

# **PROGRAMME GUIDE**

**B.Sc. Information Technology  
(CBCS-SEMESTER SCHEME)**



**KARNATAKA STATE OPEN UNIVERSITY**

**Mukthagangothri, Mysuru 570 006**

## **VICE CHANCELLOR'S MESSAGE**

**Dear Learner,**

The family of KSOU welcomes you to pursue the academic programmes you have chosen to achieve not only academic excellence but also to fulfill the desire of your career. The University, established by the Act of State Legislature has created wonderful academic ambience. The programmes offered by the University have been recognized by University Grants Commission. Therefore, the degrees are valid for employment opportunities across the country. The 'core values' of the University are derived from its vision 'Higher Education to Everyone, Everywhere'. The ultimate touchstone of quality higher education is the motto of the University. Today, higher education stands at the crossroads of keeping pace with the emerging needs of the country.

The University has adopted a school concept in its functioning. The school of science headed by a Director offers academic programmes in basic and applied sciences. It combines an inter disciplinary and professional approach to pedagogy and research. The University believes that rigors of the contemporary world require competent quality human resources to create knowledge based society. The academic activities of B.Sc. programmes are initiated through well-established department/s led by the Chairperson/s. Well-qualified teaching faculty with equally dedicated non-academic team is an asset to the University, which is always, committed for the welfare of the students.

The University functions in a 3-tier system of student support service, namely Headquarters, Regional Centres and Learners Support Centres spread all over Karnataka. The learners can undergo teaching-learning process in the notified Regional Centres/Learner Support Centres. The University has adopted a mechanism to deliver Self Learning Material by print, limited audio visual and Counseling/Personal Contact Programme. As a learner, you will have greater opportunity to gain knowledge and skill through those mechanisms. The academic counselors will play a strategic role and supports you from the enrollment of the programme till you accomplish the goal. A proper blending of the knowledge and skill will be imparted so that you will be transformed as a good citizen to contribute to the development of society and the country.

The UGC in its Public Notice dated: 23.02.2018 stated that the Degree/Diploma/Certificate Programme awarded through distance mode are at par with corresponding Degree/ Diploma/ Certificate Programme obtained through conventional universities. The degrees acquired through distance education are recognized for the purpose of employment in State/Central Government, MNCs, Private Sector etc. and also for pursuing higher education in other educational institutes. Therefore, you have greater opportunity of pursuing Higher Education without any kind of fear about your career.

I am sure you will enjoy good experience with services rendered by the university through its Regional centres and Learner Support Centres, besides Headquarters. I wish you all the best in your academic endeavors.

Prof. Vidyashankar S

## MESSAGE FROM DEAN (ACADEMIC)

**Dear learner,**

As you know education imparts knowledge and skills which empowers all to build civilized society. Higher education policy which was once a priority sector is no longer maintaining the same, due to General Agreements and Trade in Services (GATS). The education policy of the government provides a greater opportunity to accelerate Gross Enrolment Ratio (GER).

Higher education is imparted both by conventional system and ODL system. The former education has inbuilt rigidity where ODL enjoy flexibility. Presently the GER in higher education around is 27%, thanks to the role played by ODL system. The ODL system operates under access, flexibility and success.

The Karnataka State Open University, which came up in 1996 under the Act of state legislation 1992 play a stupendous role in imparting quality education. As one of the premier institution in ODL system of the country, the university strive hard to empower various dis-advantaged sections of the society like, house wives, economically and culturally backward, tribal, senior citizens, working groups, differently abled, professionals, technocrat, jail inmates etc., The University cater to the needs of students ranging from the age of 18 years to 80 years.

The programmes offered by KSOU are strictly in conformity with quality and standards set by regulatory bodies UGC/AICTE etc., The Karnataka State Open University was established on 1<sup>st</sup> June 1996 vide Government Notification No. EDI/ UOV/ 95 dated 12<sup>th</sup> February 1996- KSOU Act 1992, keeping in view the educational needs of our country, in general, and the state in particular. The University has a long and rich experience in the field of Distance Education as the erstwhile Institute of Correspondence Course and Continuing Education. University Grants Commission (UGC) New-Delhi vide order No: F.No 14-5/2018 (DEB-I) Dated : 14th August 2018 for the period from 2018-19 to 2022-23. The KSOU operates on dictum quality first and students foremost. Further the university is highly committed to provide need based education to the door steps of the students.

The KSOU has students' support services which work in 3 tiers - head office; regional centres and study centres within the jurisdiction of state. The admissions, counseling and the examinations are conducted in different places, hence, education at the door steps.

The dedicated staffs in various department and state of the art student support services create a conducive environment for teaching learning. The university put in places all possible efforts to keep the learners happy from the stage of enrolment till they get employed. I am confident that, as a learner in the university, you will enjoy good experience in the system.

I wish you all the best in your academic endeavors.

Truly yours

Dean (Academic)

## **A WORD FROM CHAIRPERSON**

**Dear Learner,**

The Department of Information Technology extends a very warm welcome to you to study two years MSc Information Technology programme. The Department of Information Technology was established in the year 2011. Highly equipped faculty members in the department are dedicating themselves and creating a very conducive academic atmosphere for teaching and learning.

The Karnataka State Open University, a premier ODL institution supports highly disadvantaged group of students to study the programme by distance mode. It is needless to say that the ODL institution empower the mass whereas the conventional system target the class. The B.Sc. (Information Technology) programme is tightly scheduled and highly structured, client centered programme that aims at developing the software professionals to keep abreast of the most recent development in the field of information science for the requirements of the dynamic and highly global environment of the present era. The curriculum based on the feedback from the best programmes available in the market, aims at enriching and sharpening software developing skills.

The Department provides you the study materials both in print and audio visuals. The information and communication technology will be employed extensively to reach the unreached. The material is in the form of self learning and revolves around the learners centric. As a student you have to study MSc Information Technology in two years with the credit assigned by the UGC. The university has a state of art library. You are advised to avail the facility to enrich your knowledge. The department has made a very sincere effort to give you exhaustive study material wherever required in order to augment to advise a certain suggested reading.

Happy Learning and Best Wishes !!!

**Chairperson,**

Department of Studies in Information Technology.

## CONTENTS

<b>Sl.No.</b>	<b>Description</b>	<b>Page- No.</b>
<b>1.</b>	Department of Studies and Research in Information Technology	1
<b>2.</b>	Faculty Details	2-10
<b>3.</b>	Programme: Bachelor of Science in Information Technology	11-12
<b>4.</b>	Delivery Mechanism	12-13
<b>5.</b>	Programme Structure and Syllabus	13-42
<b>6.</b>	Evaluation System	42
	<b>Annexure -I</b> Language syllabus for first semester	43-47
	<b>Annexure –II</b> Language syllabus for second semester	48-51
	<b>Annexure –III</b> Language syllabus for third semester	51-54
	<b>Annexure –IV</b> Language syllabus for fourth semester	55-57
	<b>Annexure –V</b> Common paper syllabus	58-60
	<b>Annexure –VI</b> Open Elective syllabus for first semester	61-70
	<b>Annexure –VII</b> Open Elective syllabus for second semester	71-79
	<b>Annexure –VIII</b> Question Paper Pattern	80

# 1. DEPARTMENT OF STUDIES IN INFORMATION TECHNOLOGY

The Department of Information Technology was established in the year 2001. The department offers post graduate and diploma programmes that develops core competencies in Information Technology to meet the needs of higher education. The department is committed to bring quality in all the academic programmes. The ambition of the department is to provide the quality education and practical training and conduct the research of international standards and repute. The department has highly qualified faculty members who have rich experience in the area of Data Science, Machine Learning and Computational Intelligence. Faculty members of the department have produced more than 14 research articles in the reputed Journals and Conference proceedings. The published papers have high citation index. The department faculties regularly participates in workshops, seminars, symposiums, and faculty development programme to keep update with emerging technologies. Alumni of the department pursue their higher studies within the country as well as abroad and some of the Alumnus are successful entrepreneurs.

The Department of Information Technology comes under the ambit of **School of Sciences**. The various programmes offered by the department are as follows:

- ❖ Master of Science in Information Technology (M.Sc IT)
- ❖ Bachelor of Science in Information Technology (B.Sc IT)
- ❖ Post Graduation Certificate in Information Technology(PGCIT)
- ❖ Diploma in Information Technology (DIT)
- ❖ Under Graduation Certificate Programme in Information Communication Technology (UGCICT)

## Faculty Details

Department of Studies & Research in Information Technology						
Sl. No	Name	Designation	Qualification	Specialization	Experience	Mobile Number
1	Dr. Rashmi B.S	Assistant Professor & Chairperson	M.Sc. M.Phil. Ph.D.	Pattern Recognition	15	9880983081
2	Ms. Nandini.H.M	Assistant Professor	M.Sc.	Image Processing	12	8123745149
3	Dr. V. Umesh	Assistant Professor (Contract Basis)				

Sl. No.	Name of the Faculty	Designation	Qualification	Specialization	Experience in Years	Mobile Number
Department of Kannada						
1	Dr. A. Rangaswamy	Professor	M.A. Ph.D	Chandassu	29	9448166815
2	Dr. D. Naganna	Professor & Chairman	M.A. Ph.D	Sahitya Vimarshe	26	9738979269
3	Dr. Kavitha Rai	Professor	M.A. Ph.D	Kavya Mimamse	15	9482206129
4	Dr. T.M. Geethanjali	Associate Professor	M.A. Ph.D	Taulinika Sahitya	26	9739425639
5	Dr. N.R. Chandre Gowda	Assistant Professor	M.A. Ph.D	Janapada mattu Vimarshe	24	9449668997
6	Dr.P.Mani	Assistant Professor	M.A. Ph.D	Basha Sahitya	20	94801970799
7	Dr. Jyothishankar	Assistant Professor	M.A. Ph.D	Pracheena Sahitya	17	9448603159
Department of English						
8	Dr. Nataraju .G	Assistant Professor & Chairman	M.A. Ph.D	British Literature	12	9741219820
9	Dr. Srikanth .S	Assistant Professor	M.A. M.Phil Ph.D.	European Classics	16	9986019910
10	Dr. A.S. Madhura	Assistant Professor	M.A. M.Phil Ph.D.	Holocaust Literature	13	9980900349
11	Dr. John Peter S	Assistant Professor (Contract			-	

		Basis)				
12	Dr. Vinutha P. Kunderi	Assistant Professor (Contract Basis)			-	
<b>Department of Hindi</b>						
13	Dr.Kamble Ashok	Professor	M.A. Ph.D	Grammar	33	9449638999
14	Dr. Prabhusena D	Assistant Professor & Chairman	M.A. Ph.D	Modern Hindi Poetry, Comparative Study, Poetic Criticism	08	9945653167
15	Dr. Veena	Assistant Professor (Contract Basis)			-	
16	Dr. Chandra Shekhar R	Assistant Professor (Contract Basis)			-	
<b>Department of Sanskrit</b>						
17	Dr. Shalva Pille Iyengar	Coordinator	M.A. Ph.D	Ancient History	13	9686215043
18	Sri Ananda Simhan	Assistant Professor (Guest Faculty)			-	
<b>Department of Urdu</b>						
19	Dr. M. Ramanatham Naidu	Coordinator	M.A. Ph.D		26	9035363892
20	Dr. Mohammed Nasrullakhan	Assistant Professor (Contract Basis)			-	
21	Dr. Syeda Ishrath Fathima	Assistant Professor (Contract Basis)			-	
<b>Department of Telugu</b>						
22	Dr. M. Ramanatham Naidu	Professor & Chairman	M.A. Ph.D	Telugu	26	9035363892
23	Dr. Bodi Nagaseshu	Assistant Professor (Contract Basis)			-	
24	Dr. B. Chakravarthi	Assistant Professor			-	

		(Contract Basis)				
25	Dr. Shalva Pille Iyengar	Assistant Professor & Chairman	M.A. Ph.D	Ancient History	13	9686215043
26	Dr. Anjanamurthy	Assistant Professor (Contract Basis)			-	
27	Dr. Raviprasad S	Assistant Professor (Contract Basis)			-	

**Department of Studies and Research in Environmental Science**

28	Dr. J.S.Chandrashekar	Assistant Professor & Chairperson	M.Sc. M.Phil Ph.D.	Ecology	10	9663061978
29	Dr. T. S. Harsha	Assistant Professor	M.Sc. Ph.D.	Environmental Microbiology	14	9449178802
30	Dr. H.R. Meena Kumari	Assistant Professor (Contract Basis)				
31	Dr. Priyadarshini N.R	Assistant Professor (Contract Basis)				
32	Dr. Gireesha .J	Assistant Professor (Contract Basis)				

**Department of Political Science**

33	Dr. Shankaranaranappa	Associate Professor	M.A. Ph.D	Public administration	21	9449405353
34	Dr. N. Ananda Gowda	Assistant Professor & Chairman	M.A. Ph.D	Political Theory	11	9916007312
35	Smt. R. Ishwarya	Assistant Professor	M.A.	Western Political Thoughts	07	8971600238 / 8277473086
36	Dr. Krishnappa G Nimbakkanavar	Assistant Professor	M.A. Ph.D	International Relations	10	9738950068
37	Dr. S.S. Jahanavi	Assistant Professor	BSc LLM MPhil Ph.D	Law	20	9449806664

## **2. PROGRAMME: BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY**

Bachelor in Information Technology is an undergraduate degree course that offers learners with comprehensive educational programs in the field of information Technology producing highly accomplished postgraduates to meet the demands of the industry. Information Technology is an interdisciplinary science primarily concerned with analysis, collection, classification, manipulation, storage, retrieval, dissemination and protection of information. Bachelor in Information Technology is designed under annual scheme for three years. The syllabus of the course is divided into 6 semesters.

The B.Sc Information Technology programme will be delivered through counseling / contact classes, and also with blended audio-visual aids. The experienced faculty members from different parts of the state have been pressed into action to develop SLM and also audio-visual aids. After completing this course, the candidate will be able to handle digital commerce, software development and can achieve organizational goals objectives. Also, they can control the

maintenance of software network to handle the technological challenges. Candidates who are interested in pursuing higher education can opt for research and allied fields. Candidates can also clear NET, K-SET conducted by UGC to get into the teaching profession both in private and public colleges and universities.

In short, the programme will facilitate a variety of research and development and teaching skills that will lend a new edge and force to their own skills to handle myriads of challenges in the ever changing scenario of modern software developing field. After successful completion of this programme, the candidates can be employed as Information Systems Manager, Teaching professionals, Information Security Analyst, Technical Operations Analyst, Software developer, Quality Information Manager, Application Programmer etc., at various public and private sector organizations.

