venn Diagram, Karnaugh Maps.

UNIT – II

Digital Logic: Basic Gates -AND, OR, NOT, Universal Gates - NAND, NOR, Other Gates - XOR, XNOR etc. NAND, NOR, AND-OR-INVERT and OR-AND-INVERT implementations of digital circuits, Combinational Logic – Characteristics, Design Procedures, analysis procedures, Multilevel NAND and NOR circuits.

UNIT – III

Combinational Circuits: Half-Adder, Full-Adder, Half-Subtractor, Full-Subtractor, Encoders, Decoders, Multiplexers, Demultiplexers, Comparators, Code Converters BCD to Seven Segment Decoder.

UNIT – IV

Sequential Logic: Characteristics, Flip-Flops, Clocked RS, D type, JK, T type and Master Slave flip-flops.State table, State diagram and State equations. Flip-flop excitation tables.

Suggested Readings:

1. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India Pvt. Ltd., 2004.
2. V. Rajaraman and T. Radhakrishnan, An Introduction to Digital Computer Design, Prentice Hall of India Pvt. Ltd., 2004
3. Andrew S. Tanenbaum, Structured Computer Organization, Prentice Hall of India Pvt. Ltd., 1984.
4. Nicholas Carter, Schaum's Outlines Computer Architecture, Tata McGraw-Hill., 2002.

SEMESTER-II

BCA-22120. DATA STRUCTURES-I(C-3)

Credits: 04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT – I

Introduction: Elementary data organization, Data Structure definition, Data type vs. data structure, Categories of data structures, Data structure operations, Applications of data structures, Algorithms complexity and time-space tradeoff, Big-O notation. Strings: Introduction, Storing strings, String operations, Pattern matching algorithms.

UNIT – II

Arrays: Introduction, Linear arrays, Representation of linear array in memory, address calculations, Traversal, Insertions, Deletion in an array, Multidimensional arrays, Parallel arrays, Sparse arrays. Linked List: Introduction, Array vs. linked list, Representation of linked lists in memory, Traversal, Insertion, Deletion, Searching in a linked list, Header linked list, Circular linked list, Two-way linked list, Threaded lists, Garbage collection, Applications of linked lists.

UNIT – III

Stack: Introduction, Array and linked representation of stacks, Operations on stacks, Applications of stacks: Polish notation, Recursion. Queues: Introduction, Array and linked representation of queues, Operations on queues, Deques, Priority Queues, Applications of queues.

UNIT – IV

Tree: Introduction, Definition, Representing Binary tree in memory, Traversing binary trees, Traversal algorithms using stacks. Graph: Introduction, Graph theory terminology, Sequential and linked representation of graphs.

Suggested Readings:

1. Seymour Lipschutz, "Data Structure", Tata-McGraw-Hill
2. Horowitz, Sahni & Anderson-Freed, "Fundamentals of Data Structures in C", Orient Longman.
3. Trembley, J.P. And Sorenson P.G., "An Introduction to Data Structures With Applications", Mcgraw- Hill International Student Edition, New York.
4. Mark Allen Weiss Data Structures and Algorithm Analysis In C, Addison- Wesley, (An Imprint Of Pearson Education), Mexico City. Prentice- Hall Of India Pvt. Ltd., New Delhi.
5. Yedidyan Langsam, Moshe J. Augenstein, and Aaron M. Tenenbaum, "Data Structures Using C", Prentice- Hall of India Pvt. Ltd., New Delhi.

BCA-22121. INTRODUCTION TO OPERATING SYSTEMS(C-4)

Credits: 04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT – I

Fundamentals of Operating system: Introduction to Operating System, its need and operating System services, Early systems, Structures - Simple Batch, Multi programmed, timeshared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems. **Process Management:** Process concept, Operation on processes, Cooperating Processes, Threads, and Inter-process Communication.

UNIT-II

CPU Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms : FCFS, SJF, Round Robin & Queue Algorithms. **Deadlocks:** Deadlock characterization, Methods for handling deadlocks, Banker's Algorithm.

UNIT-III

Memory Management: Logical versus Physical address space, Swapping, Contiguous allocation, Paging, Segmentation.

Virtual Memory: Demand paging, Performance of demand paging, Page replacement, Page replacement algorithms, Thrashing.

UNIT-IV

File management: File system Structure, Allocation methods: Contiguous allocation, Linked allocation, Indexed allocation, Free space management: Bit vector, Linked list, Grouping, Counting. **Device Management:** Disk structure, Disk scheduling: FCFS, SSTF, SCAN, C-SCAN, LOOK, C-LOOK.

Suggested Readings

1. Abraham Silberschatz, Peter B. Galvin, " Operating System Concepts", Addison-Wesley publishing. Co., 7th. Ed., 2004.
2. Nutt Gary, "Operating Systems", Addison Wesley Publication, 2000.
3. Andrew S. Tannenbaum, "Modern Operating Systems", Pearson Education Asia, Second Edition, 2001.
4. William Stallings, "Operating Systems, "Internals and Design Principles", 4th Edition,PH, 2001.
5. Ekta Walia, "Operating Systems Concepts", Khanna Publishes, New Delhi, 2002.

BCA-22122. (i)INTRODUCTION TO MANAGEMENT INFORMATION SYSTEMS(DSE-2)

Credits: 04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT – I

Introduction to system and Basic System Concepts, Types of Systems, The Systems approach, Information System: Definition & Characteristics, Types of information, Role of Information in Decision-Making, Sub-Systems of an Information system: EDP and MIS management levels, EDP/MIS/DSS.

UNIT –II

An overview of Management Information System: Definition & Characteristics, Components of MIS, Frame Work for Understanding MIS: Information requirements & Levels of Management, Simon's Model of decision-Making, Structured Vs Un-structured decisions, Formal vs. Informal systems.

UNIT – III

Developing Information Systems: Analysis & Design of Information Systems: Implementation & Evaluation, Pitfalls in MIS Development.

UNIT – IV

Functional MIS: A Study of Personnel, Financial and production MIS, Introduction to e-business systems, ecommerce – technologies, applications, Decision support systems –support systems for planning, control and decision-making

Suggested Readings:

1. J. Kanter, “Management/Information Systems”, PHI.
2. Gordon B. Davis, M. H. Olson, “Management Information Systems – Conceptual foundations, structure and Development”, McGraw Hill.
3. James A. O’Brien, “Management Information Systems”, Tata McGraw-Hill.
4. James A. Senn, “Analysis & Design of Information Systems”, Second edition, McGraw Hill.
5. Robert G. Murdick & Joel E. Ross & James R. Claggett, “Information Systems for Modern Management”, PHI.
6. Lucas, “Analysis, Design & Implementation of Information System”, McGraw Hill.

Note: Latest and additional good books may be suggested and added from time to time.

BCA-22122. (ii) INFORMATION RETRIEVAL SYSTEM(DSE-2)

Credits: 04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT – I

Introduction to Information Retrieval Systems: Definition of Information Retrieval System, Objectives of Information Retrieval Systems.

Functional Overview: Item Normalization, Selective Dissemination of Information, Document, Index and Multimedia Database Search.

Information Retrieval System Capabilities: Search Capabilities, Browse Capabilities, Miscellaneous Capabilities, Z39.50 and WAIS Standards.

UNIT – II

Cataloging and Indexing: History and Objectives of Indexing, Indexing Process, Scope of Indexing, Precoordination and Linkages, Automatic Indexing: Classes of Automatic Indexing, Statistical Indexing Natural Language, Concept Indexing, Hypertext Linkages, Information Extraction, Index Compression: Dictionary Compression, Posting File Compression.

UNIT – III

User Search Technique: Search Statements and Binding, Similarity Measures and Ranking, Relevance Feedback, Selective Dissemination of Information Search, Weighted Searches of Boolean Systems, Searching the INTERNET and Hypertext.

Computing Scores in a Complete Search System: Efficient Scoring and Ranking, Components of an Information Retrieval System.

UNIT – IV

Evaluation in Information Retrieval, Standard Test Collections, Evaluation of Unranked Retrieval Sets, Evaluation of Ranked Retrieval Results, Assessing Relevance, System Quality and User Utility.

Information Visualization: Cognition and Perception, Aspects of Visualization Process, Information Visualization Technologies.

Suggested Readings:

1. Christopher D. Manning, Prabhakar Raghavan, Hinrich Schutze, Introduction to Information Retrieval, Cambridge University Press.
2. Gerald J. Kowalski, Mark T. Maybury, Information Storage and Retrieval Systems Theory and Implementation, Kluwer Academic Publishers.

BCA-22122. (iii)SIMULATION & MODELLING(DSE-2)

Credits: 04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT – I

System Definition and Components, Stochastic Activities, Continuous and Discrete Systems, System Modeling, Types of Models, Static and Dynamic Physical Models, Static and Dynamic Mathematical Models, Full Corporate Model, Types of System Study.

UNIT – II

System Simulation, Why to Simulate and When to Simulate, Basic Nature of Simulation, Techniques of Simulation, Comparison of Simulation and Analytical Methods, Types of System Simulation, Real Time simulation, Hybrid Simulation, Simulation of Pure-Pursuit Problem, Single-Server Queuing System, An Inventory Problem, Monte Carlo Simulation, Distributed Lag Models, Cobweb Model.

UNIT – III

Simulation of Continuous Systems, Analog vs, Digital Simulation, Simulation of Water Reservoir System, Simulation of A Servo System, Simulation of An Autopilot, Discrete System Simulation, Fixed Time-Step vs, Event-To-Event Model, Generation of Random Numbers, Test for Randomness, Generalization of Non-Uniformly Distributed Random Numbers, Monte-Carlo Computation vs. Stochastic Simulation.

UNIT – IV

System Dynamics, Exponential growth models, Exponential decay models, Modified exponential growth models, Logistic curves and generalization of growth models, System dynamics diagrams and feedback in socio-economic systems. World model: critical path computation, Uncertainties in activity duration, Resource allocation simulation software, General purpose Vs Application-oriented simulation packages.

Suggested Readings:

1. Geoffrey Gordon, System Simulation, PHI.
2. Narsingh Deo, System Simulation with Digital Computer, PHI.

BCA-22123. LOGICAL ORGANIZATION OF COMPUTERS-I(C-5)

Credits: 04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT - I

Information Representation: Number Systems, Binary Arithmetic, Fixed-point and floating point representation of numbers, BCD Codes, Error detecting and correcting codes, Character Representation – ASCII, EBCDIC, Unicode.

UNIT - II

Binary Logic: Boolean Algebra, Boolean Theorems, Boolean Functions and Truth Tables, Canonical and Standard forms of Boolean functions, Simplification of Boolean Functions –Venn Diagram, Karnaugh Maps.

UNIT - III

Digital Logic: Introduction to digital signals, Basic Gates – AND, OR, NOT, Universal Gates and their implementation – NAND, NOR, Other Gates – XOR, XNOR etc. NAND, NOR, AND-OR-INVERT and OR-AND-INVERT implementations of digital circuits, Combinational Logic – Characteristics, Design Procedures, analysis procedures, Multilevel NAND and NOR circuits.

UNIT - IV

Combinational Circuits: Half-Adder, Full-Adder, Half-Subtractor, Full-Subtractor, Parallel binary adder/subtractor, Encoders, Decoders, Multiplexers, Demultiplexers, Comparators, Code Converters, BCD to Seven-Segment Decoder.

Suggested Readings:

1. Gill, Nasib Singh and Dixit J.B.: Digital Design and Computer Organisation, University Science Press (Laxmi Publications), New Delhi.
2. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India Pvt.Ltd.
3. V. Rajaraman, T. Radhakrishnan, An Introduction to Digital Computer Design, Prentice Hall of India Pvt. Ltd.
4. Andrew S. Tanenbaum, Structured Computer Organization, Prentice Hall of India Pvt. Ltd.
5. Nicholas Carter, Schaum's Outlines Computer Architecture, Tata McGraw-Hill

BCA-22124. INTERPERSONAL SKILLS & PERSONALITY DEVELOPMENT(AECC-2)

Credits: 04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT – I

Personality: Definition, Elements, Determinants.

Personal Grooming: Personal Hygiene, Social Effectiveness, Business Etiquettes (Power Dressing).

UNIT-II

Body Language: Non-Verbal Communication, Types of Body Language, Functions of Body Language, Role of Body Language, Proxemics.

Art of Good Communication: Verbal & Non-Verbal Communication, Difference between Oral and Written Communication, 7' Cs of Effective Communication, Importance of Effective Communication.

UNIT-III

Team: Team Behaviour, Types of Teams, Team Roles and Behaviour.

Group Discussion: Do's and Don't.

UNIT-IV

Interview Preparation: Introduction, Resume Writing, Dress Code, Mock- Interview, How to be successful in an Interview.

Suggested Readings:

1. C. S. Venkata Ratanam and B. K. Srivastava, Personal management and Human Resources, Tata McGraw Hill Publishing Ltd. New Delhi, 2005.
2. Keith Davis, Human Behaviour at Work, Tata McGraw Hill Publishing Ltd. New Delhi, 1975.
3. Thomas A. Harris, I m OK, You re OK, Pan Books, London and Sydney, 1973.
4. Ranjana Salgaocar, Pleasure of your Company, Pyramid Publishers, Goa, 1995.
5. Arun Agarwal, How to get the job you want, Vision Books, New Delhi, 1997.
6. Rohit Anand and Sanjeev Bikhchandani, Get That Job, Harper Collins, 1996.

SEMESTER-III

BCA – 22210: DATA STRUCTURES – II(C-6)

Credits: 04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT – I

Tree: Header nodes, Threads, Binary search trees, Searching, Insertion and deletion in a Binary search tree, AVL search trees, Insertion and deletion in AVL search tree, m-way search tree, Searching, Insertion and deletion in an m-way search tree, B-trees, Searching, Insertion and deletion in a B-tree, B+tree, Huffman's algorithm, General trees.

UNIT – II

Graphs: Warshall's algorithm for shortest path, Dijkstra algorithm for shortest path, Operations on graphs, Traversal of graph, Topological sorting.

UNIT – III

Sorting: Internal & external sorting, Radix sort, Quick sort, Heap sort, Merge sort, Tournament sort, Searching: Linear search, binary search, merging, Comparison of various sorting and searching algorithms on the basis of their complexity.

UNIT – IV

Files: Physical storage devices and their characteristics, Attributes of a file viz fields, records, Fixed and variable length records, Primary and secondary keys, Classification of files, File operations, Comparison of various types of files, File organization: Serial, Sequential, Indexed-sequential, Random-access/Direct, Inverted, Multi list file organization. Hashing: Introduction, Hashing functions and Collision resolution methods .

SUGGESTED READINGS

1. Seymour Lipschutz, "Data Structure", Tata-McGraw-Hill
2. Horowitz, Sahni & Anderson-Freed, "Fundamentals of Data Structures in C", Orientlongman.
3. Trembley, J.P. And Sorenson P.G., "An Introduction to Data Structures With Applications", Mcgrraw- Hill International Student Edition, New York.
4. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Addison- Wesley, (An Imprint Of Pearson Education), Mexico City.Prentice- Hall Of India Pvt. Ltd., New Delhi.

BCA – 22211 : (i)INTRODUCTION TO WEB TECHNOLOGIES(GE-2)

Credits:04

External Marks:80

Internal Marks:20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT – I

Introduction to Internet and World Wide Web; Evolution and History of World Wide Web; Basic features; Web Browsers; Web Servers; Hypertext Transfer Protocol, Overview of TCP/IP and its services; URLs; Searching and Web-Casting Techniques; Search Engines and Search Tools;

UNIT – II

Web Publishing: Hosting your Site; Internet Service Provider; Web terminologies, Phases of Planning and designing your Web Site; Steps for developing your Site; Choosing the contents; Home Page; Domain Names, Front page views, Adding pictures, Links, Backgrounds, Relating Front Page to DHTML. Creating a Website and the Markup Languages (HTML, DHTML);

UNIT – III

Web Development: Introduction to HTML; Hypertext and HTML; HTML Document Features; HTML command Tags; Creating Links; Headers; Text styles; Text Structuring; Text colors and Background; Formatting text; Page layouts;

UNIT – IV

Images; Ordered and Unordered lists; Inserting Graphics; Table Creation and Layouts; Frame Creation and Layouts; Working with Forms and Menus; Working with Radio Buttons; Check Boxes; Text Boxes;
DHTML: Dynamic HTML, Features of DHTML, CSSP(cascading style sheet positioning) and JSSS(JavaScript assisted style sheet), Layers of netscape, The ID attributes, DHTML events.

SUGGESTED READINGS

1. Raj Kamal, "Internet and Web Technologies", Tata McGraw-Hill.
2. Ramesh Bangia, "Multimedia and Web Technology", Firewall Media.
3. Thomas A. Powell, "Web Design: The Complete Reference" , 4/e, Tata McGraw-Hill
4. Wendy Willard, "HTML Beginners Guide", Tata McGraw-Hill.
5. Deitel and Goldberg, "Internet and World Wide Web, How to Program", PHI.

BCA – 22211 : (ii)RELATIONAL DATABASE MAAGEMENT SYSTEM(GE-2)

Credits:04

External Marks:80

Internal Marks:20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT - I

Relational Model concepts, Codd's Rules for Relational Model, Relational Algebra:- Selection and Projection, Set Operation, Renaming, Join and Division. Relational calculus: Tuple Relational Calculus and Domain Relational Calculus.

UNIT-II

Functional Dependencies and Normalization: Purpose, Data Redundancy and Update Anomalies. Functional Dependencies:Full Functional Dependencies and Transitive Functional Dependencies, Characteristics of Functional Dependencies.
Decomposition and Normal Forms (1NF, 2NF, 3NF & BCNF)

UNIT – III

SQL:Data Definition and data types, Specifying Constraints in SQL, Schema, change statement, Basic Queries in SQL, Insert, Delete and Update Statement, Views.

UNIT - IV

PL/SQL: Introduction Advantages of PL/SQL, The Generic PL/SQL Block: PL/SQL Exception Environment, PL/SQL Character set and Data Types, Control Structure in PL/SQL.

TEXT AND REFERENCE BOOKS:

1. Elmasri and Navathe, Fundamentals of Database systems, 5th Edition, Pearson Education, 2006.
2. Ivan Bayross, SQL, PL/SQL-The Program Language of ORACLE, BPB Publication, 2010.
3. H. Korth, A. Silberschatz and S. Sudarshan, Database System Concept, 4th Edition, McGraw Hill International Edition, 2001.
4. C.J.Date, An Introduction to Databases Systems, 8th Edition, Addison Wesley, New Delhi, 2003.