## **2.1 MISSION AND OBJECTIVES**

### **a. Mission:**

- Empower the learners with domain specific knowledge and creative thinking in information and technology revolution.
- To create wide angle exposure to the stakeholder on emerging thrust areas.
- To impart skills to learners through distance learning to promote their technological and professional growth.
- To prepare learners with research and entrepreneurship attitude having high moral and ethical values.
- The ambition of the department is to provide the quality education with practical training and conduct the research of international standards.

### **b. Objectives:**

- To provide the learners an advanced learning process that develops core competencies in information technology to meet the needs of the higher education and industry.
- To create an environment for learner to innovative thinking and self-learning employing ICT enabled services to abreast with the challenges of changing technology.
- To equip learners with the knowledge and expertise to contribute significantly to the information industry and to continue to grow professionally.
- To offer learner with comprehensive educational programs in the field of information technology producing highly accomplished postgraduates.

## **2.2 Programme outcomes:**

- Provide students with core competence in mathematics, scientific, and fundamentals to develop software applications.
- Train students with knowledge and skills in core areas of system engineering, information processing and application development.
- Inculcate students to excel in IT profession, entrepreneurship, and research with ethical standards

### **3. DELIVERY MECHANISM**

The delivery mechanism followed in this University is different from that of conventional universities. The Open University system is more learners centric, and is geared to cater to the needs of motivated students assuming that the student is an active participant in the teaching-learning process. Instruction to student is imparted through-

- \* Printed Self-Learning Material.
- \* Audio – visuals .
- \* Counselling/PCP

#### **a. SLM by Print Media**

SLM takes the role of a teacher in distance education system. The study material in English provided to you along with this programme guide are called self-learning material as it facilitates learning on your own. The study material is exhaustive and easy to understand. The SLM have been divided into blocks and units. Each block has one credit value which denote 30 hours of study for one block, be it studying, discussing with counsellors, attending classes, writing assignment and so on.

Objectives are given in the beginning of each unit which tells what is expected of you by learning that unit. Check your progress questions are given in content so that you can measure your progress while studying the material. References are given at the end of each unit, which gives you sources for furtherance of your study.

#### **b. Audio-visuals**

In an endeavor to impart education to reach the unreached, the university has a system to provide information by audio-visuals. The Department has developed various audio lectures on various topics by involving well experienced academicians. The study material will be broadcasted by FM radio and other channels. The limited visuals are also pressed into action to clarify many issues during teaching learning process.

#### **c. Counseling/ PCP**

The university delivers the instructions **in English** through counseling/PCP; counseling may be weekend, while the PCP will be conducted for a period around 10 or more days at stretch. Well experienced teachers working in the department and from other universities will deliver lectures; thereby they clear many intricacies which may occur on the SLM. The academic counselors will help you to prepare yourself not only to face the examination with confidence besides, your carrier also.

#### 4. B.Sc.IT Programme Structure and Syllabus

##### Evaluation Pattern B.Sc.IT (CBCS mode)

Sem	Course Code	Course Title	Credits	Theory Marks		Practical Marks		Total Marks	Duration of Exam
				Term end exam	Internal Assessment	Term end exam	Internal Assessment		
I	Lang-1.1	Kannada/Hindi/English/Telugu/Sanskrit/Urdu.	2	80	20	-	-	100	3
	Lang-2.1	Kannada/Hindi/English/Telugu/Sanskrit/Urdu.	2	80	20	-	-	100	3
	AECC-1	Indian Constitution and Human Rights	2	-	-	-	-	-	-
	BITDSC-1	Fundamentals of IT and Digital Electronics	6	80	20	40	10	150	3
	BITDSC-2	Problem Solving Techniques using C Programming	6	80	20	40	10	150	3
	BITGE-1	*Generic Elective-1	2	40	10	-	-	50	1½
<b>Total</b>			<b>20</b>	<b>360</b>				<b>550</b>	

**\*Note: Students have to choose any generic elective from Annexure-I**

Sem	Course Code	Course Title	Credits	Theory Marks		Practical Marks		Total Marks	Duration of Exam
				Term end exam	Internal Assessment	Term end exam	Internal Assessment		
II	Lang-1.2	Kannada/Hindi/English/Telugu/Sanskrit/Urdu.	2	80	20	-	-	100	3
	Lang-2.2	Kannada/Hindi/English/Telugu/Sanskrit/Urdu.	2	80	20	-	-	100	3
	AECC-2	Environmental Science	2	-	-	-	-	-	-

	BITDSC-3	Mathematics and Statistical Foundation of IT	6	80	20	40	10	150	3
	BITDSC-4	Data Structures and Applications	6	80	20	40	10	150	3
	BITGE-2	*Generic Elective-2	2	40	10	-	-	50	1½
	<b>Total</b>		<b>20</b>	<b>360</b>				<b>550</b>	

**\*Note: Students have to choose any generic elective from Annexure-II**

Sem	Course Code	Course Title	Credits	Theory Marks		Practical Marks		Total Marks	Duration of Exam
				Term end exam	Internal Assessment	Term end exam	Internal Assessment		
III	Lang-1.3	Kannada/Hindi/English/Telugu/Sanskrit/Urdu.	2	80	20	-	-	100	3
	Lang-2.3	Kannada/Hindi/English/Telugu/Sanskrit/Urdu.	2	80	20	-	-	100	3
	BITDSC-5	Linux Programming	6	80	20	40	10	150	3
	BITDSC-6	System Software and Operating System	6	80	20	40	10	150	3
	BITDSC-7	OOPs with JAVA	6	80	20	40	10	150	3
	BITSEC-1	R Programming	2	30	10	10	-	50	1½
	Total			24	440	110		700	

Sem	Course Code	Course Title	Credits	Theory Marks		Practical Marks		Total Marks	Duration of Exam
				Term end exam	Internal Assessment	Term end exam	Internal Assessment		
IV	Lang-1.4	Kannada/Hindi/English/Telugu/Sanskrit/Urdu.	2	80	20	-	-	100	3
	Lang-2.4	Kannada/Hindi/English/Telugu/Sanskrit/Urdu.	2	80	20	-	-	100	3
	BITDSC-8	Database Management System	6	80	20	40	10	150	3

BITDS C-9	Analysis and Design of Algorithms	6	80	20	40	10	150	3	
BITDS C-10	Computer Organization and Embedded System Programming	6	80	20	40	10	150	3	
BITSE C-2	Tableau	2	30	10	10	-	50	11-Feb	
Total		24	440	110			700		

Sem	Course Code	Course Title	Credits	Counseling/PCP Hours	Theory Marks		Practical Marks		Total Marks	Duration of Exam
					Term end exam	Internal Assessment	Term end exam	Internal Assessment		
V	BITDSC-11	Python Programming	6		80	20	40	10	150	3
	BITDSC-12	Software Engineering	6		80	20	40	10	150	3

	BITDSE-1	Cloud Computing	6	80	20	40	10	150	3
	BITDSE-2	Web Programming							
	BITDSE-3	Mobile Application Development	6	80	20	40	10	150	3
	BITDSE-4	Digital Image Processing							
	Total		24	320				600	

**Note:** Students should opt for either BITDSE-1 or BITDSE-2  
Students should opt for either BITDSE-3 or BITDSE-4

Sem	Course Code	Course Title	Credits	Counseling/PCP Hours	Theory Marks		Practical Marks		Total Marks	Duration of Exam
					Term end exam	Internal Assessment	Term end exam	Internal Assessment		
VI	BITDSC-13	Data Communication and Networks	6		80	20	40	10	150	3
	BITDSC-14	Computer Graphics	6		80	20	40	10	150	3
	BITDSE-5	Foundation of Data Science			80	20	40	10	150	3

	BITDSE-6	Big Data Analytics	6								
	BITDSC-7	Project	6		80	20	40	10	150	3	
	Total		24		320				600		

**Note:** Students should opt for either BITDSE-5 or BITDSE-6.  
BITDSC-7 is a compulsory course.

### Credit Structure

SEM	Lang-I	Lang-II	AECC -1	AECC -2	SEC-1	SEC-2	GE-1	GE-2	DSC/DSE			Total credits
									Course Nature	Theory	Practical	
I	2	2	2	-	-	-	2	-	DSC-1	4	2	20
									DSC-2	4	2	
II	2	2	-	2	-	-	-	2	DSC-3	4	2	20
									DSC-4	4	2	
III	2	2	-	-	2	-	-	-	DSC-5	4	2	24
									DSC-6	4	2	
									DSC-7	4	2	
IV	2	2	-	-	-	2	-	-	DSC-8	4	2	24
									DSC-9	4	2	
									DSC-10	4	2	
V	-	-	-	-	-	-	-	-	DSC-11	4	2	24
									DSC-12	4	2	
									DSE-1	4	2	
									DSE-2	4	2	
VI	-	-	-	-	-	-	-	-	DSC-13	4	2	24
									DSC-14	4	2	
									DSE-3	4	2	
									DSE-4	4	2	
	<b>8</b>	<b>8</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>		<b>72</b>	<b>36</b>	<b>136</b>

**AECC-** Ability Enhancement Compulsory Course;

**DSC-** Discipline Specific Core;

**DSE-**Discipline Specific Elective;

**GE-**Generic Elective/Interdisciplinary;

**SEC-** Skill Enhancement Course

**Open Elective ( Generic elective) Courses Offered for Under graduate programmes**

<b>Sl. No</b>	<b>Department</b>	<b>Semester</b>	<b>Course Code</b>	<b>Course Title</b>
1	Physics	First	BPGE-1	Physics in Daily Life
		Second	BPGE-2	Energy Sources
2	Food Science and Nutrition	First	BFSNGE-1	Culinary Food Science
		Second	BFSNGE-2	Food and Society
3	Botany	First	BBOTGE-1	Plant Tissue Culture and it's Biotechnological Application
		Second	BBOTGE-2	Plant Microbe Interaction
4	Microbiology	First	BMBGE-1	Micro biome and Human Health
		Second	BMBGE-2	Food Micro Biology
5	Library and Information Science	First	BLIGE-1	Personality Development and Soft Skills for Professionals
		Second	BLIGE-2	Electronic Sources and E-Publishing
6	Public Administrations	First	BPA-1	Introduction to Public Administration
		Second	BPA-2	Local Governments in India
7	Commerce	First	BCO-1	Fundamentals of Accountancy
		Second	BCO-2	Fundamental of Marketing
8	Computer Science	First	BCA-1	Android Programming
		Second	BCA-2	Cyber Security
9	Mathematics	First	BMM-1	Objective Mathematics -1
		Second	BMM-2	Objective Mathematics -2
10	Management	First	BMG-1	Office Management
		Second	BMG-2	Management Skills

Note :

- A. Languages, Compulsory paper and I and II Semester open elective syllabus are attached in Annexure I to Annexure V respectively.
- B. The Students may contact respective department chairperson in case of any queries regarding open elective course. The contact details available in the university website.

## **BSc Information Technology Syllabus (Tentative)**

### **BITDSC-1: Fundamentals of IT and Digital Electronics**

Block 1: Introduction to Computers: Introduction, Definition, Characteristics of computer, Evolution of Computer, Block Diagram Of a computer, Generations of Computer, Classification Of Computers, Applications of Computer, Capabilities and limitations of computer. Basic Computer Organization: Role of I/O devices in a computer system. Primary Vs Secondary Storage, Data storage & retrieval methods. Primary Storage: RAM ROM, PROM, EPROM, EEPROM. Secondary Storage: Magnetic Tapes, Magnetic Disks. Cartridge tape, hard disks, Floppy disks Optical Disks, Compact Disks, Zip Drive, Flash Drives.

Block 2: Software: Software and its needs, Types of S/W. System Software: Operating System, Utility Programs Programming Language: Machine Language, Assembly Language, High Level Language their Operating System: Functions and types of Operating System. Data Communication: Communication Process, Data Transmission speed, Communication Types (modes), Data Transmission Medias, Modem and its working, characteristics, Types of Networks, LAN Topologies, Computer Protocols, Concepts relating to networking.

Block 3 : Number System: Analog System, digital system, numbering system, binary number system, octal number system, hexadecimal number system, conversion from one number system to another, floating point numbers, weighted codes binary coded decimal, non-weighted codes Excess – 3 code, Gray code, Alphanumeric codes Binary Arithmetic: Binary addition, Binary subtraction, Negative number representation, Subtraction using 1's complement and 2's complement, Binary multiplication and division, Boolean Algebra and Logic Gates and Karnaugh Maps

Block 4: Combinational Logic Circuits: Introduction, Multi-input, multi-output Combinational circuits, Code converters design and implementations Multiplexer, De multiplexer, ALU, Encoder and Decoder: Introduction, Multiplexer, De multiplexer, Decoder, ALU, Encoders. Sequential Circuits: Flip-Flop: Introduction, Terminologies used, Counters: Introduction, Asynchronous counter, Terms related to counters, IC7493 (4-bit binary counter), Synchronous

counter, Bushing, Shift Register: Introduction, parallel and shift registers, serial shifting, serial–in serial–out, serial–in parallel–out , parallel–in parallel–out, Ring counter, Johnson counter

**Reference books:**

Digital Electronics and Logic Design Authors N. G. Palan Publisher Technova Edition Year 2014

Digital Principles and Applications by Malvino and Leach

Digital Fundamentals by Floyd

**BITDSC-2 Problem Solving Techniques using C Programming**

**Block 1: Introduction to Problem Solving**

**Unit 1-** Problem Solving concepts using C:Introduction to C language, C language standards features of C, Program Concept, Characteristics of Programming, Structure of C program, Introduction to C compilers, Creating and compiling C Programs, IDE features of Turbo C compiler, Command line options to compile C program in TC

**Unit 2-** Fundamentals of C:Keywords, Identifiers, Variables, constants, Scope and life of variables - local and global variable. Data types and sizes, C tokens, keywords and identifiers, Constants, Variables, Data types, Declaration of variables, Assigning values to variables, Defining symbolic constants

**Unit 3-** Input/Output statements: Basic input/output library functions: Single character input/output i.e.getch(), getchar(), putchar(). Formatted input/output i.e. printf() and scanf(),Library functions - concepts mathematical and character functions

**Unit 4–Operators and Expressions:** Introduction to Operators, Arithmetic operators, Relational operators, Logical operators, Assignment operators, Increment and decrement operators, Conditional operators, Bitwise operators, Special operators, Arithmetic expressions, Evaluation of expressions. Precedence of arithmetic operators, some computational problems, Type conversions in expressions, Operator precedence and Associativity, Mathematical functions.