BCA – 22211 : (iii) SYSTEM ADMINISTRATION & MAINTENANCE(GE-2)

Credits:04

External Marks:80

Internal Marks:20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Exploring different Operating Systems: Introduction to Linux/Unix based operating systems, introduction to Windows based operating systems, difference between Linux/Unix and other operating systems, introduction to server based operating systems, difference between desktop based (Windows 10) and server based operating systems like Windows server 2003/2008.

UNIT-II

Linux/Ubuntu System Environment: Configuring desktop environment and desktop settings, installing and configuring software and hardware, exploring file structure, terminal, shell, basic Unix Commands like cat, ls, cd, date, cal, man, echo, pwd, mkdir, rm, rmdir, kill etc.

UNIT-III

Windows System Environment: Configuring desktop environment and desktop settings, installing and configuring software and hardware, explore system configuration using control panel, creating users, add/delete users, difference between workgroup and domain, concept of user profiles – creating and roaming, concept of Active Directory, process and disk management, Windows task manager, exploring file structure and file properties, backup and recovery.

UNIT-IV

Network Administration: Examine network settings using commands like ipconfig/ifconfig, hostname, net, netstat, whoami etc., troubleshoot network connectivity issues using commands like: ipconfig, ping, tracert, route etc., sharing resources (files, printers etc.) on the network, accessing a system remotely using remote desktop.

TEXT AND REFERENCE BOOKS:

1. W. Panek and T. Wentworth, Mastering Windows 7 administration, Wiley Publishing Inc., 2010.
2. G. Snyder, T. R. Hein, and B. W. EviNemeth, UNIX and Linux System Administration Handbook, 5th Edition, Pearson, 2018.
3. M. S. Sobell, A Practical Guide to Ubuntu Linux, 4th Edition, Prentice Hall, 2014.
4. M. Burges, Principles of Network and System Administration. John Wiley & sons Ltd., 2003.

BCA – 22212 : INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS(C-7)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT – I

Basic Concepts – Data, Information, Records and files. Traditional file –based Systems-File Based Approach-Limitations of File Based Approach, Database Approach-Characteristics of Database Approach, advantages and disadvantages of database system, components of database system, Database Management System (DBMS), Components of DBMS Environment, DBMS Functions and Components, DBMS users, Advantages and Disadvantages of DBMS, DBMS languages.

Roles in the Database Environment - Data and Database Administrator, Database Designers, Applications Developers and Users .

UNIT – II

Database System Architecture – Three Levels of Architecture, External, Conceptual and Internal Levels, Schemas, Mappings and Instances .

Data Independence – Logical and Physical Data Independence . Classification of Database Management System, Centralized and Client Server architecture to DBMS .

Data Models: Records- based Data Models, Object-based Data Models, Physical Data Models and Conceptual Modeling.

UNIT – III

Entity-Relationship Model – Entity Types, Entity Sets, Attributes Relationship Types, Relationship Instances and ER Diagrams, abstraction and integration. Basic Concepts of Hierarchical and Network Data Model, Relational Data Model:-Brief History, Relational Model Terminology-Relational Data Structure, Database Relations, Properties of Relations, Keys, Domains, Integrity Constraints over Relations, .

UNIT – IV

Relational algebra, Relational calculus, Relational database design: Functional dependencies, Modification anomalies, 1st to 3rd NFs, BCNF, 4th and 5th NFs, computing closures of set FDs, SQL: Data types, Basic Queries in SQL, Insert, Delete and Update Statements, Views, Query processing: General strategies of query processing, query optimization, query processor, concept of security, concurrency and recovery.

SUGGESTED READINGS

1. Elmasri & Navathe, “Fundamentals of Database Systems”, 5th edition, Pearson Education.
2. Thomas Connolly Carolyn Begg, “Database Systems”, 3/e, Pearson Education
3. C. J. Date, “An Introduction to Database Systems”, 8th edition, Addison Wesley N. Delhi.

BCA-22213: LOGICAL ORGANIZATION OF COMPUTERS-II(C-8)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT - I

Sequential Logic: Characteristics, Flip-Flops, Clocked RS, D type, JK, T type and Master-Slave flip-flops. State table, state diagram and state equations. Flip-flop excitation tables

UNIT - II

Sequential Circuits: Designing registers – Serial Input Serial Output (SISO), Serial Input Parallel Output (SIPO), Parallel Input Serial Output (PISO), Parallel Input Parallel Output (PIPO) and shift registers. Designing counters – Asynchronous and Synchronous Binary Counters, Modulo-N Counters and Up-Down Counters.

UNIT - III

Memory & I/O Devices: Memory Parameters, Semiconductor RAM, ROM, Magnetic and Optical Storage devices, Flash memory, I/O Devices and their controllers.

UNIT - IV

Instruction Design & I/O Organization: Machine instruction, Instruction set selection, Instruction cycle, Instruction Format and Addressing Modes. I/O Interface, Interrupt structure, Program-controlled, Interrupt-controlled & DMA transfer, I/O Channels, IOP.

SUGGESTED READINGS

1. Gill, Nasib Singh and Dixit J.B.: Digital Design and Computer Organisation, University Science Press (Laxmi Publications), New Delhi.
2. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India Pvt. Ltd.
3. V. Rajaraman, T. Radhakrishnan, An Introduction to Digital Computer Design, Prentice Hall of India Pvt. Ltd.
4. Andrew S. Tanenbaum, Structured Computer Organization, Prentice Hall of India Pvt. Ltd.
5. Nicholas Carter, Schaum's Outlines Computer Architecture, Tata McGraw-Hill

BCA-22214: (i)OBJECT ORIENTED PROGRAMMING USING C++(GE-3)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Object Oriented Programming Concepts : Procedural Language and Object Oriented approach, Characteristics of OOP, user defined types, polymorphism and encapsulation. Getting started with C++: syntax, data types, variables, string, function, namespace and exception, operators, flow control, recursion, array and pointer, structure .

UNIT-II

Abstracting Mechanism: classes, private and public, Constructor and Destructor , member function, static members, references;

Memory Management: new, delete, object copying, copy constructor, assignment operator, this input/output

UNIT-III

Inheritance and Polymorphism: Derived Class and Base Class, Different types of Inheritance, Overriding member function, Abstract Class, Public and Private Inheritance, Ambiguity in Multiple inheritance , Virtual function, Friend function, Static function.

UNIT-IV

Exception Handling: Exception and derived class, function exception declaration, unexpected exception, exception when handling exception, resource capture and release.

Template and Standard Template Library: Template classes, declaration, template functions, namespace, string, iterators, hashes, iostreams and other types.

SUGGESTED READINGS

1. Herbert Schildts : C++ - The Complete Reference, Tata McGraw Hill Publications.
2. Balaguru Swamy : C++, Tata McGraw Hill Publications.
3. Balaguruswamy : Object Oriented Programming and C++, TMH.
4. Shah & Thakker : Programming in C++, ISTE/EXCEL.
5. Johnston : C++ Programming Today, PHI.
6. Object Oriented Programming and C++, Rajaram, New Age International.
7. Samanta : Object Oriented Programming with C++ & JAVA, PHI.

BCA-22214: (ii)THEORY OF COMPUTATION(GE-3)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Finite Automata and Regular Expressions: Definition and Description of Finite Automaton , Non-Deterministic finite automata (NFA), Deterministic finite automata (DFA), Equivalence of DFA and NFA, Finite automata with E-moves, Regular Expressions, Equivalence of finite automata and Regular Expressions, Regular expression conversion and vice versa

UNIT-II

Introduction to Machines: Concept of basic Machine, Properties and limitations of FSM. Moore and mealy Machines, Equivalence of Moore and Mealy machines, Conversion of NFA to DFA by Arden's Method.

Properties of Regular Sets: The Pumping Lemma for Regular Sets, Applications of the pumping lemma, Closure properties of regular sets, Minimization of finite Automata

UNIT-III

Grammars: Definition, Language generated by a Grammer, Chomsky Classification of Languages, Relation between classes of Languages, Operations on Languages

Context Free Language: Context Free Grammer, Ambiguity in Context Free Grammer, Reduced Form, Removal of Useless Symbols and Unit Production, Chomsky Normal Form

UNIT-IV

Pushdown Automata: Introduction to Pushdown Machines, Application of Pushdown Machines **Turing Machines:** Deterministic and Non-Deterministic Turing Machines, Design of T.M, Haltingproblem of T.M.

TEXT AND REFERENCE BOOKS:

1. Introduction to automata theory, language & computations- Hopcroft & O.D.Ullman, R Mothwani, 2001, AW.

2. Theory of Computer Sc. (Automata, Languages and computation):K.L.P.Mishra & N.Chandrasekaran, 2000, PHI.
3. Introduction to Formal Languages & Automata-Peter Linz, 2001, Narosa Publ.
4. Introduction to languages and the Theory of Computation by John C. Martin 2003, T.M.H.

BCA-22214: (iii) OPEN SOURCE COMPUTATION (GE-3)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Introduction: History of Open Source Software (OSS), commercial software vs OSS, free software vs freeware, open source software examples - the GNU projects, copy right issues about open source software.