**Block 2: Control Flow statement, Functions and Arrays**

**Unit 5 –Control Statements:** Introduction to control flow, Statements and Block, If-Else, Else-If, Nesting of If -Else Statement, Else If Ladder, The ?: Operator Switch Statement, Compound Statement, Loop Controls – For, While, Do-While Loops, Break Continue, Exit, Goto Statement and Labels

**Unit 6-** Storage Classes: Scope of variable, Global and Local variables, Automatic, external, register and static variables

**Unit 7-** Functions in C: Introduction to functions, The Need of a Function, User Defined and Library Function, Prototype of a Function, Calling of a function, Function Argument, Passing arguments to function, Return Values, Nesting of Function, main(), Command Line Argument, Recursion. Storage Class specifier – Auto, Extern, Static, Register

**Unit 8-** Arrays and its types: Basis of Arrays, One-dimensional arrays, Two-dimensional arrays, initializing two-dimensional arrays, Multidimensional arrays, Array as function arguments

### **Block 3 :Strings, Pointers and Structures**

**Unit 9-** Strings: Declaring and initializing string variables, Reading strings from terminal, Writing strings to screen, Arithmetic operations on characters, Putting strings together, Comparison of two strings, String-Handling functions

**Unit 10-** Introduction to Pointers: Declarations, The & and \* Operators, Passing pointers to a function, Operations on pointers, Pointer Arithmetic, Pointers and arrays

**Unit 11-** Pointers types: Pointer to functions, Function returning pointers. Static and dynamic memory allocation in C, DMA functions: Malloc(), Calloc(), Sizeof(), Free(), Relloc(). Bitwise operator, Preprocessor Directive

**Unit 12-** Structure and Unions: Functions Structure and Union-Defining Structure, Declaration of Structure Variable, Accessing Structure Members, Nested Structures, Array of Structures, Structure Assignment, Structure as Function Argument, Function That Return Structure, Pointer to Structures, Typedef, Unions, Bit-fields

### **References**

1. Balagurusamy E. programming in ANSI C. Tata McGraw-Hill Education; 2002..
2. Rajaraman V, ADABALA N. Fundamentals of computers. PHI Learning Pvt. Ltd.; 2014 Dec 15.
3. Wang PS. Standard C++: with Object-Oriented Programming. Brooks/Cole Publishing Co.; 2001 Jan 1.
4. Ritchie DM, Kernighan BW, Lesk ME. The C programming language. Englewood Cliffs: Prentice Hall; 1988.

## **BITDSC-3 Mathematics and Statistical Foundation of IT**

### **Block IT 1 : Linear Algebra**

**Unit 1:** Introduction, solving linear systems equations, vector spaces.

**Unit 2:** Orthogonality and GramSchmidt algorithm,

**Unit 3:** Determinants, Eigen values and Eigenvectors

**Unit 4:** linear transforms.

### **Block IT 2 : Graph Theory**

**Unit 1-** Basics, Representation, Applications of graph theory, Types of graphs, Matrix representations

**Unit 2-** Isomorphism, Connectedness, Paths, Circuits, Walks, Eulerian graphs, Hamiltonian circuits, Travelling salesman problem

**Unit 3-** Planar graphs and graph coloring

**Unit 4-** Graph Algorithms: Minimum Spanning tree algorithms, graphs, Breadth first and depth first searching algorithms.

### **Block IS 3 : Number Theory and Cryptography**

**Unit 1-** Divisibility, Prime Numbers, Division, Greatest Common Divisor

**Unit 2-** The Euclidean Algorithm, The Fundamental Theorem, Primes, Distribution of Primes

**Unit 3-** Perfect Numbers and Mersenne Primes, Congruences, Divisibility Tests, More Properties of Congruences, Residue Classes, The Chinese Remainder Theorem

**Unit 4-** Introduction, Basic Concepts, Modes of ciphers, Information Theory

### **Block IS 4 : Algebraic Structures**

**Unit 1-** Semi groups, Monoids, Groups, Properties, Examples

**Unit 2-** Subgroups, Cosets, Lagrange's theorem, Normal subgroups

**Unit 3-** Homomorphism, Isomorphism, Algebraic system with two binary operations

**Unit 4-** Group codes, Error detecting codes, Error correcting codes

### **References**

1. Tremblay JP, Manohar R. Discrete mathematical structures with applications to computer science. New York: McGraw-Hill; 1975 Jan.
2. Kolman B, Busby RC, Ross SC. Discrete mathematical structures. Prentice Hall PTR; 1999 Nov 1., PHI.
3. BL Agarwal, Basic Statistics, New Age international, 2013

## **BITDSC-4 Data Structure and Applications**

### **Block-I: Overview of Data Structures**

**Unit-1:** Introduction, concept of data type, primitive data types, non-primitive data types, classification of data structures, abstract data types.

**Unit-2:** Primitive data structures such as integer, real, character & Boolean, and their representation.

**Unit-3:** Non-primitive data structures such as arrays, their representations, operations and applications.

**Unit-4:** Linked lists, types of linked lists, operations on linked lists and their applications.

### **Block-II: Stack and Queue Data Structures**

**Unit-5:** Introduction to stacks, representation of stacks and various operations on stacks.

**Unit-6:** Applications of stacks with illustrations.

**Unit-7:** Introduction to queues, representation of queues and various operations on queues.

**Unit-8:** Types of queues, their representations, operations and applications.

**Block-III: Graph and Tree Data Structures**

**Unit-9:** Introduction to graphs, representation of graphs and various operations on graphs.

**Unit-10:** Applications of graphs with illustrations.

**Unit-11:** Introduction to trees, representation of trees and various operations on queues.

**Unit-12:** Types of trees, their representations, operations and applications.

**Block-IV: Balanced Search Trees and Tree Structures for Sets of Intervals**

**Unit-13** Introduction, Height balanced trees, Weight balanced trees, B-trees, B+ trees, representations, operations and applications.

**Unit-14:** Red-Black trees, Splay trees and Skip lists, representations, operations and applications.

**Unit-15:** Interval trees, Segment trees, Orthogonal range trees, operations and applications.

**Unit-16:** KD-trees, Quad trees and related structures with their applications.

**Reference Books**

1. Horowitz and Sahni, Fundamentals of Data Structures, W H Freeman & Co (June 1983).
2. Tenenbaum, Langsam, Augenstein, Data Structures Using C, PHI.
3. Aho, Ullman and Hopcroft, Data Structures and Algorithms, Addison Wesley (January 1983).
4. Peter Brass, Advanced Data Structures, Cambridge University Press, New York, 2008.
5. Jean-Paul, Tremblay and Sorenson, An introduction to data structures with applications, McGraw-Hill, 2<sup>nd</sup> Edition.
6. Debasis Samantha, Classic Data Structures, PHI Learning Pvt. Ltd. 2<sup>nd</sup> Edition.

**BITDSC-5 Linux Programming**

Block 1

INTRODUCTION TO LINUX AND LINUX UTILITIES: A brief history of LINUX, architecture of LINUX,

features of LINUX, introduction to vi editor.

Linux commands- PATH, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, unlink, du, df, mount, umount, find, unmask, ulimit, ps, w, finger, arp, ftp, telnet, rlogin. Text Processing utilities and backup utilities , tail, head , sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk, cpio

Block 2

Introduction to Shells: Linux Session, Standard Streams, Redirection, Pipes, Tee command, Command Execution, Command-Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Options, Shell/Environment Customization. Filters:

Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Files with Duplicate Lines, Count Characters, Words or Lines, Comparing Files.

### Block 3

Grep: Operation, grep Family, Searching for File Content. Sed :Scripts, Operation, Addresses, commands, Applications, grep and sed. UNIX FILE STRUCTURE: Introduction to UNIX file system, inode (Index Node), file descriptors, system calls and device drivers. File Management :File Structures, System Calls for File Management – create, open, close, read, write, lseek, link, symlink, unlink, stat, fstat, lstat, chmod, chown, Directory API – opendir, readdir, closedir, mkdir, rmdir, umask.

### Block 4

PROCESS AND SIGNALS: Process, process identifiers, process structure: process table, viewing processes, system processes, process scheduling, starting new processes: waiting for a process, zombie processes, orphan process, fork, vfork, exit, wait, waitpid, exec, signals functions, unreliable signals, interrupted system calls, kill, raise, alarm, pause, abort, system, sleep functions, signal sets. File locking: creating lock files, locking regions, use of read and write with locking, competing locks, other lock commands, deadlocks. INTER PROCESS COMMUNICATION: Pipe, process pipes, the pipe call, parent and child processes, and named pipes: fifos, semaphores: semget, semop, semctl, message queues: msgget, msgsnd, msgrcv, msgctl, shared memory: shmget, shmat, shmdt, shmctl, ipc status commands. INTRODUCTION TO SOCKETS: Socket, socket connections - socket attributes, socket addresses, socket, connect, bind, listen, accept, socket communications.

#### TEXT BOOKS:

1. W. Richard. Stevens (2005), Advanced Programming in the UNIX Environment, 3rd edition, Pearson Education, New Delhi, India.

1. Unix and shell Programming Behrouz A. Forouzan, Richard F. Gilberg. Thomson

#### REFERENCES:

1. Linux System Programming, Robert Love, O'Reilly, SPD.

2. Advanced Programming in the UNIX environment, 2nd Edition, W.R.Stevens, Pearson Education.

3. UNIX Network Programming, W.R. Stevens, PHI.

UNIX for Programmers and Users, 3rd Edition, Graham Glass, King Ables, Pearson Education

## **BITDSC-6 System Software and Operating System**

### Block 1: Introduction to Systems Programming

Introduction: Components of System Software, Language Processing Activities, Fundamentals of Language Processing.

Assemblers: Elements of Assembly language programming. Simple assembler scheme, Structure of an assembler, Design of single and two pass assembler. Macro Processors: Macro Definition and call, Macro expansion, Nested Macro Calls, Advanced Macro Facilities, Design of a two-pass macro-processor.

#### Block 2: Compiler, Loaders and Linkers

Compilers: Basic compilers function, Phases of compilation, memory allocation, compilation of expression, Compilation of expressions, compilation of control structures, Code of optimization.

Loaders: Loader Schemes: Compile and go, General Loader Scheme, Absolute loaders, subroutine linkages, relocating loaders, direct linking loaders, Design of an absolute loader.

Linkers: Relocation and linking concepts, Design of linker, self relocating programs, Static and dynamic linker.

#### Block 3:: Introduction to OS and Process management

Introduction to OS : Architecture, Goals & Structures of O.S, Basic functions, Interaction of O. S. & hardware architecture, System calls, Batch, multiprogramming. Multitasking, time sharing, parallel, distributed & real -time O.S. Process Management: Process Concept, Process states, Process control, Threads, Scheduling: Types of scheduling: Preemptive, Non preemptive, Scheduling algorithms: FCFS, SJF, RR.

#### Block 4: Concurrency control

Concurrency: Interprocess communication, Mutual Exclusion, Semaphores, Classical Problems of Synchronization: Readers-Writers, Producer Consumer, and Dining Philosopher problem. Deadlock: Principles of deadlock, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection.

Memory Management Basics of memory management, Swapping, Memory Allocation, Paging, Segmentation ,Virtual memory, Demand Paging, Page replacement, Page replacement algorithms – Optimal FIFO, LRU, LRU approximation, Allocation of frames

Input and Output, File System

I/O management & Disk scheduling: I/O Devices, Organization of I/O functions, Operating System Design issues, I/O Buffering, Disk Scheduling (FCFS), RAID, Disk Cache.

File Management: Concepts, File Organization, File Directories, File Sharing, Record Blocking, Allocation methods, Free Space management

#### **Text Books:**

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne: Operating System Principles, 7<sup>th</sup> edition, Wiley India, 2006.

(Listed topics only from Chapters 1 to 12, 17, 21)

#### **Reference Books:**

1 D.M Dhamdhare: Operating systems - A concept based Approach, 2<sup>nd</sup> Edition, Tata McGraw- Hill, 2002.

- 2 P.C.P. Bhatt: Operating Systems, 2<sup>nd</sup> Edition, PHI, 2006.
- 3 Harvey M Deital: Operating systems, 3<sup>rd</sup> Edition, Pearson Education, 1990.

### **BITDSC-7 OOPs with JAVA**

Block 1: Introduction to Object Programming and Basics of Java

Unit-1: Introduction, Object oriented paradigm, OOPs Concepts, Characteristics of object oriented programming, Applications of OOPs, Benefits, Object oriented languages

Unit-2 : Introduction to Java – History, Features of Java, Java and internet, JDK, Java API, General structure of java program, character set, Java tokens, Statements in java, JVM, Command line arguments

Unit-3: Data types, Constants – Types of constants, Variables, Operators in Java,

Unit-4: Control structures – Decision making statements – If statement, different forms of If statements, Switch statement, Looping statements – For, While and do statements, Nested loops and Labelled loop

Block 2 : Objects, Classes and Interface

Unit-5: Classes and Object – Defining a class, Object creation, Accessing class members, Constructors, Static members, Method overloading, Abstract methods and class, Access specifiers, Final methods and variables, Inheritance, Method overriding

Unit-6: Interface – Defining interface Extending and implementing interface

Unit-7: Array, Vectors and String – Creating and working with array, Vector class and methods, String class and methods, String buffer class and methods

Unit-8 : Packages – Introduction, API packages, Creating and accessing package, Adding and hiding classes to package

Block-3: Multithreading, Exception handling and Applets

Unit-9: Introduction to threads, Creating a thread, Thread class, Thread methods, Thread life cycle, Thread priority

Unit-10: Exception handling – Errors, Types of error, Exception – Try and catch block, Multiple catch blocks, Throwing user defined exception, Writing and executing applets, Applet life cycle, Applet tab, Adding applet to html file, Accepting user inputs

Unit-11: Graphics application – Graphic class, Drawing different geometric shapes, Drawing line and bar charts

Unit-12: Stream class – Different types of stream class, Introduction to files – Creating and working with files, Random access files

Reference Books

1. Programming with Java - E. Balagurusamy, Tata McGraw Hill, 6th Edition
2. Java – The Complete Reference - Herbert Schildt, McGraw Hill, Tenth Edition
3. Object Oriented Programming with Java – M.T. Somashekara, D.S Guru, K.S.Manjunatha, PHI, First Edition

### **BITSEC-1 R Programming**

#### Block 1:

Introduction to R: What is R? – Why R? – Advantages of R over Other Programming Languages - R Studio: R command Prompt, R script file, comments – Handling Packages in R: Installing a R Package, Few commands to get started: `installed.packages()`, `packageDescription()`, `help()`, `find.package()`, `library()` - Input and Output – Entering Data from keyboard – Printing fewer digits or more digits – Special Values functions : NA, Inf and `-inf`.

R Data Types: Vectors, Lists, Matrices, Arrays, Factors, Data Frame – R - Variables: Variable assignment, Data types of Variable, Finding Variable `ls()`, Deleting Variables – R Operators: Arithmetic Operators, Relational Operators, Logical Operator, Assignment Operators, Miscellaneous Operators - R Decision Making: if statement, if – else statement, if – else if statement, switch statement – R Loops: repeat loop, while loop, for loop – Loop control statement: break statement, next statement.

#### Block 2:

R-Function : function definition, Built in functions: `mean()`, `paste()`, `sum()`, `min()`, `max()`, `seq()`, user-defined function, calling a function, calling a function without an argument, calling a function with argument values - R-Strings – Manipulating Text in Data: `substr()`, `strsplit()`, `paste()`, `grep()`, `toupper()`, `tolower()` - R Vectors – Sequence vector, `rep` function, vector access, vector names, vector math, vector recycling, vector element sorting - R List - Creating a List, List Tags and Values, Add/Delete Element to or from a List, Size of List, Merging Lists, Converting List to Vector - R Matrices – Accessing Elements of a Matrix, Matrix Computations: Addition, subtraction, Multiplication and Division- R Arrays: Naming Columns and Rows, Accessing Array Elements, Manipulating Array Elements, Calculation Across Array Elements - R Factors –creating factors, generating factor levels `gl()`.

#### REFERENCES

1. Sandip Rakshit, R Programming for Beginners, McGraw Hill Education (India), 2017, ISBN : 978-93-5260-455-5.
2. Seema Acharya, Data Analytics using R, McGrawHill Education (India), 2018, ISBN: 978-93-5260-524-8.
3. Tutorials Point (I) simply easy learning, Online Tutorial Library (2018), R Programming, Retrieved from [https://www.tutorialspoint.com/r/r\\_tutorial.pdf](https://www.tutorialspoint.com/r/r_tutorial.pdf).
4. Andrie de Vries, Joris Meys, R for Dummies A Wiley Brand, 2nd Edition, John Wiley and Sons, Inc, 2015, ISBN: 978-1-119-05580-8

### **BITDSC-8 Database Management System**

#### **Block 1: Introduction**

### **Unit 1. Introduction to Database Systems**

Introduction , Basic Definitions and Concepts Traditional File System Versus Database Systems, DBMS Users , Database or DBMS Languages , Schemas, Subschema and Instances, Three Level Architecture of Database Systems (DBMS), Data Models, Types of Database Systems, Comparison between Client/Server and Distributed Database System

### **Unit 2. File Organization**

Introduction, Basic Concepts of Files, File Organization Techniques, Indexing, Comparison of Different File Organizations, Comparison of Different File Organizations, Factors Affecting Choice of File Organization

### **Unit 3: Data Models**

Data Modeling and Data Models, The Importance of Data Models, Data Model Basic Building Blocks, Business Rules, The Evolution of Data Models, Degrees of Data Abstraction

### **Unit 4: The Relational Database Model**

Logical View of Data, Keys, Integrity Rules, Relational Algebra, The Data Dictionary and the System Catalog, Relationships within the Relational Database, Data Redundancy Revisited, Indexes, Codd's Relational Database Rules

## **Block 2: ER Model and SQL**

### **Unit 5. E-R Models**

Introduction , Basic Concepts, Types of Attributes, Relationship Sets, Mapping Constraints, Keys, Entity—Relationship Diagram, Types of Entity Sets, Database Design Challenges: Conflicting Goals

### **Unit 6: Normalization of Database**

Database Tables and Normalization, The Need for Normalization, The Normalization Process, Improving the Design , Surrogate Key Considerations, Higher-Level Normal Forms, Normalization and Database Design, Denormalization

### **Unit 7: Introduction to Structured Query Language (SQL)**

Introduction to SQL, Basic SELECT Queries, SELECT Statement Options, FROM Clause Options, ORDER BY Clause Options, WHERE Clause Options, Aggregate Processing, Subqueries, SQL Functions, Relational Set Operators, Crafting SELECT Queries

### **Unit 8: Advanced SQL**

Data Definition Commands, Creating Table Structures, Altering Table Structures, Data Manipulation Commands, Virtual Tables: Creating a View, Sequences, Procedural SQL, Embedded SQL

## **Block 3: Database Design and control**

**Unit 9: Database Design**

The Information System, The Systems Development Life Cycle, The Database Life Cycle, Conceptual Design, DBMS Software Selection, Logical Design, Physical Design, Database Design Strategies, Centralized versus Decentralized Design

**Unit 10: Transaction Management and Concurrency Control,**

What Is a Transaction? Concurrency Control, Concurrency Control with Locking Methods, Concurrency Control with Time Stamping Methods, Concurrency Control with Optimistic Methods, ANSI Levels of Transaction Isolation, Database Recovery Management

**Unit 11: Distributed Database Management Systems (DDBMS)**

The Evolution of DDBMS, DDBMS Advantages and Disadvantages, Distributed Processing and Distributed Databases, Characteristics of DDBMS, DDBMS Components, Levels of Data and Process Distribution, Distributed Database Transparency Features

**Unit 12: Business Intelligence and Data Warehouses**

The Need for Data Analysis, Business Intelligence, Decision Support Data, The Data Warehouse, Star Schemas, Online Analytical Processing, Data Analytics, SQL Analytic Functions, Data Visualization

**Block 4: Database and internet****Unit 13: Database Connectivity and Web Technologies**

Database Connectivity, Database Internet Connectivity, Extensible Markup Language (XML)

**Unit 14. Database Security and Authorization**

Introduction, Security Violations, Authorization (Access Rights), Views, Granting of Privileges, Notion of Roles (Grouping of Users), Audit Trails

**Unit 15. Database Recovery System**

Introduction, Classification of Failures, Recovery Concept, Log based recovery, Shadow Paging

**Unit 16: Database Administration and Security**

Data as a Corporate Asset , The Need for a Database and Its Role in an Organization , Introduction of a Database: Special Considerations, The Evolution of Database Administration, The Database Environment's Human Component, Security, Database Administration Tools, Developing a Data Administration Strategy, The DBA's Role in the Cloud , The DBA at Work: Using Oracle for Database Administration

**References:**

1. Coronel, C., & Morris, S. (2016). Database systems: design, implementation, & management. Cengage Learning.
2. Gupta, S. B., & Mittal, A. (2009). Introduction to database management system. Laxmi Publications, Ltd..
3. Ramakrishnan, R., & Gehrke, J. (2000). Database management systems. McGraw-Hill.

Block 1 Basics of Algorithms and Mathematics: What is an algorithm?, Mathematics for Algorithmic Sets, Functions and Relations, Vectors and Matrices, Linear Inequalities and Linear Equations. Analysis of Algorithm: The efficient algorithm, Average, Best and worst case analysis, Amortized analysis, Asymptotic Notations, Analyzing control statement, Loop invariant and the correctness of the algorithm, Sorting Algorithms and analysis: Bubble sort, Selection sort, Insertion sort, Shell sort Heap sort, Sorting in linear time : Bucket sort, Radix sort and Counting sort 08 10

Block 2 Divide and Conquer Algorithm: Introduction, Recurrence and different methods to solve recurrence, Multiplying large Integers Problem, Problem Solving using divide and conquer algorithm - Binary Search, Max-Min problem, Sorting (Merge Sort, Quick Sort), Matrix Multiplication, Exponential. Dynamic Programming: Introduction, The Principle of Optimality, Problem Solving using Dynamic Programming – Calculating the Binomial Coefficient, Making Change Problem, Assembly Line-Scheduling, Knapsack problem, All Points Shortest path, Matrix chain multiplication, Longest Common Subsequence.

Block 3 :Greedy Algorithm General Characteristics of greedy algorithms, Problem solving using Greedy Algorithm - Activity selection problem, Elements of Greedy Strategy, Minimum Spanning trees (Kruskal's algorithm, Prim's algorithm), Graphs: Shortest paths, The Knapsack Problem, Job Scheduling Problem, Huffman code.

Block 4 Exploring Graphs: An introduction using graphs and games, Undirected Graph, Directed Graph, Traversing Graphs, Depth First Search, Breath First Search, Topological sort, Connected components, 04 10 7 Backtracking and Branch and Bound: Introduction, The Eight queens problem , Knapsack problem, Travelling Salesman problem, Minimax principle 03 5 8 String Matching: Introduction, The naive string matching algorithm, The Rabin-Karp algorithm, String Matching with finite automata, The Knuth-Morris-Pratt algorithm. 03 8 9 Introduction to NP-Completeness: The class P and NP, Polynomial reduction, NP- Completeness Problem, NP-Hard Problems. Travelling Salesman problem, Hamiltonian problem, Approximation algorithms

### **Reference Books:**

1. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, PHI.
2. Fundamental of Algorithms by Gills Brassard, Paul Bratley, PHI.
3. Introduction to Design and Analysis of Algorithms, Anany Levitin, Pearson.

## **BITDSC-10 Computer Organization and Embedded System Programming**

### **Block 1:Computer Evolution, Machine Instructions, Processor Organization, Basic Arithmetic Operations**

**Unit 1: Computer Evolution:** Brief history of Computer, Classification of Computer, Functional Units, Basic Performance Equation, and Bus Structure.

**Unit 2: Machine Instructions:** Register Transfer Notation, Assembly Language Notation, Basic Instruction Types, Instruction Execution and straight line sequencing, branching, condition codes, Addressing Modes

**Unit 3: Processor Organization:** Some Fundamental Concepts: Register Transfers, Performing an Arithmetic or Logic Operation, Fetching a word from Memory, Storing a word in memory; Execution of a complete Instruction: Branch Instructions; Multiple Bus Organization,

**Unit 4: Basic Arithmetic Operations:** Signed numbers, Binary Arithmetic, 1's and 2's Complements Arithmetic, Integer Addition and Subtraction, IEEE format Floating point representation, Booths Algorithm, Integer Division

### **Block 2:Memory Organization, I/O Organization-1, I/O Organization-2, Pipelining**

**Unit 5: Memory Organization:** Memory Locations and Addresses, Memory Operations Internal organization of Memory chips, Static Memory, Read-only Memory, Speed, Size and Cost, Memory system considerations, High Speed Memories: Cache Memory, Mapping Function

**Unit 6: I/O Organization-1:** Access of I/O devices, Interrupts, Direct Memory Access, Buses,

**Unit 7: I/O Organization-2:** I/O interfaces - Serial port, Parallel port, Standard I/O Interfaces: PCI, SCSCI, USB

**Unit 8 :Pipelining :** Defining Computer Architecture -Instruction Set Architecture, Pipelining: What Is Pipelining?, The Basics of a RISC Instruction Set, A Simple Implementation of a RISC Instruction Set, The Classic Five-Stage Pipeline for a RISC Processor, The Major Hurdle of Pipelining—Pipeline Hazards.

### **Block 3: Multicore computing**

**UNIT – 9 : Introduction to Computer Architecture,** Four decades of Computing, Flynn's taxonomy of Computer Architecture, SIMD Architecture, MIMD Architecture, Interconnection networks

**UNIT – 10 : Multiprocessors Interconnection Networks** Interconnection Networks Taxonomy Bus-Based Dynamic Interconnection Networks Switch-Based Interconnection Networks Static Interconnection Networks Analysis and Performance Metrics.

**UNIT – 11: Computational Models** An Argument for Parallel Architectures Interconnection Networks Performance Issues Scalability of Parallel Architecture

**UNIT – 12: Shared Memory Architecture** Classification of Shared Memory Systems Bus-Based Symmetric Multiprocessors Basic Cache Coherency Methods Snooping Protocols Directory Based Protocols Shared Memory Programming

#### **Text books:**

1. Computer Organization, Carl Hamacher, Zvonko Vranesic, Safwat Zaky, 5th Edition, TMH,2002

2. Computer architecture: A quantitative approach, John L. Hennessy and David. A. Patterson, 4<sup>th</sup> edition, Elsevier

**Reference books:**

1. Computer Organization & Architecture, William Stallings, 9<sup>th</sup> Edition, PHI, 2015

**BITSEC-2 Tableau**

**Block 1: Tableau for Visual Data Analytics**

Introduction to Tableau : Overview of Visual Data Analytics, Features, The Tableau Suite, Installing the Tableau Desktop, Tableau Desktop workspace

Connecting your Data : Data preparation, Connecting to Database sources, Connecting to Public data sources, Data Extract, Tableau's File types

**Block 2: Tableau for Visual Data Analytics**

Data Visualization : Chart types - Crosstabs, Maps, Heatmaps, Barcharts, Piechart, Scatter plot, Trend lines and Reference lines, Sorting Data, Enhancing views with filters, sets, groups.

Calculations with Tableau : Aggregation, Calculated dialog box, Building formulas, Table calculation functions, Parameters

**References:**

- Carlo Verzellis (2011). "Business Intelligence: Data Mining and Optimization for Decision Making". John Wiley & Sons.
- David Loshin (2012). "Business Intelligence: The Savvy Manager's Guide". Newnes.
- Elizabeth Vitt, Michael Luckevich, Stacia Misner (2010). "Business Intelligence". O'Reilly Media, Inc.
- Rajiv Sabhrwal, Irma Becerra-Fernandez (2010). "Business Intelligence".
- John Wiley & Sons. Swain Scheps (2013). "Business Intelligence for Dummies". Wiley

**Reference Books for Tableau**

1. Mastering Tableau, David Baldwin
2. Tableau your Data!, Daniel Murray, Wiley
3. Visual Analytics with Tableau, Alexander Loth

**BITDSC-11 Python Programming**

Block 1

Basics of Python: Python Installation and Working of it, get familiar with python variables and data types, Operator understanding and its usage, detail study of python blocks, Structure Types and mutability: Hands on with conditional blocks using if, else and elif, Hands on examples and

study of looping with range, list and dictionaries. hands on to organize python code with function, modular approach in python.