UNIT 2

The Linux operating system : Linux installation and hardware configuration – boot process - Linux loader (LILO) – Grand Unified Boot loader (GRUB), user account, accessing, starting and shutting processes, log in and log out, command line, simple commands, Unix file system, Unix files, i-node structure and file system related commands.

UNIT 3

Basic principles of copyright law, open source licensing, issues with copyright and patent, warranty, MIT license, BSD License, Apache license, Academic Free License, Mozilla Public License, GPL, LGPL. 59

UNIT 4

Study of commercial application software vs OSS, Open Office. GIMP:
Installation, GIMP user interface, creating new windows.

GIMP: Freehand drawing in GIMP, drawing regular shapes, image editing- cropping and resizing,masking.

GIMP: Language support

TEXT AND REFERENCE BOOKS:

1. A.M. Laurent, Understanding Open Source and Free Software Licensing. O'Reilly Media, 2004.
2. M. N. Rao, Fundamentals of Open Source Software, 1st Edition, PHI Learning, 2014.
3. W.E. Shotts, The Linux Command Line: A Complete Introduction, No Starch Press, 2012.
4. O. Lecarme and K. Delvare, The Book of GIMP, No Starch Press, 2013.
5. J. Smith and R. Joost, GIMP for Absolute Beginners, Apress, 2012.

SEMESTER – IV

BCA-22220: BASICS OF NETWORKS(C-9)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT – I

Introduction to Computer Communications and Networking Technologies; Uses of Computer Networks; Network Devices, Nodes, and Hosts; Types of Computer Networks and their Topologies; Network Software: Network Design issues and Protocols; Connection-Oriented and Connectionless Services; Network Applications and Application Protocols; Computer Communications and Networking Models: Decentralized and Centralized Systems, Distributed Systems, Client/Server Model, Peer-to-Peer Model, Web-Based Model, Network Architecture and the OSI Reference Model, TCP/IP reference model, Example Networks: The Internet, X.25, Frame Relay, ATM.

UNIT – II

Analog and Digital Communications Concepts: Concept of data, signal, channel, bit-rate, maximum data-rate of channel, Representing Data as Analog Signals, Representing Data as Digital Signals, Data Rate and Bandwidth, Capacity, Baud Rate; Asynchronous and synchronous transmission, data encoding techniques, Modulation techniques, Digital Carrier Systems; Guided and Wireless Transmission Media; Communication Satellites; Switching and Multiplexing; Dialup Networking; Analog Modem Concepts; DSL Service.

UNIT - III

Data Link Layer: Framing, Flow Control, Error Control; Error Detection and Correction; Sliding Window Protocols; Media Access Control: Random Access Protocols, Token Passing Protocols; Token Ring; Introduction to LAN technologies: Ethernet, switched Ethernet, VLAN, fast Ethernet, gigabit Ethernet, token ring, FDDI, Wireless LANs; Bluetooth; Network Hardware Components: Connectors, Transceivers, Repeaters, Hubs, Network Interface Cards and PC Cards, Bridges, Switches, Routers, Gateways.

UNIT – IV

Network Layer and Routing Concepts: Virtual Circuits and Datagrams; Routing Algorithms: Flooding, Shortest Path Routing, Distance Vector Routing; Link State Routing, Hierarchical Routing; Congestion Control Algorithms; Internetworking; Network Security Issues: Security threats; Encryption Methods; Authentication; Symmetric –Key Algorithms; Public-Key Algorithms.

SUGGESTED READINGS

1. Michael A. Gallo, William M. Hancock, “Computer Communications and Networking Technologies”, CENGAGE Learning.
2. Andrew S. Tanenbaum, “Computer Networks”, Pearson Education.
3. James F. Kurose, Keith W. Ross, “Computer Networking”, Pearson Education.
4. Behrouz A Forouzan, “Data Communications and Networking”, McGraw Hill.

BCA-22221: INTRODUCTION TO .NET (C-10)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT – I

The Framework of .Net: Building blocks of .Net Platform (the CLR, CTS and CLS), Features of .Net, Deploying the .Net Runtime, Architecture of .Net platform, Introduction to namespaces & type distinction. Types & Object in .Net, the evolution of Web development .

UNIT – II

Class Libraries in .Net, Introduction to Assemblies & Manifest in .Net, Metadata & attributes . Introduction to C#: Characteristics of C#, Data types: Value types, reference types, default value, constants, variables, scope of variables, boxing and unboxing.

UNIT – III

Operators and expressions: Arithmetic, relational, logical, bitwise, special operators, evolution of expressions, operator precedence & associativity, Control constructs in C#: Decision making, loops, Classes & methods: Class, methods, constructors, destructors, overloading of operators & functions.

UNIT – IV

Inheritance & polymorphism: visibility control, overriding, abstract class & methods, sealed classes & methods, interfaces. Advanced features of C#: Exception handling & error handling, automatic memory management, Input and output (Directories, Files, and streams).

SUGGESTED READINGS

1. Introduction to C# using .NET By Robert J. Oberg, PHI, 2002.
2. Programming in C# By E. Balaguruswamy, Tata McGraw Hill.
3. The Complete Guide to C# Programming by V. P. Jain.
4. C# : A Beginner's Guide, Herbert Schildt, Tata McGraw Hill.
5. C# and .NET Platform by Andrew Troelsen, Apress, 1st edition, 2001.

BCA-22222: (i)HYPERTEXT PREPROCESSOR(PHP) LANGUAGE (GE-4)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

1. Introduction to PHP

Evaluation of Php, Basic Syntax, Defining variable and constant, Php Data type, Operator and Expression.

2. Decisions and loop

Making Decisions, Doing Repetitive task with looping, Mixing Decisions and looping with Html.

3. Function

What is a function, Define a function, Call by value and Call by reference, Recursive function, String

Creating and accessing, String Searching & Replacing String, Formatting String, String Related Library function

UNIT-II

1. Array

Anatomy of an Array, Creating index based and Associative array Accessing array, Element Looping with Index based array, Looping with associative array using each () and foreach(), Some useful Library function.

2. Handling Html Form with Php

Capturing Form, Data Dealing with Multi-value filed, and Generating File uploaded form, redirecting a form after submission.

UNIT-III

1. Working with file and Directories

Understanding file& directory, Opening and closing, a file, Coping, renaming and deleting a file, working with directories, Creating and deleting folder, File Uploading & Downloading.

2. Session and Cookie

Introduction to Session Control, Session Functionality What is a Cookie, Setting Cookies with PHP. Using Cookies with Sessions, Deleting Cookies, Registering Session variables, Destroying the variables and Session.

UNIT-IV

1. Database Connectivity with MySql

Introduction to RDBMS, Connection with MySql Database, Performing basic database operation(DML) (Insert, Delete, Update, Select), Setting query parameter, Executing query-Join (Cross joins, Inner joins, Outer Joins, Self joins.)

2. Exception Handling

Understanding Exception and error, Try, catch, throw. Error tracking and debugging.

References:

1. Learning PHP, MySQL & Javascript, Robin Nixon, O'Reilly.
2. Head, First PHP & MySQL. Lynn Beighley, O'Reilly.
3. PHP & MySQL web development. Luke Welling, Addison Wesley.
4. Modern PHP. Josh Lockhart, O'Reilly.

BCA-22222: (ii) MULTIMEDIA TECHNOLOGIES (GE-4)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Introduction to Multimedia: Components of Multimedia; Hypermedia and Multimedia; Overview of Multimedia Software Tools; Multimedia Hardware and Software; Basic Software Tools; Making Instant Multimedia; Presentation Tools; Multimedia Authoring; Types of Authoring Tools; Page- Based Authoring Tools; Icon-Based Authoring tools; Time-Based Authoring Tools.

UNIT-II

Graphics and Image Data Representation: Graphics/Image Data Types, Popular File Formats; Color Models in Images and Video; Types of Video Signals Analog and Digital Video: Broadcast Video Standards: NTSC, HDTV; Chroma Subsampling.

UNIT-III

Digital Audio: Digitization of Sound; MIDI Versus Digital Audio; Quantization and Transmission of audio: Coding of Audio; Pulse Code Modulation; Differential Coding of Audio; Lossless Predictive Coding; DPCM.

UNIT-IV

Multimedia Data Compression: Run-Length Coding; Variable-Length Coding; Dictionary-Based Coding; Transform Coding; Image Compression Standards-JPEG standard; Video Compression Technique: MPEG.

TEXT AND REFERENCE BOOKS:

1. Ze-Nian Li and Mark S. Drew, Fundamentals of Multimedia, Pearson Education, 2003.
2. Tay Vaughan, Multimedia Making it Work, Tata McGraw-Hill, 1999.
3. Ramesh Bangia, Multimedia and Web Technology, Firewall Media, 2007.
4. John F. Koegel Buford, Multimedia systems, Addison Wesley, Pearson Education, 1994.
5. Ana Weston Solomon, Introduction to Multimedia, Tata McGraw-Hill

BCA-22222: (iii)OFFICE AUTOMATION-1 (GE-4)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Word Processing Basics: Creating, Formatting and Editing a Word Document: Word Wrap, Spelling and Grammar Check, Formatting Text and Paragraph, Paragraph Indents, Inserting and Formatting a Picture/ Clip Art in a Word document, Smart Art, Wrap Text around Images, Adding Effect to Images, Inserting Symbols and Equations, Document, Bullet and Numbered List, Find and Replace, Page Setup.