#### Block 2

Exception, Testing and Debugging: Handling if exceptions to handle the code cracks, handling and helping file operations, coding with the exceptional handling and testing Anonymous method, Properties, Indexers, Exception Handling

#### Block 3

Classes and OOP Concepts: Procedural and Object-Oriented Programming, Classes and working with instances, Method overloading, Polymorphism, importing internal module as well as external modules in the code Packages understanding and their usage, hands on with Lamba function in python coding with the use of functions, modules and external packages

#### Block 4

Algorithm and Data Structure: Stack, Queue, Tree, ordered list, Introduction to Recursion, Divide and Conquer Strategy, Greedy Strategy, Graph Algorithms.

References:

1. Starting Out with Python (2009) Pearson , Tonny Gaddis
2. Beginning Pyhton Wrox Publication Peter Norton, Alex Samuel
3. Python Algorithms Apress, Magnus Liet Hetland,

## **BITDSC-12 Software Engineering**

### **Block 1: Introduction**

Unit 1: Introduction to Software Engineering: The role of software engineering in system design, software products, emergence of software engineering, notable changes in software development practices, the changing nature of software, the software engineering challenges

Unit 2: Software process: Desired characteristics of software process, the software life cycle, software development process models, comparison of process models

Unit 3: Software Requirements: Requirement analysis and specification need for SRS, characteristics of SRS, organization of SRS document. Techniques for representing complex logic, functional specification with Use Cases, formal system development techniques

Unit 4: System models: Data-flow models, semantic data models, object models, data dictionaries

### **Block 2: Software Project Management**

Unit 5: Software Project Management: Main objectives of SPM, responsibility of software project managers, project planning, structure of software project management document

Unit 6: Project Estimation Techniques: Project size estimation metrics, project estimation techniques (empirical, heuristic, analytical), Halstead's software science

Unit 7: Project scheduling and staffing: work break down structure, Gantt charts, PERT charts, organization and team structures, attributes of a good software engineer

Unit 8: Risk management plan and configuration management plan: Risk management activities, Risk assessment, Risk containment, Risk leverage, Risk related to schedule slippage, Software configuration management

### **Block 3: Software Design Concepts**

Unit 9: Software design concepts: Introduction, cohesion and coupling, software design approaches, design principles, module level concepts

Unit 10: Function-oriented software design: Overview of the structured analysis and structured design methodology, data flow diagrams, extending DFD to real time systems, structure design

Unit 11: Object-oriented software design concepts: Overview, UML, object-oriented design methodology, OOD metrics and goodness criteria

Unit 12: User-interface design: Characteristics, basic concepts, command language based interface, menu-based interface, direct manipulation interfaces, windowing systems, types of widgets, overview of X window

### **Block 4: Coding and Testing, Software Reliability and Quality, Maintenance and CASE tools**

Unit13: Coding and Testing: Coding standards, guidelines, code walkthroughs, code inspections, software documentation, unit testing, black box testing, white box testing

Unit 14: Debugging: approaches and guidelines, program analysis tools, integration testing, system testing, general issues associated with testing

Unit 15: Software reliability: metrics, software reliability specification, reliability growth modeling, software quality factors, quality metrics, software quality management system

Unit 16: Software maintenance: Maintenance process, software reverse engineering, software maintenance process models, estimation of maintenance costs, maintainability measurement. CASE and its scope, CASE support in software life cycle, characteristics of CASE tools, architecture of CASE environment

### **References**

1. Sommerville I. Software Engineering. International computer science series. ed: Addison Wesley. 2004 Feb.
2. Jalote P. An integrated approach to Software Engineering. Springer Science & Business Media; 2012 Dec 6.
3. Mall R. Fundamentals of software engineering. PHI Learning Pvt. Ltd.; 2014 Apr 2.
4. Pressman RS. Software engineering: a practitioner's approach. Palgrave Macmillan; 2005.
5. Ghezzi C, Jazayeri M, Mandrioli D. Fundamentals of software engineering. Prentice Hall PTR; 2002 Mar 1.

## **BITDSE-1 Cloud Computing**

Block 1

Introduction: Cloud models-Evolution of Cloud Computing –System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture – On-demand Provisioning – Elasticity in Cloud – deployment models – service models-cloud service providers  
Virtualization: Basics of Virtualization -Types ofVirtualization – Implementation Levels of Virtualization, Virtualization Structures - Tools and Mechanisms – resource sharing and resource pooling Desktop Virtualization – Server Virtualization.

#### Block 2

Cloud Infrastructure: Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources. Programming Model: Parallel and Distributed Programming Paradigms – Map Reduce, Twister and Iterative Map Reduce – Hadoop Library from Apache – Mapping Applications - Programming Support. Security in the Cloud: Security Overview – Cloud Security Challenges – Access control mechanisms – Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Virtual Machine Security.

#### Block 3

Enterprise Cloud-Based High Performance Computing (HPC): Overview of High Performance Computing (HPC) on Cloud-Enterprises HPC applications (high-performance grid computing, high-performance big data computing/analytics, high performance reasoning)-HPC Cloud vendor solutions: compute grids (Windows HPC, Hadoop, Platform Symphony ,Gridgain), data grids (Oracle coherence,

#### Block 4

IBM Object grid, Cassandra, HBase, Memcached, HPChardware (GPGPU, SSD, Infiniband, Non-blocking switches) Setting up own Cloud:Cloud setup-How to build private cloud using open source tools – Understanding various cloud plugins-Setting up your own cloud environment-Auto provisioningCustom images-Integrating tools like Nagio-Integration of Public and Private cloud.

#### Reference Books:

1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, Distributed and Cloud Computing, From Parallel Processing to the Internet of Things, 2012, 1st Edition, Morgan Kaufmann Publishers.
2. Katarina Stanoevska-Slabeva, Thomas Wozniak, SantiRistol, Grid and Cloud Computing – A usiness Perspective on Technology and Applications, 2010, Springer.
3. John W.Rittinghouse and James F.Ransome, Cloud Computing: Implementation, Management, and Security”, 2010, CRC Press.

### **BITDSE-2 Web Programming**

#### **Block 1 : Overview**

Unit 1: Web Fundamentals: Fundamentals of Web, Internet, WWW, Web Browsers, and Web Servers; URLs

Unit 2: Web Security: MIME; HTTP; Security; The Web Programmers Toolbox

Unit 3: Evolution of HTML: XHTML, Origins and evolution of HTML and XHTML; Basic syntax; Standard XHTML document structure

Unit 4: Hypertext and Markup Languages: Basic Text markup. Images; Hypertext Links; Lists; Tables; Forms; Frames; Syntactic differences between HTML and XHTML

### **Block 2 :Sheet properties**

Unit5: Style Sheet : Introduction; Levels of style sheets; Style specification formats; Selector forms; Property value forms

Unit 6: Web Page properties and formatting: Font properties; List properties; Color; Alignment of text; The Box model; Background images

Unit 7: Tags: The <span> and <div> tags; examples

Unit 8: Conflict resolution: Conflict resolution examples

### **Block 3 : Overview of Java script**

Unit 9: Java script: Overview of Java script; Object orientation and Java script; General syntactic characteristics; Primitives, operations, and expressions

Unit 10: Fundamental of Programming: Screen output and keyboard input; Control statements; Object creation and modification; Arrays

Unit 11: Advanced JAVA Script: Functions; Constructor; Pattern matching using regular expressions; Errors in scripts; Examples

Unit 12: XML: Syntax; Document structure; Document Type definitions; Namespaces; XML schemas; Displaying raw XML documents; Displaying XML documents with CSS

### **Block 4 : PERL, CGI and Servlets**

Unit 13: Perl and CGI Programming: Perl, CGI Programming, Origins and uses of Perl; Scalars and their operations; Assignment statements and simple input and output

Unit 14: Perl and CGI Programming Language Basics: Control statements; Fundamentals of arrays; Hashes; References; Functions

Unit 15: Advanced Programming in Perl and CGI Programming: Pattern matching; File input and output; Examples. The Common Gateway Interface CGI linkage; Query string format; CGI.pm module; A survey example; Cookies

Unit 16: Servlets and Java Server Pages: Overview of Servlets; Servlet details; A survey example; Storing information on Clients; Java Server Pages

### **References**

1. Sebesta RW. Programming the world wide web. Pearson Education India; 2013.
2. Deitel HM, Deitel PJ, Nieto TR. Internet & world wide web. Prentice Hall; 2002.
3. 2Bates C. WEB PROGRAMMING: BUILDING INTERNET APPLICATIONS. John Wiley & Sons; 2007 Jun 1.
4. Bai X, Zak D, Ekedahl M, Farrell J, Gosselin D. The web warrior guide to web programming. Course Technology Ptr; 2003 Mar 1.

## **BITDSE-3 Mobile Application Development**

### **Block 1**

Mobile application development: A brief history of mobile, Mobile ecosystem, Designing for context, Developing a Mobile Strategy, Mobile Information Architecture, Mobile Design, Types of mobile application

### **Block 2**

Technologies: HTML5-elements, form, graphics, media, CSS3-2Dtransforms, 3Dtransforms, transitions, animations, images, Javascript-forms, objects, error handling, validations, JQuery-selectors, effects, traversing, Ajax

#### Block 3

Android programming: Android toolkit, Java for android, components of an Android Application. Android software development: Eclipse Concepts and Terminology, Eclipse Views and Perspectives, Eclipse and Android, Effective java for Android. Android Framework: Building a View, Fragments and Multiplatform Support, Handling and Persisting Data. Android UID principles: Designing powerful user interfaces, handling advanced user input, designing accessible applications.

#### Block 4

Drawing, Animations and Graphics programming: Developing 2D graphics applications, working with animations developing Android 3D graphics applications, using Android NDK.

#### Reference Books :

1. Zigurd Mednieks, Laird Dornin, G. Blake Meike, and Masumi Nakamura, Programming Android, 2011, 1st Edition, O'Reilly Media.
2. Jonathan Stark, Building iPhone Apps with HTML, CSS and JavaScript, 2011, 1st Edition, O'Reilly Media.
3. Brian fling, Mobile Design and Development, 2009,1st Edition, O'Reilly Media.
4. Paul Deitel, Harvey Deitel, Abbey Deitel, Michael Morgana, Android for Programmers An App-Driven Approach, 2012, 2nd Edition, Deitel Developer Series, Pearson Education.

### **BITDSE-4 Digital Image Processing**

#### Block 1

Introduction – Image Processing, Applications, Stages, Architecture of Image Processing System, Sampling and Quantization, Pixel Neighborhood and Connectivity, Distance Measures.

#### Block 2

Image Enhancement – Enhancement in the Spatial Domain, Transformation Functions, Histogram Processing – Equalization, Matching, Local Histogram Processing, Spatial Domain Filters – Smoothing and Sharpening Filters, Enhancement in the Frequency Domain - Fourier Transforms, One-D and Two-D discrete Fourier Transforms, Lowpass and Highpass Frequency Domain Filters – Ideal, Butterworth and Gaussian, Fast Fourier Transforms

#### Block 3

Image Restoration – Image Degradation and Restoration Model, Noise Properties, Noise Probability Density Junction, Noise Reduction using Spatial and Frequency Domain Filtering, Color Image Processing – Color Models, Pseudo Color Image Processing

#### Block 4

Image Morphology – Fundamentals, Erosion and Dilation, Opening and Closing, Hit-or-Miss Transformation, Basic Morphological Algorithms

Image Segmentation – Point, Line and Edge detection, Image thresholding, Region Based Segmentation – Region Growing, Merging and Splitting

Representation – Chain Code, Polygon Approximation, Boundary Descriptors – Shape Number, Regional

Descriptor

Reference Book:

1. Digital Image Processing, Rafael C Gonzalez, Richard E Woods, Pearson
2. Digital Image Processing – Anil K Jain
3. Image analysis and Pattern recognition by Earl Gose, Richard Johnsonbaugh, Steve Jost, PHI

### **BITDSC-13 Data Communication and Networks**

#### Block 1

Data Communication, Component and Basic Concepts – Introduction, Characteristics – Delivery, Accuracy, Timeliness and Jitter, Components Topology – Mesh, Star, Tree, Bus, Ring and Hybrid Topologies Transmission modes – Simplex, Half Duplex, Full Duplex Categories of networks – LAN, MAN, WAN Network Components – Signal Transmission – Analog Signaling, concept of ASK, FSK, PSK, Digital Signaling, concept of Unipolar, Polar, Return-to-Zero(RZ), Biphase,

#### Block 2

Manchester, Differential Manchester, Non-Return-to-Zero (NRZ), Bit Synchronization, Asynchronous Bit Synchronization and Synchronous Bit Synchronization, Baseband and Broadband Transmissions. Transmission Media - Guided Media – Twisted-Pair Cable, Coaxial Cable, Fiber-Optic Cable Unguided Media – Radio Wave Transmission Systems, Microwave Transmission Systems, Infrared Transmission Systems and Satellite Communication System.

#### Block 3

The OSI Model – Functions of all the Seven Layers Networking Devices – Functions and Applications of Hub, Switches, Bridges, Repeaters Internetworking Devices – Functions and Applications of Routers and Gateways IP Addressing – Dynamic IP Addressing, Static IP Addressing, Types of IP Addresses Protocols –TCP, UDP, IP, IPV4, IPV6, TCP/IP Suite, SMTP, ARP, RARP, OSPF, BGP, ALOHA

#### Block 4

Packet Switching Networks – Network Services and Internal Network Operations, Packet Network Topology, Datagrams and Virtual Circuits, Connectionless Packet Switching, Virtual

Circuit Packet Switching. Routing Concepts – Routing Tables, Dijkstra’s Shortest Path Routing Algorithm, Flooding, Distance Vector Routing, Congestion Control Algorithms-Leaky Bucket Algorithm. Data Link Issues –Single bit error and Burst Error, concepts of Redundancy, Checksum, Single Bit Error correction and Hamming Code correction method.

Reference Books:

1. Introduction to Data Communications and Networking by BehrouzForouzan.
2. Computer Networks by Andrew S Tanenbaum.
3. Networking Essentials – Third Edition – Jeffrey S. Beasley, PiyasatNilkaew

## **BITDSC-14 Computer Graphics**

### **Block 1**

Introduction – applications of computer graphics, operations of computer graphics, graphics software packages. Graphical input – output devices- graphical input devices, graphical output devices Raster and random scan devices, Scan conversion – scan conversion methods, polynomial method for line, polynomial method for circle, DDA algorithm for line, circle and ellipse, Bresenham’s algorithm for line drawing and circle. Midpoint methods for line and circle.

### **Block 2**

Scan conversion for solids- solid areas or polygons, inside-outside test – odd even method, winding number method. Solid area filling algorithms- boundary fill algorithm, scan line fill algorithm, scan line seed fill algorithm, ordered edge list algorithm. 2D geometrical transformations – basic 2d transformations- translation, rotation, scaling, homogeneous coordinate system – transformations in homogeneous notation, Other transformations – reflection about any arbitrary line, shearing, combined transformation- computational efficiency, visual reality, inverse of combines’ transformations.

### **Block 3**

3D geometrical transformations- basic 3D transformation- 3D translation, 3D scaling.3D rotation, rotation about an arbitrary axis in space, other 3D transformations- 3D reflection, reflection about any arbitrary plane, 3D shearing. Projection – introduction, parallel projection and perspective projections. Image formation inside a camera.

### **Block 4**

2D viewing and clipping- windows and viewports, viewing transformation, clipping of lines in 2D-cohensutherland clipping algorithm, midpoint subdivision method, polygon clipping – Sutherland – hogman polygon clipping. Curve design – classical techniques for designing curves and object surfaces, modern curve representations.

**REFERENCES BOOKS:**

1. Computer Graphics, Donald Hearn, M. Pauline Baker, Prentice-Hall
2. Computer Graphics, Roy A. Plastock, Gordon Kalley, Schaum’s Outlines, McGraw Hill

3. Computer Graphics : Principles and Practice in C, Andries Van Dam, F. Hughes John, James D. Foley, Steven K. Feiner, 2nd Edition, Pearson Education
4. Computer Graphics 2nd Edition (Paperback) by Steven Harrington, Tata McGraw Hill

### **BITDSE-5 Foundation of Data Science**

#### Block 1

Introduction: What is Data Science? Big Data and Data Science – Datafication – Current landscape of perspectives – Skill sets needed; Matrices – Matrices to represent relations between data, and necessary linear algebraic operations on matrices -Approximately representing matrices by decompositions (SVD and PCA); Statistics: Descriptive Statistics: distributions and probability – Statistical Inference: Populations and samples – Statistical modeling – probability distributions – fitting a model – Hypothesis Testing – Intro to R/ Python.

#### Block 2

Data preprocessing: Data cleaning – data integration – Data Reduction Data Transformation and Data Discretization.Evaluation of classification methods – Confusion matrix, Students T-tests and ROC curves-Exploratory Data Analysis – Basic tools (plots, graphs and summary statistics) of EDA, Philosophy of EDA – The Data Science Process.

#### Block 3

Basic Machine Learning Algorithms: Association Rule mining – Linear Regression- Logistic Regression – Classifiers – k-Nearest Neighbors (k-NN), k-means -Decision tree – Naive Bayes- Ensemble Methods – Random Forest. Feature Generation and Feature Selection – Feature Selection algorithms – Filters; Wrappers; Decision Trees; Random Forests.

#### Block 4

Clustering: Choosing distance metrics – Different clustering approaches – hierarchical agglomerative clustering, k-means (Lloyd’s algorithm), – DBSCAN – Relative merits of each method – clustering tendency and quality. Data Visualization: Basic principles, ideas and tools for data visualization.

#### Text Books

Cathy O’Neil and Rachel Schutt, “ Doing Data Science, Straight Talk From The Frontline”, O’Reilly, 2014.

Jiawei Han, Micheline Kamber and Jian Pei, “ Data Mining: Concepts and Techniques”, Third Edition. ISBN 0123814790, 2011.

Mohammed J. Zaki and Wagner Miera Jr, “Data Mining and Analysis: Fundamental Concepts and Algorithms”, Cambridge University Press, 2014.

#### References

Matt Harrison, “Learning the Pandas Library: Python Tools for Data Munging, Analysis, and Visualization , O’Reilly, 2016.

Joel Grus, “Data Science from Scratch: First Principles with Python”, O’Reilly Media, 2015.

Wes McKinney, “Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython”, O’Reilly Media, 2012.

‘Foundations of Data Science’ is a Soft Core course offered for the M. Tech. in Computer Science and Engineering program at School of Engineering, Amrita Vishwa Vidyapeetham.

### **BITDSE-6 Big Data Analytics**

#### Block 1

Introduction to Big Data Analytics: Big Data Overview, State of practice in analytics, Role of Data Scientists, Examples of Big Data Analytics, Data Analytics Lifecycle, Components of Hadoop, Analyzing Big data with Hadoop, Design of HDFS, Developing a Map reduce Application.

#### Block 2

Map Reduce: Distributed File System(DFS), Map Reduce, Algorithms using Map Reduce, Communication cost Model, Graph Model for Map Reduce Problem.

#### Block 3

Hadoop Environment: Setting up a Hadoop Cluster, Hadoop Configuration, Security in Hadoop, Administering Hadoop, Hadoop Benchmarks, Hadoop in the cloud. Big Data Analytics Methods using R: Introduction to R-Attributes, R Graphical user interfaces, Data import and export, attribute and Data Types, Descriptive Statistics, Exploratory Data Analysis.

#### Block 4

Statistical methods for evaluation: Hypothesis Testing, Difference of Means, Wilcoxon Rank-Sum Test, Type I and Type II errors, power and sample size, ANOVA. Advanced Analytics - technologies and tools: Analytics for unstructured data, The Hadoop ecosystem – pig –Hive-HBase- Mahout- NoSQL.

#### Reference Books:

- Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data by EMC Education Services, 2015, publishing.
- Anand Raja Raman and Jeffrey David Ullman, Mining of Massive Datasets, 2012, Cambridge University Press.
- Tom White, Hadoop: The Definitive Guide, 3rd Edition, O’Reilly Media

### **5. EVALUATION SYSTEM**

Students of MSc. Information Technology are assessed by both internal assessment and term end examination. The weightage given are 20 and 80 percent respectively. The internal assessment covers:

- Class test
- Student seminars
- Project works, dissertation, and viva-voce component
- MCQ's Google forms

The assignment questions will be uploaded in the university website. The term end examination will be conducted to assess the knowledge, skill and attitude of the student on the curriculum.

**Annexure I**

### **Languages :-**

**Students can opt any two of the following languages**

1. Kannada
2. English
3. Hindi
4. Urdu
5. Telugu

## 6. Sanskrit

### I Semester Languages

#### ಕನ್ನಡ (ಭಾಷಿಕ)

##### ಬ್ಲಾಕ್-1

- ಘಟಕ - ೧ ಹುತ್ತರಿಯ ಹಾಡು - ಪಂಜೆ ಮಂಗೇಶರಾವ್  
ದುಃಖಸೇತು - ಬಿ.ಎಂ.ಶ್ರೀ  
ನೀ ಹೀಂಗ ನೋಡಬ್ಯಾಡ ನನ್ನ - ದ.ರಾ. ಬೇಂದ್ರೆ  
ಶ್ರೀ ಸಾಮಾನ್ಯರ ದೀಕ್ಷಾಗೀತೆ - ಕುವೆಂಪು
- ಘಟಕ - ೨ ಕಣಿವೆಯ ಮುದುಕ - ಪುತಿನ  
ತುಂಗಭದ್ರೆ - ಕೆ.ಎಸ್.ನರಸಿಂಹಸ್ವಾಮಿ  
ವರ್ಧಮಾನ - ಎಂ. ಗೋಪಾಲಕೃಷ್ಣ ಅಡಿಗ ;  
ದಾಸಿಮಯ್ಯ ಮತ್ತು ಬೆಕ್ಕು - ಸು.ರಂ. ಎಕ್ಕುಂಡಿ
- ಘಟಕ - ೩ ಪುರುಷ ಸೂಕ್ತ - ಜಿ.ಎಸ್. ಶಿವರುದ್ರಪ್ಪ  
ಕಾಲ ನಿಲ್ಲುವುದಿಲ್ಲ - ಚೆನ್ನವೀರ ಕಣವಿ  
ಗಂಗಾಮಾಯಿ - ಚಂದ್ರಶೇಖರ ಕಂಬಾರ  
ಬದಲಾದ ಇತಿಹಾಸ - ಡಾ. ರಾಮೇಗೌಡ
- ಘಟಕ - ೪ ನನ್ನ ಜನಗಳು - ಡಾ. ಸಿದ್ದಲಿಂಗಯ್ಯ  
ಜಾಜಿ ಮಲ್ಲಿಗೆ - ಡಾ. ಸತ್ಯಾನಂದ ಪಾತ್ರೋಟಿ  
ರಂಗೋಲಿ ಮತ್ತು ಹುಡುಗ - ಡಾ. ನಿಸಾರ್ ಅಹಮದ್  
ರಾಣಿ ತಿಮ್ಮಿಯ ಸಿಂಹಾಸನ - ವಿಜಯದಬ್ಬೆ

##### ಬ್ಲಾಕ್-2

- ಘಟಕ - ೫ ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ
- ಘಟಕ - ೬ ಪತ್ರ ವ್ಯವಹಾರ : ಸ್ವರೂಪ, ಲಕ್ಷಣ
- ಘಟಕ - ೭ ಅರ್ಜಿ ನಮೂನೆಗಳು, ಹುದ್ದೆಗಳ ಜಾಹೀರಾತು, ಅಭ್ಯರ್ಥನ ಪತ್ರ, ನೇಮಕಾದೇಶ ಮತ್ತು ಹಾಜರಾತಿ ವರದಿ, ಲೇಖನ ಚಿಹ್ನೆಗಳು
- ಘಟಕ - ೮ ಕಂಪ್ಯೂಟರ್ ಮತ್ತು ಕನ್ನಡ ಲೋಕ

### COURSE-I/II ENGLISH

#### BBAEC-101/102 POETRY, PROSE AND LANGUAGE COMPONENT

#### OBJECTIVES

- To familiarize students with artistic and moral imagination through poetry
- To instil in the students a sense of compassionate aesthetics that promotes social conscience through literature

- To have a general idea of the ways in which the forms of poetry evolved in the hands of great poets
- To define prose as a form of literature
- To provide expertise in language and communication skills through English Grammar

### **BLOCK- I: POETRY**

**William Shakespeare:** Not Marble nor the Gilded Monuments

Let me not to the Marriage of True Minds

**Thomas Gray:** Selections from Gray’s Elegy

**William Wordsworth:** The Daffodils. Upon Westminster Bridge

**Alfred Tennyson:** Ulysses

### **BLOCK –II: PROSE**

**Francis Bacon:** Of Studies, **Joseph Addison:** Ladies’ Head-Dress

**O’ Henry:** Witches’ Loaves, **Guy de Maupassant:** The Necklace

**Nathaniel Hawthorne:** Dr. Heidegger’s Experiment

### **BLOCK- III: LANGUAGE COMPONENT**

Expansion of an Idea; Antonyms and Synonyms; Comprehension; Use of Idioms

### **Suggested Reading:**

- **Boris Ford.** *Pelican Guide to English Literature.* Penguin Books.1956.
- **George Samson.** *A Concise Cambridge History of English Literature.* Cambridge University Press.1970.
- **Hugh Walker.** *The English Essays and Essayists.* J.M. Dent & Sons, Limited,
- **A.J. Thomson & A.V Martinet.** *A Practical English Grammar.* Oxford University Press, 1986.
- **F.T .Wood.** *A Remedial English Grammar for Foreign Students.* Trinity Press. 2014
- **Wren and Martin.** *English Grammar &Composition.* Blackie. 2015.

## **HINDI**

SL.NO	Course	Title	Present SLM Position	Unit and Block
01.	I semester	<b>Snatak Kavya Sangrah</b> 1) Kavita ka vikas	I B.A/B.Com	Block-I

		2) Kabirdas 3) Soordas 4) Meerabai 5) Tulsidas 6) Bihari 7) Rahim 8) Ram Naresh Tripathi 9) Ayodhya singh upadhya ‘Harioudh’ 10) Maithili Sharan gupt 11) Jayshankar Prasad 12) Makhanlal Chaturvedi 13) Balkrishna sharma ‘Naveen’ 14) Subhadrakumari chouhan 15) Harivamshrai Bachhan 16) Sachhidanand Heeranand Vatsyayan Agney 17) Naresh Mehta	(L) Hindi	Unit: 1 to 4
02.	I semester	<b>Hindi Vyakaran aur  anuvaaad</b> 1) Varnamala 2) Uchharan, Vargeekaran 3) Shabdh-bedh 4) Sangya, roopantar, Ling, Vachan, Karak 5) Sarvanam tatha uske bhed 6) Visheshan tatha uske bhed 7) Sandhi 8) Anuvaaad	I B.A/B.Com (L) Hindi	Block-II Unit: 5 to 8

## URDU

Poetry, Prose, Novel, & Grammar

Block 1 (Unit 1 to 4) Block 2 (Unit 5 to 8)

### Part -- Poetry

#### Unit - 1

- a. Hamd
- b. Nath
- c. Munajath
- d. Nazmein

**Unit - 2**

- a. Allama Iqbal(Nazmien)
- b. Mirza Ghalib

**Unit -3-Ghazliyath**

- a. Meer Taqi Meer
- b. Mirza Ghalib

**Unit 4-Ghazliyath**

- c. Bahadur Shah Zafar
- d. Mohammed Ali Jowhar

**Prose Part**

**Unit- 5**

- a. Khaka Masood Marhoom Ki Zinda Dili Syed Aabid Hussain
- b. Khaka Yaldrum Ki Yaad Mein, Rasheed Ahmed Siddiqui

**Unit -6**

- a. Mazmoon
- b. Khaka

**Unit- 7**

- a. Tanz-O-Mizah
- b. Afasana

**Unit- 8**

- a. Drama Naql-e-Makani

**SANSKRIT ( B .Sc )**

Course code : SANDSC-1A Core

Credit – 04

**Modern Poetry and Prose**

<b>Block I Poetry</b> Unit I. Subhashitaani Unit II. Dileepasya Rajyaabhaaravarnam
<b>Block II Prose</b> Unit III. Snaatakopadeshaha Unit IV. Mahaaswethavruttanthaha
<b>Block III Modern Poetry</b> Unit V. Veerottejanam Unit VI. Shivadhanurbhangaha
<b>Block IV Grammer</b> Unit VII. Akshara Prakaranam

**Annexure II**

## **II Semester Languages**

## ಕನ್ನಡ (ಭಾಷಿಕ)

ಬ್ಲಾಕ್ -3 : ನಾಟಕ (ಸವಿಸ್ತರ ಪಠ್ಯ)

- ಘಟಕ - ೧ : ಹರಿಜನ್ವಾರ : ಶ್ರೀರಂಗ : ಕರ್ತೃ ಪರಿಚಯ, ವಸ್ತು, ವಿಶ್ಲೇಷಣೆ, ಪಾತ್ರ ಚಿತ್ರಣ ಹಾಗೂ ಭಾಷೆ ಮತ್ತು ತಂತ್ರ, ಸಾರಾಂಶ.
- ಘಟಕ - ೨ : ತೆರೆಗಳು : ಪಿ. ಲಂಕೇಶ ; ಕರ್ತೃ ಪರಿಚಯ, ವಸ್ತು, ವಿಶ್ಲೇಷಣೆ, ಪಾತ್ರ ಚಿತ್ರಣ ಹಾಗೂ ಭಾಷೆ ಮತ್ತು ತಂತ್ರ, ಸಾರಾಂಶ.
- ಘಟಕ - ೩ : ಟಿಂಗರ ಬುಡ್ಡಣ್ಣ : ಚಂಪಾ : ಕರ್ತೃ ಪರಿಚಯ, ವಸ್ತು, ವಿಶ್ಲೇಷಣೆ, ಪಾತ್ರ ಚಿತ್ರಣ ಹಾಗೂ ಭಾಷೆ ಮತ್ತು ತಂತ್ರ, ಸಾರಾಂಶ.
- ಘಟಕ - ೪ : ಮನೆ : ಚಂದ್ರಕಾಂತ ಕುಸನೂರ : ಕರ್ತೃ ಪರಿಚಯ, ವಸ್ತು, ವಿಶ್ಲೇಷಣೆ, ಪಾತ್ರ ಚಿತ್ರಣ ಹಾಗೂ ಭಾಷೆ ಮತ್ತು ತಂತ್ರ, ಸಾರಾಂಶ.