UNIT-II

Advance Features of Word Processing: Formatting Tables, Align Cell Text, Merge Cell, Text Directions, Adding a Chart and Chart Styles, using and Making Templates, Mail- Merge, Add to Dictionary, Treasures, Character Map, Headers and Footers, Page Numbering, Page Borders, Creating Columns, Creating and Dropping Comments, Watermark.

UNIT-III

Excel Basics: About Ribbon Menus, Creating & Editing Worksheet, Use of Various Data Types, Text Orientation, Formatting Spreadsheet: Cell Alignment and Border, Freeze Panes, Conditional Formatting, Using Formulas and Functions, VLookup, Cell Referencing, Page Setup, Page Options, Customizing Margins, Headers and Footers, Print Options, Print Formulas.

Unit – IV

Excel Advance Features: Transferring Data to and From Non Worksheet Files, Database Handling, Adding, Formatting and Customising Chart, Change Chart Type, Sorting Data, Use of Filters, Data Analysis with Goal Seek and Scenario Manager, Creating Scenario, Creating Pivot Tables, Using Slicers, Pivot Chart, Creating a Drop Down List, Locking Cells, Using Multiple Workbooks.

Text Books:

1. Kevin Wilson, Essential Office 2016, pdfdrive.com
2. Microsoft Office- Complete Reference, BPB Publication.
3. Russell A. Stultz, Learn Microsoft Office, BPB Publication.

BCA-22223: INTRODUCTION TO JAVA PROGRAMMING (SEC-1)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Java Language Basics: Introduction To Java, Basic Features, Java Virtual Machine Concepts, Primitive Data Type And Variables, Java Operators, Expressions, Statements and Arrays.

Object Oriented Concepts: Class and Objects-- Class Fundamentals, Creating objects , Assigning object reference variables; Introducing Methods, Static methods, Constructors , Overloading constructors; This Keyword; Using Objects as Parameters, Argument passing, Returning objects , Method overloading, Garbage Collection, The Finalize () Method.

UNIT-II

Inheritance and Polymorphism: Inheritance Basics, Access Control, Multilevel Inheritance, Method Overriding, Abstract Classes, Polymorphism, Final Keyword.

Packages : Defining Package, CLASSPATH, Package naming, Accessibility of Packages , using Package Members.

Interfaces: Implementing Interfaces, Interface and Abstract Classes, Extends and Implements together .

UNIT-III

Exceptions Handling : Exception , Handling of Exception, Using try-catch , Catching Multiple Exceptions , Using finally clause , Types of Exceptions, Throwing Exceptions, Writing Exception Subclasses.

Multithreading : Introduction , The Main Thread, Java Thread Model, Thread Priorities, Synchronization in Java, Inter thread Communication.

UNIT-IV

I/O in Java : I/O Basics, Streams and Stream Classes ,The Predefined Streams, Reading from, and Writing to, Console, Reading and Writing Files , The Transient and Volatile Modifiers , Using Instance of Native Methods.

Strings and Characters : Fundamentals of Characters and Strings, The String Class , String Operations , Data Conversion using Value Of () Methods , String Buffer Class and Methods.

Suggested Readings

1. Programming in Java, E Balagurusamy .
2. The Complete Reference JAVA, TMH Publication.
3. Begining JAVA, Ivor Horton, WROX Public.

BCA-22224: (i)MOBILE APPLICATION DEVELOPMENT (DSE-3)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT – I

Getting started with Mobility:Mobility landscape, mobile platform, mobile apps development, overview of android platform, setting up the mobile app development environment along with an emulator, a case study on mobile app development.

UNIT – II

Building blocks of mobile apps: Apps user: Interface designing-mobile UI resources (Layout, UI elements, Draw-able, Menu), activity-states and life-cycle, interaction amongst activities. app- functionality beyond user interface- threads, async task, service –state and life cycle, notification, broadcast receivers, telephony and smsapis native data handling- on device file I/O, shared preferences, mobile database such as SQLite, and enterprise data access (via Internet/Intranet)

UNIT - III

Sprucing up mobile apps:Graphics and animation- custom views, canvas, animation APIs, multimedia-audio/video playback and record, location awareness, and native hardware access (sensor such as accelerometer and gyroscope).

UNIT – IV

Testing mobile apps: Debugging mobile apps, white box testing, black box testing, and test automation of mobile app, JUnit for Android, Robotium, Monkey Talk. Taking apps to market: Versioning signing and packaging mobile apps, distributing apps on mobile marketplace.

TEXT AND REFERENCE BOOKS:

1. Barry Burd, Android Application Development All in One for Dummies, John Wiley & Sons Inc., Edition I , 2011.
2. Anubhav Pradhan and Anil V Deshpandy, Mobile App Development, Edition I.

BCA-22224: (ii) STATISTICAL PACKAGE FOR SOCIAL SCIENCES (DSE-3)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit- I

Introduction - Introduction to SPSS - Data analysis with SPSS: general aspects, workflow, critical issues - SPSS: general description, functions, menus, commands - SPSS file management.

Unit- II

Input and data cleaning - Defining variables - Manual input of data - Automated input of data and file import, Data manipulation - Data Transformation - Syntax files and scripts - Output management.

Unit- III

Descriptive analysis of data - Frequencies - Descriptives - Explore - Crosstabs – Charts.

Statistical tests - Means - T-test - One-way ANOVA - Non parametric tests - Normality tests.

Unit- IV

Correlation and regression - Linear correlation and regression - Multiple regression (linear).

Multivariate analysis - Factor analysis - Cluster analysis.

Text Books:

1. Agresti, A. and B. Findlay, Statistical Analysis for the Social Science. Prentice Hall.
2. Field, A. P., Discovering Statistics using SPSS (Introducing Statistical Method), Oriental Press.

BCA-22224: (iii) PRINCIPLES OF BIG DATA(DSE-3)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit- I

Big Data: Concept and Terminology, Definition, Historic Development, Characteristics, Features, Purpose, Value and Challenges of Big Data, Different types of Data, Business Motivations and Drivers for Big Data Adoption, Big Data Generation, Big Data Acquisition.

Unit- II

Big Data Storage: Storage System with Massive Data, Distributed Storage System, Storage Mechanism for Big Data, Sharding, Replication, CAP Theorem, Database Technology and Design Factors. Big data Planning Considerations, Database Programming Model: MapReduce, Dryad, All-Pairs, Pregel.

Unit- III

Big Data Analysis: Traditional Data Analysis, Big Data Analytic Methods, Architecture for Big Data Analysis, Tools for Big Data Mining and Analysis. Big Data Analysis Fields: Structured, Text, Web, Multimedia, Network, Mobile Traffic Data Analysis.

Unit- IV

Big Data Related Technologies: Cloud Computing, Relationship between Cloud Computing and Big Data, Data Security related to cloud based big data solutions, IoT, Relationship between Iot and Big Data, Hadoop, Relationship between Hadoop and Big Data. Data Center, Data Security.

Text Books:

1. Vince Reynolds, Big Data for Beginners.
2. Min Chen, Shiwen Mao, Yin Zhang, Victor C.M. Leung Big Data Related Technologies, Challenges and Future Prospects, Springer.

SEMESTER – V

BCA-22310: INTRODUCTION TO PYTHON (SEC-2)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT - I

Introduction to Python: History and Features of Python Programming, Python Interpreter. Variable, identifiers and literal. Token, keywords. Data Types. Arithmetic operators, Relational operators, Logical operators, Bitwise operators, Assignment operators, Membership operators, Identity operators. Operator precedence. Comment, Indentation, Need for indentation
Built-in Functions: input, eval, composition, print, type, round, min and max, pow. Type Conversion, Random Number Generation. Mathematical Functions. Getting help on a function, Assert Statement.

UNIT - II

Control Statements: if Conditional Statement, for and while Statements. break, continue and pass statements. Functions: Function Definition and Call, Function Arguments-Variable Function Arguments, Default Arguments, Keyword Arguments, Arbitrary Arguments. Command Line Arguments. Global and local Variables. Accessing local variables outside the scope, Using Global and Local variables in same code, Using Global variable and Local variable with same Name.

UNIT - III

Strings: String as a compound data type. String operations- Concatenation, Repetition, Membership operation, Slicing operation. String methods-count, find, rfind, capitalize, title, lower, upper, swapcase, islower, isupper, istitle, replace, isalpha, isdigit, isalnum. String Processing examples.
Lists: List operations-multiplication, concatenation, length, indexing, slicing, min, max, sum, membership operator; List functions-append, extend, remove, pop, count, index, insert, sort, reverse.

UNIT - IV

Object Oriented Programming: Introduction to Classes, Method, Class object, Instance object, Method object. Class as abstract data type, Date Class. Access attributes using functions-getattr, setattr, delattr. Built-In Class Attributes of Class object (dict, doc, name, module). _

TEXT AND REFERENCE BOOKS:

1. Sheetal Taneja and Naveen Kumar, Python Programming A modular Approach, Pearson, 2017.
2. ReemaThareja, Python Programming Using Problem Solving Approach, Oxford Publications.
3. Y. Daniel Liang, Introduction to Programming Using Python, Pearson, 2013.