ಬ್ಲಾಕ್-4 : ಪ್ರಬಂಧ (ಅವಿಸ್ತರ ಪಠ್ಯ)

- ಘಟಕ - ೧ : ಅ. ಮೈಸೂರ ರುಮಾಲು : ವಿ. ಸೀತಾರಾಮವಯ್ಯ : ಕರ್ತೃ ಪರಿಚಯ, ಪ್ರಬಂಧ ವಿಶ್ಲೇಷಣೆ, ಪಾತ್ರ ಪರಿಚಯ, ಭಾಷೆ, ಆಶಯ, ಸಾರಾಂಶ.  
ಆ. ದಿವಾನಖಾನೆಯ ಅಂದಚೆಂದ : ಎ.ಎನ್. ಮೂರ್ತಿರಾವ್ : ಕರ್ತೃ ಪರಿಚಯ, ಪ್ರಬಂಧ ವಿಶ್ಲೇಷಣೆ, ಪಾತ್ರ ಪರಿಚಯ, ಭಾಷೆ, ಆಶಯ, ಸಾರಾಂಶ.
- ಘಟಕ - ೨ : ಅ. ನಿದ್ರಾಭ್ಯಾಸ : ರಾಕು : ಕರ್ತೃ ಪರಿಚಯ, ಪ್ರಬಂಧ ವಿಶ್ಲೇಷಣೆ, ಪಾತ್ರ ಪರಿಚಯ, ಭಾಷೆ, ಆಶಯ, ಸಾರಾಂಶ.  
ಆ. ವಿರಾಟ್‌ಪರ್ವದ ಸ್ವಾರಸ್ಯ : ಎನ್. ಪ್ರಹ್ಲಾದರಾವ್ : ಕರ್ತೃ ಪರಿಚಯ, ಪ್ರಬಂಧ ವಿಶ್ಲೇಷಣೆ, ಪಾತ್ರ ಪರಿಚಯ, ಭಾಷೆ, ಆಶಯ, ಸಾರಾಂಶ.
- ಘಟಕ - ೩ : ಅ. ನಮ್ಮ ಮನೆಯ ದೀಪ : ಹಾ.ಮಾ. ನಾಯಕ್ : ಕರ್ತೃ ಪರಿಚಯ, ಪ್ರಬಂಧ ವಿಶ್ಲೇಷಣೆ, ಪಾತ್ರ ಪರಿಚಯ, ಭಾಷೆ, ಆಶಯ, ಸಾರಾಂಶ.  
ಆ. ನನ್ನ ಟೋಪಿ : ಬಿ.ಜಿ.ಎಲ್. ಸ್ವಾಮಿ : ಕರ್ತೃ ಪರಿಚಯ, ಪ್ರಬಂಧ ವಿಶ್ಲೇಷಣೆ, ಪಾತ್ರ ಪರಿಚಯ, ಭಾಷೆ, ಆಶಯ, ಸಾರಾಂಶ.
- ಘಟಕ - ೪ : ಅ. ರುಚಿ : ಸುನಂದಾ ಬೆಳಗಾಂವ್‌ಕರ್ ಕರ್ತೃ ಪರಿಚಯ, ಪ್ರಬಂಧ ವಿಶ್ಲೇಷಣೆ, ಪಾತ್ರ ಪರಿಚಯ, ಭಾಷೆ, ಆಶಯ, ಸಾರಾಂಶ  
ಆ. ಸುಲಭದಲ್ಲಿ ಸಜ್ಜನಲಾಗಲಾರಿ : ಭುವನೇಶ್ವರಿ ಹೆಗಡೆ : ಕರ್ತೃ ಪರಿಚಯ, ಪ್ರಬಂಧ ವಿಶ್ಲೇಷಣೆ, ಪಾತ್ರ ಪರಿಚಯ, ಭಾಷೆ, ಆಶಯ, ಸಾರಾಂಶ.

## COURSE-I/II ENGLISH

BBAEC-201/202

POETRY, NOVEL AND LANGUAGE COMPONENT

## OBJECTIVES

- To familiarize the students with representative texts of the period
- To have a general idea of the ways in which the forms of poetry evolved in the hands of great poets
- To comprehend the unique quality of the novel prescribed
- To evolve different ways of testing language proficiency through English Grammar

## BLOCK- I: POETRY

**W.B. Yeats:** The Second Coming

**Robert Frost:** Mending Wall, Stopping by Woods on a Snowy Evening

**W.H. Auden:** The Unknown Citizen

**Nissim Ezekiel:** Night of the Scorpion

**Ravichandra P.Chittampalli:** Banalities

## BLOCK –II: NOVEL

**Jane Austen:** *Pride and Prejudice*

## BLOCK- III: LANGUAGE COMPONENT

Forms of the Verb, Prepositions, Active and Passive Voice, Precis writing

## Suggested Reading:

- **Allot, Mariam.** *The Complete Poems.* Longman, 1975.
- **Daiches, David.** *A Critical History of English Literature.* Supernova. 2011.
- **Rickett, A. Compton.** *A History of English Literature.* Filiquarian Legacy.2012.
- **K.R.Srinivas, Iyengar.** *Indian Writing in English.* Macmillan, 1979.
- **M.K.Naik.** *Critical Essays on Indian Writing in English.* Sahitya Akademi.1969.
- **F.T .Wood.** *A Remedial English Grammar for Foreign Students.* Trinity Press. 2014
- **Wren and Martin.** *English Grammar &Composition.* Blackie. 2015.

## **LANGUAGE: HINDI**

03.	II semester	<b>Pratinidhi Kahaniyan</b> 1) Poos ki raat- Premchand 2) Shiksha aur apni bhasha- Mahatma Gandhi 3) Madhuva- Jayashankar Prasad 4) Bittho- mahadevi verma 5) Mahadan- Yashpal 6) Vasanth aagaya hai- Acharya hazariprasad dwiwedi 7) Mai nahi marna chahta hoon- Vishnu	I B.A/B.Com (L) Hindi	Block-III Unit: 9 to 12
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		Prabhakar 8) Chief ki dawat- Bheeshm sahani 9) Tarch bechnewala- Harishankar parsai 10) Haar- Mannu Bhandari 11) Samudragupt parakramank- Ramkumar verma		
04.	II semester	<b>Hindi Gadya Bharathi</b> 1) Shatranj ke Khiladi- Munshi Premchand 2) Aakashdeep- Jayashankar Prasad 3) Padhai- Jainendrakumar 4) Aadmi ka bacha- Schhidanand Heeranand Vatsyayan ' agney' 5) Master sahib- Chandragupt Vidyalankar 6) Goonge- Ranghey raghav 7) Genius- Mohan Rakesh 8) Bholaram ka jeev- Harishankar parisai 9) Hindi Kahani ka udbhav aur vikas	I B.A/B.Com (L) Hindi	Block-IV Unit: 13 to 16

## Urdu

### Poetry, Prose, Novel, & Grammar

**Unit -9**

- a. Urdu Novel Ka Irteqa
- b. Urdu Novel ke Ajzaye Tarkeebi

**Unit -10**

Premchand Shakhshiath Aur fun

**Unit -11**

Prem Chand ke Novelun Mein Nirmala ka Muqam  
Novel Nirmala ka tanqeedi Jayeza .

**Unit -12**

Premchand ki Kirdar Nigari  
(Novel Nirmala ke Hawale se)

**Book Urdu Qawaid (Grammar) Maulvi Abdul Huq****Unit 13**

Urdu Qawaid (Grammar) Maulvi Abdul Huq

- a. Urdu Qawaid ek taarof
- b. Ism ki tareef aur iske Aqam

**Unit -14** -Sifath ki Tareef Aur iske Aqam

**Unit-15** -Zameer ki Tareef aur iski Qismein

**Unit- 16-**

- a. Fail ki tareef aur iski Qismein
- b. Huroof ki Tareef Aur iski qismein

**SANSKRIT**

Course code : SANDSC-BA Core

Credit – 04

<b>Modern Poetry and Prose</b>
<b>Block I Poetry</b>
Unit I. Upadesha Shathakam
Unit II. Gumaanikavi Virachitam
<b>Block II Prose</b>
Unit III. Veeravarasya Swaminishta
Unit IV. Vidhya Samuddheshaha
<b>Block III Modern Poetry</b>
Unit V. Mysooru Nagaravarnanam
Unit VI. Baalasaahithyam
<b>Block IV Grammer</b>
Unit VII. Sandhi Prakaranam

**Annexure III**

**III SEMESTER**

## COURSE I/II KANNADA

### ಮೂರನೇ ಸೆಮಿಸ್ಟರ್

- ಬ್ಲಾಕ್- 5 : ಪ್ರಾಚೀನ ಕನ್ನಡ ಕಾವ್ಯ (ಸವಿಸ್ತರ ಪಠ್ಯ)
- ಘಟಕ - 1 : (ಅ) ಕೃಷ್ಣ ಸಂಧಾನ (ವಿಕ್ರಮಾರ್ಜುನ ವಿಜಯಂ) -ಪಂಪ  
(ಆ) ದುರ್ಯೋಧನ ವಿಲಾಪ (ಸಾಹಸ ಭೀಮ ವಿಜಯಂ) -ರನ್ನ
- ಘಟಕ - 2 : (ಅ) ಅಮೃತಮತಿ ಪ್ರಸಂಗ (ಯಶೋಧರ ಚರಿತೆ) -ಜನ್ನ  
(ಆ) ಸಾಮಾಜಿಕ ವಚನಗಳು - ಬಸವಣ್ಣ, ಅಕ್ಕಮಹಾದೇವಿ
- ಘಟಕ - 3 : (ಅ) ಅಭಿಮನ್ಯು ಪ್ರಸಂಗ (ಕರ್ನಾಟ ಭಾರತ ಕಥಾಮಂಜರಿ) -ಕುಮಾರವ್ಯಾಸ  
(ಆ) ಪ್ರಭುದೇವರ ರಗಳೆ -ಹರಿಹರ
- ಘಟಕ - 4 : (ಅ) ಭರತ-ಬಾಹುಬಲಿ ಪ್ರಸಂಗ (ಭರತೇಶ ವೈಭವ) -ರತ್ನಾಕರವರ್ಣಿ  
(ಆ) ಧರೆಗೊಬ್ಬ ದಾನಶೂರ ಕರ್ಣನೆಂದಾದ ಪರ್ವ - (ಜನಪದ ಮಹಾಭಾರತ)

### ಬ್ಲಾಕ್- 6 : ಗದ್ಯ ಸಂಪದ (ಅವಿಸ್ತರ ಪಠ್ಯ)

- ಘಟಕ - 1 : (ಅ) ಕರ್ನಾಟಕ ವೈಭವ ವರ್ಣನೆ : -ಆಲೂರು ವೆಂಕಟರಾವ್  
(ಆ) ಬಾಳ್ವೆ ಸ್ವೀಕಾರಕ್ಕಿದೆ, ನಿರಾಕರಣೆಗಲ್ಲ : -ಶಿವರಾಮ ಕಾರಂತ
- ಘಟಕ - 2 : (ಅ) ಶ್ರೇಷ್ಠತೆಯ ವ್ಯಸನ : -ಕೆ. ವಿ. ಸುಬ್ಬಣ್ಣ  
(ಆ) ವೈಚಾರಿಕ ಪ್ರಜ್ಞೆಗೆ ಅಡೆತಡೆಗಳು : -ಎಚ್. ನರಸಿಂಹಯ್ಯ
- ಘಟಕ - 3 : (ಅ) ಗಿರಣಿಯ ವಿಸ್ತಾರ ನೋಡಯ್ಯಾ : -ಡಿ.ಆರ್.ನಾಗರಾಜ್  
(ಆ) ರಾಷ್ಟ್ರೀಯತೆ : ಒಂದು ಮರುಚಿಂತನೆ -ಕೆ.ವಿ. ತಿರುಮಲೇಶ್
- ಘಟಕ - 4 : (ಅ) ಮಹಿಳಾ ರಾಜಕೀಯ ಮೀಸಲಾತಿ : -ಡಾ. ಹೇಮಲತಾ ಮಹಿಷಿ  
(ಆ) ಹಸಿವು ಮತ್ತು ಸಂತ್ಯಾಪ್ತಿ : -ಡಾ. ಬಿ.ಎ. ವಿವೇಕ ರೈ

## COURSE-I/II ENGLISH

### BBAEC 301/302 ENGLISH FOR COMMERCIAL PURPOSES AND DRAMA

## **OBJECTIVES**

- To gain the knowledge of principles of commercial correspondence and business letters
- To provide expertise in language and communication skills
- To enhance the student's ability to understand the dynamics of social interaction
- To evolve different ways of testing language proficiency through English Grammar

## **BLOCK-I: ENGLISH FOR COMMERCIAL PURPOSES -I**

Face to Face Interaction: Spoken English

Distance Communication: Written English

English for Commercial Correspondence (Form of a Business Letter, Purchase and Sales Letter