BCA-22311: INTRODUCTION TO SOFTWARE ENGINEERING(C-11)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT – I

Introduction: Software Crisis, Software Processes & Characteristics, Software life cycle models, Waterfall, Prototype, Evolutionary and Spiral Models.

Software Requirements Analysis & Specifications: Requirement engineering, requirement elicitation techniques like FAST, QFD, requirements analysis using DFD, Data dictionaries & ER Diagrams, Requirements documentation, Nature of SRS, Characteristics & organization of SRS .

UNIT – II

Software Project Management Concepts: The Management spectrum, The People The Problem, The Process, The Project.

Software Project Planning: Size Estimation like lines of Code & Function Count, Cost Estimation Models, COCOMO, Risk Management.

UNIT - III

Software Design: Cohesion & Coupling, Classification of Cohesiveness & Coupling, Function Oriented Design, Object Oriented Design, Software Metrics: Software measurements: What & Why, Token Count, Halstead Software Science Measures, Design Metrics, Data Structure Metrics

Software Implementation: Relationship between design and implementation, Implementation issues and programming support environment, Coding the procedural design, Good coding style.

UNIT - IV

Software Testing: Testing Process, Design of Test Cases, Types of Testing, Functional Testing, Structural Testing, Test Activities, Unit Testing, Integration Testing and System Testing, Debugging Activities.

Software Maintenance: Management of Maintenance, Maintenance Process, Reverse Engineering, Software Re-engineering, Configuration Management, Documentation.

Suggested Readings

1. Gill, Nasib Singh : Software Engineering, Khanna Book Publishing Co. (P) Ltd. N. Delhi.
2. Pressman : Software Engineering, TMH.
3. Jalote, Pankaj : An Integrated Approach to Software Engineering, Narosa Publications.
4. Chhillar Rajender Singh : Software Engineering : Testing, Faults, Metrics, Excel Books, New Delhi.
5. Ghezzi, Carlo : Fundamentals of Software Engineering, PHI.
6. Fairely, R.E. : Software Engineering Concepts, McGraw-Hill.
7. Lewis, T.G.: Software Engineering, McGraw-Hill.
8. Shere : Software Engineering & Management, Prentice Hall.

BCA-22312: DATA WAREHOUSE AND DATA MINING(C-12)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit I

Data Mining: Introduction, Kind of data to be mined, Data Mining Functionalities, Technologies used in Data Mining, Applications of data Mining, Major Issues in Data Mining.

Unit II

Data Pre-Processing: Introduction, Need of preprocessing, Data Objects and Attribute type, Statistical description of data, Data Visualization, Measuring similarity and dissimilarity of data, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization

Unit III

Data Warehouse: Introduction, Data Warehouse and Database Systems, Data Warehouse Architecture, Data Warehouse Models, Data Cube and OLAP, Multidimensional data Model, Concept Hierarchies, OLAP operations, Data Warehouse Implementation

Unit IV

Mining Frequent Patterns, Associations and Correlations: Introduction, Frequent Itemset Mining using Apriori Algorithm, Generating Association Rule from Frequent Itemsets. Improving efficiency of Apriori, Pattern Growth Approach for Mining Frequent Itemsets, Pattern evaluation Methods.

TEXT AND REFERENCE BOOKS:

1. Jiawei Han, Micheline Kamber and Jian Pei, Data Mining Concepts and Techniques, 3rd Edition, Morgan Kaufmann Publishers, July 2011
2. Alex Berson and Stephen J. Smith, Data Warehousing, Data Mining & Olap, Tata Mcgraw – Hill Edition, 2004.
3. Michael Steinbach and Vipin Kumar, Introduction To Data Mining, Pang-Ning Tan, Pearson Education, 2014.
4. K.P. Soman, Shyam Diwakar and V. Ajay, Insight Into Data Mining Theory And Practice, Easter Economy Edition, Prentice Hall Of India, 2009.
5. G. K. Gupta, Introduction To Data Mining With Case Studies, Easter Economy Edition, Prentice Hall Of India, 2006.

6. Daniel T. Larose, Data Mining Methods And Models, Wiley, 2006.
7. W.H. Inmon, Building The Data Warehouse, 4th Edition, Wiley India,2005.

BCA-22313: (i)CLOUD COMPUTING (DSE-4)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT -I

Cloud Computing: Introduction to client server computing, Peer to Peer computing, Distributed computing, collaborative computing and cloud computing, Importance of cloud computing in current era, Characteristics, advantages and disadvantages of cloud computing.

UNIT -II

Cloud Services: Functioning of cloud computing, Classification of cloud on the basis of services: Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS): Definition, characteristics and their benefits.

UNIT- III

Cloud Architecture: Cloud computing Logical and service architecture, Types of clouds: Private cloud, Public cloud and Hybrid cloud, Comparison of a Private, public and hybrid clouds, Migrating to a cloud, Seven step model to migrate.

UNIT -IV

Applications: Business opportunities using cloud, Managing Desktop and devices in cloud, cloud as a type of distributed infrastructure, Application of cloud computing for centralizing Email communication, collaboration on schedules, calendars. Overview of major cloud service providers - Amazon Ec2, Google App Engine.

TEXT AND REFERENCE BOOKS:

1. Srinivasan, A. Cloud Computing: A Practical Approach for Learning and Implementation, Pearson Education India, 2014.
2. Velte, Anthony T., Toby J. Velte, Robert C. Elsenpeter, and Robert C. Elsenpeter, Cloud computing: a practical approach, New York: McGraw-Hill, 2010.

BCA-22313: (ii) PROGRAMMING IN XML (DSE-4)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit – I

Introduction to XML: Getting Multilingual with XML ,The Convergence of HTML and XML, XML and Web Browsers, XML Building Blocks, XML's Five Commandments, Schemas and XML Data Modeling, Document Type Definitions (DTDs), XML Schema (XSDs), Comparing DTDs and XSDs, The Importance of Document Validation.

Unit – II

DTD Construction Basics: Pondering Elements and Attributes, Empty Elements, Empty-Only Elements, Mixed Elements, Putting Attributes to Work, String Attributes, Enumerated Attributes, Tokenized Attributes, Working with Multiple Attributes.

Using XML Schema: XSD Data Types, XSD Schemas and XML Documents, Working with Simple Types, Complex XML Schema Example, World of Entities.

Unit – III

Putting Namespaces to Use: Namespaces and XSD Schemas, Validating XML Documents: Validation Tools, DTD and XSD Validation, Repairing Invalid Documents.

Formatting and Displaying XML Documents: Cascading Style Sheets (CSS): Layout Properties, Formatting Properties, Style Sheet into an XML Document.CSS and XSL, Rendering XML with Style Sheets, Leveraging CSS and XSLT on the Web.

Unit – IV

Styling XML Content with CSS: Tinkering with the z-Index, Creating Margins, The ins and outs of text formatting, Working with Fonts, Jazzing Up Text with Colors and Image Backgrounds.

eXtensible Style Language (XSL) Fundamentals: Understanding XSL, XSL Transformation, XPath, XSL Formatting Objects, Patterns and Expressions.

Text Books:

1. Michael Morrison, Teach Yourself XML in 24 Hours, Sams Publishing.

BCA-22313: (iii) GRAPHICAL USER INTERFACE (GUI) PROGRAMMING (DSE-4)

Credits: 04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit- I

About .Net Framework: .Net definition and characteristics, Understanding the .Net Framework Architecture, The Basic of IL, CLS and CTS, Managed Module Framework Class Library (FCL), Common Language Runtime (CLR) and Just-in-Time Compiler (JIT) and its Type, Introduction to Assembly and NameSpace: Types of Assembly, difference between Assembly and NameSpace, Managed Code: Interoperability with Unmanaged Code.

Unit- II

About C Sharp: Introduction to C#, Versions, Features, Class and Object, Variables, data types, Property, Event and Method. Array, Functions and Subroutine, Creating User Define Class and Property, Concept of Inheritance, Window Form: SDI and MDI, Common Controls: Label, Button, TextBox, ListBox, ComboBox, Check Box, Radio Button and their Common Property, Event and Method.

Unit- III

ADO.Net: Introduction to ADO.Net, Importance/features of ADO.Net, ADO.Net Architecture: .Net Data Provider, Connection, Command, DataReader, DataAdapter, DataSet, Common Properties and Methods for Components of ADO.Net Architecture. Introduction to GridView.

Unit- IV

Advance Features: Collections (ArrayList) and Exception Handling, Advance Control: DateTimePicker, RichTextBox, Timer, Crystal Report: Creation of simple report using Crystal Report.

Text Books:

1. John Sharp, Microsoft Visual C# 2010 Step by Step.
2. Christian Nagel, Jay Glynn, Morgan Skinner, Microsoft Professional C# 5.0 And .Net 4.5.1, Wrox.

BCA-22314: INTERACTIVE COMPUTER GRAPHICS (C-13)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Graphics Primitives: Introduction to computer graphics, Basics of Graphics systems, Application areas of Computer Graphics, overview of graphics systems, video-display devices, and raster-scan systems, random scan systems, graphics monitors and workstations and input devices.

Output Primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary fill and floodfill algorithms .

UNIT-II

2-D Geometrical Transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

2-D Viewing: The viewing pipeline, viewing coordinate reference frame, window to viewport coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm.

UNIT-III

3-D Object Representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces. Basic illumination models, polygon-rendering methods.

UNIT-IV

3-D Geometric Transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.

3-D Viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

SUGGESTED READINGS

1. Donald Hearn and M. Pauline Baker : Computer Graphics, PHI Publications.
2. Plastock : Theory & Problem of Computer Gaphics, Schaum Series.
3. Foley & Van Dam : Fundamentals of Interactive Computer Graphics, Addison-Wesley.
4. Newman : Principles of Interactive Computer Graphics, McGraw Hill.
5. Tosijasu, L.K. : Computer Graphics, Springer-Verleg.

SEMESTER – VI

BCA-22320: (i)DATA ANALYTICS USING R (GE-6)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT- I

Introduction to R:Installation of R, features of R, applications of R programming, data types in R, scripting in R, data editing, use of R as a calculator, control structures in R.

UNIT- II

Data Handling in R:Importing data in R (loading Tables and CSV files), Reading and writing files inR.

UNIT- III

Basic data structures in R:Vectors, matrices, array, lists, data frames.

UNIT- IV

Visualization Tools:Introduction to simple graphics and plots, bar charts, histograms, pie charts, scatter plots (plotting multiple variables), line plots and regression, word clouds, radar charts, waffle charts, box plots, exporting plots as images.

TEXT AND REFERENCE BOOKS:

1. R. Kabacoff, R in Action: Data Analysis and Graphics with R, Manning Publications, 2011.
2. T. Rahlf, Data Visualization with R: 100 Examples. Springer, 2017.
3. J. Adler, R in a Nutshell: A Desktop Quick Reference, 2nd Edition, O'Reilly Media, 2012.
4. T. M. Davies, The book of R, 1st Edition, No Starch Press, 2016.

BCA-22320: (ii)OFFICE AUTOMATION-II (GE-6)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

PowerPoint Basics: Ribbon Menus, Creating a New Presentation, Designing a Slide, Adding Text and Images, Slide Master, Adding Notes, Applying Design Template, Inserting and Formatting Tables, Data Labels, Chart Legends, Chart Styles, Chart Color Scheme, Adding Objects, Smart Art, Adding Special Effect, Printing Options, PowerPoint Views, Saving PowerPoint Files in Different Formats.

UNIT-II

MS-PowerPoint Advance: Design Template, Adding Transitions, Animation, Motion Paths, Effects and Timing, Animation Pane, Adding and Timing Videos, Adding Sounds, Screen Recording, Photo Albums, Preparing Audience Handouts, Import and Export to and From Non PowerPoint Files, Using Office Mix, Online Collaboration.

UNIT-III

Access Basics: Fundamental Concepts and terminology of Database System, Creating a Database, Determining Tables and Fields, Creating a Table, Importing or Linking Data from other Applications to Access, To Change Database Properties, Determining Keys, and Determining Relationship between Tables. Assigning Data Types to Fields, Identifying and Removing Redundancy.

Unit – IV

Access Advance Features: Creating a Database Query, Use a Wildcard, Comparison Operator, Sorting Data in a Query, Joining Tables, Crosstab Queries, Designing Form for a Query, Updating Records, Filtering Records, And Exporting Data.

Text Books:

1. Kevin Wilson, Essential Office 2016, pdfdrive.com
2. Microsoft Office- Complete Reference, BPB Publication.
3. Russell A. Stultz, Learn Microsoft Office, BPB Publication.

BCA-22320: (iii)SOFT SKILLS (GE-6)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT – I

Soft Skills: Importance and attributes of soft skills, social soft skills, Identifying and Improving soft skills. Self-Discovery: Importance and process of Knowing oneself, SWOT Analysis.

Personality Development: Types and elements of Personality Development, Attitude and behavior, Features and Formation of Attitude, Attitude in Workplace, Examples of Positive and Negative Attitude.

UNIT – II

Forming Values: Core of Values, Values and Attitude, Importance, type and power of values.

Communication Skill: Purpose, elements and process of Communication, Tools of Effective Communication, Channels of Communication, Conversation Tips, Barriers in communication skill and Overcoming Barriers.

UNIT – III

Art of Listening: Benefit and kinds of listening, Factors that hamper listening, Poor listening habits.

Art of Reading: Different types of reading, Tips for effective reading, SQ3R Techniques, Different stages of reading. Art of Writing E-Mail: Use Appropriate Salutation, Drafting the Subject Matter Significant, Shorten the Attachment.

UNIT – IV

Team Building and Teamwork: Characteristics and Aspects of Team Building, Role of Team Leader and Team Member, Inter-Group Collaboration, Difficulties Faced in Inter-Group Collaboration, Factors Shaping Inter-Group Collaboration.

Etiquette and Manners: Modern etiquette, benefits and classification of etiquette, poor manners, practicing good manner.

Time Management: The 80:20 Rule, Sense of time management, aspects of time management, time management matrix, Five Steps to Successful Time Management.

Text Books:

1. K. Alex, Soft Skills- Know Yourself and Know the World, S. Chand Publications.

BCA-22321: INTRODUCTION TO AI (C-14)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT – I

Overview of A.I: Introduction to AI, Importance of AI, AI and its related field, AI techniques, Criteria for success.

Problems, problem space and search: Defining the problem as a state space search, Production system and its characteristics, Issues in the design of the search problem

Heuristic search techniques : Generate and test, hill climbing, best first search technique, problem reduction, constraint satisfaction

UNIT - II

Knowledge Representation: Definition and importance of knowledge, Knowledge representation, Various approaches used in knowledge representation, Issues in knowledge representation.

Using Predicate Logic : Representing Simple Facts in logic, Representing instances and is_a relationship, Computable function and predicate.

UNIT - III

Natural language processing : Introduction syntactic processing, Semantic processing, Discourse and pragmatic processing.

Learning: Introduction learning, Rote learning, Learning by taking advice, Learning in problem solving, Learning from example-induction, Explanation based learning.

UNIT - IV

Expert System: Introduction, Representing using domain specific knowledge, Expert system shells.

Suggested Readings

1. David W. Rolston : Principles of Artificial Intelligence and Expert System Development, McGraw Hill Book Company.
2. Elaine Rich, Kevin Knight : Artificial Intelligence, Tata McGraw Hill.
3. D.W. Patterson, "Introduction to AI and Expert Systems", PHI, 1999 .
4. Nils J Nilsson , "Artificial Intelligence -A new Synthesis" 2nd Edition (2000), Harcourt Asia Ltd.

BCA-22322: (i)INTRODUCTION TO INTERNET (GE-7)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT- I

Internet and TCP/IP: Introduction to the Internet, Internet History, Internet Administration; Internet and Intranet; Internet Service; TCP/IP Model and its protocols; IP addresses: IPv4; Subnetting, IPv4 addresses; Supernetting; Next generation Internet Protocol(IPv6); The need for IPv6; Packet Format; IPv6 Addresses; Extension Headers.

UNIT- II

TCP/IPs Transport and Network Layer Protocols: Role of TCP, UDP, IP and Port Numbers; Format of TCP, UDP and IP; TCP services; TCP connection management; Remote Procedure Call; SCTP; IP address resolution- Domain Name Space; DNS mapping; Recursive and Iterative resolution; Resource records; Mapping Internet Address to Physical Addresses; ARP, RARP, BOOTP, DHCP; ICMP; IGMP.

UNIT- III

TCP/IP Application Level Protocols; Electronic Mail: Architecture; SMTP, MIME, POP, IMAP; Web Based Mail; File Access and transfer: FTP, Anonymous FTP, TFTP, NFS; Remote login using TELNET; Voice and Video over IP: RTP, RTCP, IP Telephony and Signaling, Resource Reservation and Quality of service, RSVP.

UNIT- IV

Routing in Internet: RIP, OSPF, BGP; Internet Multicasting; Mobile IP; Private Network Interconnection: Network Address Translation(NAT), Virtual Private network(VPN); Internet Management: SNMP; Internet Security; IPSec, EMail Security; Web Security, Firewalls; Digital Signatures; Certificates.

TEXT AND REFERENCE BOOKS:

1. Douglas E. Comer, Internetworking with TCP/IP Volume-I, Principles, Protocols, and Architecture, Fourth Edition, Pearson Education, 2018.
2. Andrew S. Tanenbaum, Computer networks, Pearson Education, 2013.
3. Behrouz A Forouzan, Data Communications and Networking, McGraw Hill, 2017.
4. Michael A. Gallo and William M. Hancock, Computer Communications and Networking Technologies, Course Technology, 2001.

BCA-22322: (ii) PRINCIPLES OF ACCOUNTING (GE-7)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT – I

Basic Accounting: Nature, scope and objectives of accounting, Users of accounting information, Accounting equation: Accounting concepts and conventions, Capital and revenue expenditure.

UNIT – II

Journal and Ledger: Double Entry System, Journal and recording of entries in journal and subsidiary books with narration, Ledger – Posting from Journal and subsidiary books to respective ledger accounts.

UNIT – III

Trial Balance: Need and objectives, Preparation of Trial Balance, Different types of errors, Rectification of errors before preparation of trial balance and after preparation of trial balance.

Depreciation provisions and reserves: concept and classification, Methods of depreciation accounting.

UNIT – IV

Final Accounts: Concept of adjustment; Preparation of Trading Account and Profit and Loss Account. Preparation of Balance Sheet. Preparation of Financial Statements at the end of financial year and their analysis.

An introduction to accounting software- Tally Version.

Text Books:

1. Anil Chowdhry, Fundamentals of Accounting & Financial Analysis, Pearson Education.
2. Jain and Narang : Financial Accounting.
3. Rajesh Agarwal & R Srinivasan, Accounting Made Easy, Tata McGraw –Hill.

BCA-22322: (iii)IT ACT AND CYBER LAWS (GE-7)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Basic Concepts: Definition of Cyber Law, Cyber-Crimes, Intellectual Property, Data Protection and Privacy, Scope and Needs of Cyber Laws, Reasons for Cyber Crimes and Cyber Criminals, Cyber Crime against Individual, Institution and State, The Jurisdiction of Indian Cyber Law.

UNIT-II

Evolution of Cyber-Crime, Cyber Fraud and Cyber Cheating, Virus on the Internet, Email Spoofing, Email Bombing, Cyber Stalking, Denial of Service Attack, Cyber Terrorism, Salami Attack, Online Gambling, Sale of Illegal Articles, Internet Time Theft, Web Jacking, Data Diddling, Intellectual Property Crimes, Web Defamation, Cyber Pornography.

UNIT-III

Law of Digital Contracts: Essence of Digital Contracts, System of Digital Signatures, Digital Signature Certificates, Certifying Authorities and Liabilities, Role and function of Certifying Authority. Legal Recognition of Digital Signature, Use of Electronic Records and Digital Signatures.

Unit – IV

Information Technology Act: Object and Scope of the IT Act, Major Issues Address by the IT Act, Jurisdiction of IT Act, Applicability of IT Act, and Relevant Authorities in India. Copyright: Meaning, Ownership and Assignment, License of Copyright, Copyright Protection of Content on the Internet.

Text Books:

1. Vivek Sood: Cyber Law Simplified, Tata McGraw Hill.
2. Vakul Sharma: Information Technology Law and Practice, Universal Law Publishing Co. Pvt. Ltd

BCA-22323: (i)E-COMMERCE(GE-8)

Credits:04
External Marks: 80
Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT – I

Electronic Commerce: Overview of Electronic Commerce, Scope of Electronic Commerce, Traditional Commerce vs. Electronic Commerce, Impact of E-Commerce, Electronic Markets, Internet Commerce, e-commerce in perspective, Application of E Commerce in Direct Marketing and Selling, Obstacles in adopting E-Commerce Applications; Future of ECommerce.

UNIT-II

Value Chains in electronic Commerce, Supply chain, Porter's value chain Model, Inter Organizational value chains, Strategic Business unit chains, Industry value chains. Security Threats to E-commerce: Security Overview, Computer Security Classification, Copyright and Intellectual Property, security Policy and Integrated Security, Intellectual Property Threats, electronic Commerce Threats, Clients Threats, Communication Channel Threats, server Threats.

UNIT-III

Implementing security for E-Commerce: Protecting E-Commerce Assets, Protecting Intellectual Property, Protecting Client Computers, Protecting E-commerce Channels, Insuring Transaction Integrity, Protecting the Commerce Server. Electronic Payment System: Electronic Cash, Electronic Wallets, Smart Card, Credit and Change Card.

UNIT – IV

Business to Business E-Commerce: Inter-organizational Transitions, Credit Transaction Trade Cycle, a variety of transactions. Electronic Data Interchange (EDI): Introduction to EDI, Benefits of EDI, EDI Technology, EDI standards, EDI Communication, EDI Implementation, EDI agreement, EDI security.

Suggested Readings:

1. R.Kalakota and A.B.Winston, Readings in Electronic Commerce, Addison Wesley,
- 2 David Kosiur, Understanding E- Commerce, Microsoft Press, 1997. 3) Soka, From EDI to Electronic Commerce , McGraw Hill, 1995.
- 3 David whitely, E-commerce Strategy, Technology and application, Tata McGraw Hill.
- 4 Gary P. Schneider and Jame Perry, Electronic Commerce Thomson Publication.
- 5 Doing Business on the Internet E-COMMERCE S. Jaiswal; Galgotia Publications.
- 6 E-Commerce An Indian Perspective; P.T.Joseph; S.J.; PHI.

7 E-Commerce; S.Jaiswal – Glgotia.

8 E-Commerce; Efrain Turbon; Jae Lee; David King; H.Michael Chang.

BCA-22323: (ii)VISUAL BASIC(GE-8)

Credits:04
External Marks: 80
Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT – I

Introduction to VB: Visual & non-visual programming, Procedural, Object-oriented and Event driven programming languages, The VB environment: Menu bar, Toolbar, Project explorer, Toolbox, Properties window, Form designer, Form layout, Immediate window. Visual Development and Event Driven programming.

UNIT – II

Basics of Programming: Variables: Declaring variables, Types of variables, Converting variables types, User-defined data types, Forcing variable declaration, Scope & lifetime of variables. Constants: Named & intrinsic. Operators: Arithmetic, Relational & Logical operators. I/O in VB: Various controls for I/O in VB, Message box, Input Box, Print statement.

UNIT – III

Programming with VB: Decisions and conditions: If statement, If-then-else, Select-case. Looping statements: Do-loops, For-next, While-wend, Exit statement. Nested control structures. Arrays: Declaring and using arrays, one-dimensional and multi-dimensional arrays, Static & dynamic arrays, Arrays of array. Collections: Adding, Removing, Counting, Returning items in a collection, Processing a collection.

UNIT – IV

Programming with VB: Procedures: General & event procedures, Subroutines, Functions, Calling procedures, Arguments- passing mechanisms, Optional arguments, Named arguments, Functions returning custom data types, Functions returning arrays. Working with forms and menus : Adding multiple forms in VB, Hiding & showing forms, Load & unload statements, creating menu, submenu, popup menus, Activate & deactivate events, Form-load event, menu designing in VB Simple programs in VB.

SUGGESTED READINGS

1. Steven Holzner, “Visual Basic 6 Programming: Black Book”, Dreamtech Press.
2. Evangelos Petroustos. “Mastering Visual Basic 6”, BPB Publications.
3. Julia Case Bradley & Anita C. Millspaugh, “Programming in Visual Basic 6.0”, Tata McGraw-Hill Edition
4. Michael Halvorson, “Step by Step Microsoft Visual Basic 6.0 Professional”, PHI
5. “Visual basic 6 Complete”, BPB Publications.
6. Scott Warner, “Teach Yourself Visual basic 6”, Tata McGraw-Hill Edition

BCA-22323: (iii)LINUX & SHELL PROGRAMMING(GE-8)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT – I

Introduction to Linux: Linux distributions, Overview of Linux operating system, Linux architecture, Features of Linux, Accessing Linux system, Starting and shutting down system, Logging in and Logging out, Comparison of Linux with other operating systems.

UNIT – II

Commands in Linux: General-Purpose commands, File oriented commands, directory oriented commands, Communication-oriented commands, process oriented commands, etc. Regular expressions & Filters in Linux: Simple filters viz. more, wc, diff, sort, uniq, grep; Introducing regular expressions.

UNIT – III

Linux file system: Linux files, inodes and structure and file system, file system components, standard file system, file system types. Processes in Linux: Starting and Stopping Processes, Initialization Processes, Mechanism of process creation, Job control in linux using at, batch, cron & time.

UNIT – IV

Shell Programming: vi editor, shell variables, I/O in shell, control structures, loops, subprograms, creating & executing shell scripts in linux.

Text Books:

1. Yashwant Kanetkar, Unix & Shell programming – BPB Publications.
2. Richard Petersen, The Complete Reference – Linux, McGraw-Hill.
3. M.G.Venkateshmurthy, Introduction to Unix & Shell Programming, Pearson Education.

BCA-22324: INFORMATION & CYBER SECURITY(C-15)

Credits:04

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT – I

Cryptography: Overview of Information Security, Basic Concepts, Cryptosystems, Cryptanalysis, Ciphers & Cipher modes, Symmetric Key Cryptography DES, AES. Asymmetric Key Cryptography, RSA algorithm, Diffie Hellman Algorithm. Digital Signature-Digital Signatures.

UNIT – III

System Security: Program Security, Malicious Logic, Protection. Database Security- Access Controls, Security & Integrity Threats, Defence Mechanisms. OS Security-Protection of System Resources.

UNIT – III

Ethics in Cyber Security: Privacy, Intellectual Property in cyberspace, Professional Ethics, Freedom of Speech, Fair User and Ethical Hacking, Trademarks, Internet Fraud, Electronic Evidence, forensic Technologies, Digital Evidence collections. Tools and Methods Used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking.

UNIT – IV

Cybercrimes and Cybersecurity: Cybercrime and Legal Landscape around the world, Cyberlaws, The Indian IT Act, Challenges, Digital Signatures and Indian IT Act, Amendments to the Indian IT Act, Cybercrime and punishment, Cost of Cybercrimes and IPR Issues, Web threats for Organizations, Social Computing and associated Challenges for Organizations.

Suggested Readings:

1. Cryptography and Network security-Principles and Practices, Pearson Education, 9th IndianReprint, 2005
2. Charlie Kaufman , Network Security : Private communication in Public World, Prentice-HallInternational, Inc. April 2008
3. Nina Godhole and Sunit Belapure, Cyber Security, Wiley India, 2011.
James Graham and Ryan Olson, Cyber Security Essentials, Rick Howard CRC Press, Taylor &Francis, 2011.

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