Letter of Complaints, Claims and Cancellations

## **BLOCK-II: DRAMA**

**William Shakespeare:** *Julius Caesar*

## **BLOCK-III: LANGUAGE COMPONENT**

Essay writing; Precis writing; Resume writing with letter of application for a job

## **Suggested Reading:**

- **Mccomas.** *Modern Business Correspondence.* McGraw Hill Post.1992.
- **F.W.King &D.A.Cree.** *Modern English Business Letters.* Longman, 1977.
- **A.N.Kapoor.** *A Guide to Business Correspondence and Communication Skills.*S.Chand.Ltd 2010.
- **A.J. Thomson & A.V Martinet.** *A Practical English Grammar.* Oxford University Press, 1986.
- **F.T .Wood.** *A Remedial English Grammar for Foreign Students.* Trinity Press.2014.
- **Wren and Martin.** *English Grammar &Composition.* Blackie.2015.
- **Wilson Knight. G.** *The Crown of Life. The Wheel of Life.* Methuen& Co LTD, 1947

Urdu

**Block 1 Units (1-4) Block 2 (5 to 8)**

Book Hamare Pasandeeda Afsane, Ather Parveez

**Unit-1**

- 1 –Urdu Afsana Nigari ka irteqa
- 2-Afsane ke ajzaye tarkeebi
- 3-Muktasar Afsane ki Kususiyaath

**Unit-2**

- 1-Afsana Amavas ki Raat, Premchand

Course

**Unit -3**

- 1-Afsana Melaghomni, Ali Abbas Hussaini

**Unit-4**

- 1-Afsana Aazmaish, Sudarshan

**Unit-5** Afsana Kanwal, Azam Karevi**Unit-6**-Afsana Naya Khanon, Sadath Hassan Mantoo**Unit-7** –Afsana Kalubhangi, Krishan Chandr**Unit-8**-Afsana Siya o Safed, Ghulam Abbas**SANSKRIT**

Course code : SANDSC-1C Core

Credit - 04

<b>Modern Poetry and Prose</b>
<b>Block I Drama</b> Unit I. Introduction Unit II. Introduction to Pratimanaatakam Unit III. Pratimanaatakam Act I & II Unit IV. Pratimanaatakam Act III & IV
<b>Block II Champu</b> Unit V. Ayodhyakandam Unit VI. Kaikeyi Varayachanam
<b>Block III Non-Detailed Text</b> Unit VII. Story of Jimutavahana Part I
<b>Block IV Language Component</b> Unit VIII. Active and Passive voice

**Annexure IV**

**COURSE I/II KANNADA**

## ನಾಲ್ಕನೇ ಸೆಮಿಸ್ಟರ್

ಬ್ಲಾಕ್ -7: ಸಣ್ಣ ಕತೆಗಳು (ಸವಿಸ್ತರ ಪಠ್ಯ)

ಘಟಕ - 5 : ಅ) ವೆಂಕಟಶಾಮಿಯ ಪ್ರಣಯ - ಮಾಸ್ತಿ  
ಆ) ಧನ್ವಂತರಿಯ ಚಿಕಿತ್ಸೆ - ಕುವೆಂಪು

ಘಟಕ - 6 : ಅ) ಮನುವಿನ ರಾಣಿ - ಕೊಡಗಿನ ಗೌರಮ್ಮ  
ಆ) ಶವದ ಮನೆ - ಚದುರಂಗ

ಘಟಕ - 7 : ಅ) ಗಾಂಧಿ - ಬೆಸಗರಳ್ಳಿ ರಾಮಣ್ಣ  
ಆ) ರೊಟ್ಟಿ - ಪಿ. ಲಂಕೇಶ್

ಘಟಕ - 8 : ಅ) ಮಾರಿಕೊಂಡವರು - ದೇವನೂರ ಮಹಾದೇವ  
ಆ) ಕೃಷ್ಣೇಗೌಡನ ಆನೆ - ಪೂರ್ಣಚಂದ್ರ ತೇಜಸ್ವಿ

ಬ್ಲಾಕ್ -8: ವಿಮರ್ಶೆ (ಅವಿಸ್ತರ ಪಠ್ಯ)

ಘಟಕ - 13 : ಅ) ಕನ್ನಡದಲ್ಲಿ ಬೌದ್ಧರು ಗ್ರಂಥಗಳೂ ರಚಿಸಿದ್ದರೇ? -ಟಿ.ಎಸ್. ವೆಂಕಣ್ಣಯ್ಯ  
ಆ) ಜನ್ನನ ಕಾವ್ಯಗಳಲ್ಲಿ ಪ್ರಣಯ ನಿರೂಪಣೆ : -ಶೀ.ನಂ. ಶ್ರೀಕಂಠಯ್ಯ

ಘಟಕ - 14 : ಅ) ಪರಂಪರೆ ಮತ್ತು ರಾಘವಾಂಕನ ಪ್ರತಿಭೆ : -ಜಿ.ಎಸ್. ಶಿವರುದ್ರಪ್ಪ  
ಆ) ಪ್ರಜ್ಞೆ ಮತ್ತು ಪರಿಸರ : -ಯು.ಆರ್. ಅನಂತಮೂರ್ತಿ

ಘಟಕ - 15 : ಅ) ಸಾಹಿತ್ಯ ಮತ್ತು ಬದ್ಧತೆ : -ಬರಗೂರು ರಾಮಚಂದ್ರಪ್ಪ  
ಆ) ಮಲೆಗಳಲ್ಲಿ ಮದುಮಗಳು : -ಎಚ್.ಎಂ. ಚನ್ನಯ್ಯ

ಘಟಕ - 16 : ಅ) ಕಾರಂತರ ಕಾದಂಬರಿಗಳಲ್ಲಿ ಜೀವನ ಶ್ರದ್ಧೆ ಮತ್ತು ಶೋಧನೆ : -ಜಿ.ಎಚ್. ನಾಯಕ  
ಆ) ಚಿಕ್ಕೋಳು ಹಿರಿದಿಮ್ಮವ್ವ -ಒಂದು ಮನೋವೈಜ್ಞಾನಿಕ ವಿಶ್ಲೇಷಣೆ:-ಶಿವರಾಮ ಕಾಡನಕುಪ್ಪೆ

## COURSE I/II ENGLISH

### BBAEC 401/402 English for Commercial Purposes and Novel

#### OBJECTIVES

- To acquire knowledge and comprehensive details of correspondence between a bank and its customers
- To appreciate the importance of banks as business institutions
- To provide expertise in language and communication skills
- To enhance the student's ability to understand the dynamics of social interaction
- To evolve different ways of testing language proficiency through English Grammar

#### BLOCK- I: ENGLISH FOR COMMERCIAL PURPOSES -II

Bank Correspondence -I  
Bank Correspondence -II  
Employment Letters  
Business Circulars  
Reports

### **BLOCK –II: NOVEL**

**R.K Narayan:** The Financial Expert

### **BLOCK-III: LANGUAGE COMPONENT**

Correction of sentences; Degree of comparison; Question Tags; Paragraph writing

### **Suggested Reading:**

- **Mccomas.** *Modern Business Correspondence.* McGraw Hill Post.1992.
- **F.W.King &D.A.Cree.** *Modern English Business Letters.* Longman, 1977.
- **A.N.Kapoor.** *A Guide to Business Correspondence and Communication Skills.*S.Chand.Ltd 2010.
- **A.J. Thomson & A.V Martinet.** *A Practical English Grammar.* Oxford University Press, 1986.
- **F.T .Wood.** *A Remedial English Grammar for Foreign Students.* Trinity Press.2014.
- **Wren and Martin.** *English Grammar &Composition.* Blackie.2015.
- **Wilson Knight. G.** The Crown of Life. The Wheel of Life. Methuen& Co LTD, 1947.

## Urdu

### **Business Correspondence and Precise writing**

Block 1 Units (9 to 12) Block 2 ( 12 to 16)

**Unit. 9-** Afsana Kaliyan Aur Kante, Akhtar Urenvi

**Unit -10-** Afsana Hamari Gali, Ahmad Ali

**Unit -11** Afsana Alhamdulillah, Ahmad Nadeem Qasmi

Book Karobari Khath o Kitabath, Mohammed Khaleel Ahmed Ibn Maqdoom

**Unit -12-**

1-Karobari Khath o Kitabath ke chand aham nukath

2-Khawayad zaban kutooth Aur Fun-e- Khatnavesi

**Unit 13**

1-Kutooth Tijarath ki Tashkeel-o-Tarkeeb

2-Murasalati Shobe ka intezam

3-Daryaftname

4-Narq Name Aur Razakarana Peshkash

**Unit-14**

1-Farmayish Aur Taameele Farmayish

2-Shikayath o Izala shikayath

- 3-Hisab ki Chuktayee  
4-Bisaath Tijarath ki Jankari

**Unit-15**

- 1-Tarufi Kutooth Aur Sifarishi Naame  
2-Khidmath-e-Talbi  
3-Gashti Name  
4-Kutooth Bankari

**Unit-16**

- 1-Beema  
2-Kutooth Daramad o Baramad  
3-Mazmoon nigari  
4-Ikhtesariya(Precise Writing)

**SANSKRIT**

Course code : SANDSC-1D Core

Credit - 04

<b>Modern Poetry and Prose</b>
<b>Block I Drama</b> Unit I. Pratimanaatakam Act V Unit II. Pratimanaatakam Act VI Unit III. Pratimanaatakam Act VII Unit IV. Pratimanaatakam Act VIII
<b>Block II Champu</b> Unit V. Sri Ramasya Vanagamanam Unit VI. Paduka Pattabhishekaha
<b>Block III Non-Detailed Text</b> Unit VII. Story of Jimutavahana Part II
<b>Block IV Language Component</b> Unit VIII. Bhashantara Pathyam

**Annexure V**

**COURSE CODE: INDIAN CONSTITUTION AND HUMAN RIGHTS**

**COURSE OBJECTIVES**

**The Objectives of this course are**

1. To provide an oversight of Indian constitution to the students;
2. To Expose students to the fundamental duties and rights and
3. To make students aware of human rights.

**COURSE OUTCOMES**

**After studying this course the students should be able to**

1. Identify the salient features of Indian constitution;
2. Speak out about fundamental rights and duties and
3. Explain the special privileges provided to backward classes.

**COURSE CONTENTS**

**BLOCK -1 INDIAN CONSTITUTION**

- UNIT-1** Constitution – Meaning and Importance Historical development of the Indian Constitution Reorganisation of States and National Integration and Zonal Councils
- UNIT -2** Framing of the Indian Constitution and Preamble, Salient features of Indian Constitution, Procedures of amending the Constitution and its limitations
- UNIT-3** Fundamental Rights and Duties, Special Privileges for SC/Sts, Backward classes, Woman, Children and Religious and Linguistic Minorities
- UNIT-4** Directive principles of State Policy, values and limitations, differences between Fundamental Rights and Directive Principles of State Policy.

**BLOCK -2 HUMAN RIGHTS**

- UNIT-5** Human Rights – Meaning and Importance. Universal Declaration of Human Rights. Development of Human Rights and Fundamental Rights, International law and position in India.
- UNIT-6** Social and Gender discrimination. Torture and Genocide's, two human Rights Covenants. European Charter to Human Rights-Amnesty International.
- UNIT-7** People's Union for Civil Liberty (PUCL) and People's Union for Democratic Rights (PUDR).
- UNIT-8** Human Rights Commission and Minorities Commission Remedies against violation of Human Rights.

**Reference:**

1. Theory and Practice of Modern Governments- Herman Finer, Methuen and Ltd 1954
2. Modern Constitution, K.C. Wheare, Oxford University Press 1966
3. Indian Constitution – J.C. Johari, Delhi Vishal 2001
4. Right to be Human, Chakkravarthy M, Lancer International, New Delhi 1987

# **COURSE NAME: ENVIRONMENTAL STUDIES**

**COURSE CODE AECC - 2**

**CREDITS: 4**

## **COURSE OBJECTIVES**

**The Objectives of this course are**

1. To Create awareness about Environment;
2. To Develop concern about Environment and
3. To promote the culture of thinking about sustainable development.

## **COURSE OUTCOMES**

**After studying this course the students should be able to**

1. Identify the factors affecting environment;
2. Critically evaluate the issues to nurture the environment and
3. To identify solutions to promote sustainable development.

## **COURSE CONTENTS**

### **BLOCK -1 ENVIRONMENT STUDIES**

**UNIT -1** *Environmental Studies - Meaning, Scope and Importance Components, Physical, Cultural, Natural and Man made*

**UNIT -2** *Concepts of Ecology, Structure and Functions of Ecosystem.*

**UNIT-3** *Biotic and Abiotic Factor, Environmental Interactions*

**UNIT-4** *Biological Resources - Plants, Animals and Micro organism*

### **BLOCK - 2 ENVIRONMENT AND SUSTAINABLE DEVELOPMENT**

**UNIT-1** *Social Issues - Human population and Environment, Environment & Sustainability.*

**UNI -2** *Environmental Pollution - Air, Water, Soil and Sound types and Control Measures, Conservation and Preservation of Environment.*

**UNIT-3** *The Concept of Sustainable Development. The Definition of Sustainable Development as an Ambiguous Compromise, The Triple P, An Introduction to Economic Growth, Questions about Sustainable Development, Timeline for Sustainable Development.*

**UNIT- 4** *Climate Change, Energy and Sustainable Development • Climate Change: A Threat to Sustainable Development • Adaptation to Current and Future Climate Regimes • The cause: The greenhouse effect • The consequences: crop failure • Solutions technology and lifestyle changes| Mitigating Climate Change • Political & economic instruments*

**Reference:**

1. Textbook for Environmental Studies – Erach Bharucha, Institute of Environmental Education and Research 2004
2. Fundamental of Ecology- Odum E.P.- E.B. Saunders and Co 1971
3. Understanding Environment- Kiran B Chhokkar- 1995  
Environmental Studies , Nandini Sapna Book House 2015

**Annexure VI****DEPARTMENT : PHYSICS**

## Open Elective: 1<sup>st</sup> semester: Physics in Daily Life

<b>Block-1</b>
<b>Unit-1: Motion:</b> Concept of motion, concept of inertia and its types, examples, importance of seat belts in vehicles, relative motion, vector method of velocity addition, conservation laws (qualitative explanation of LCM and LCE with examples)
<b>Unit-2: Oscillations And Waves:</b> SHM, time periods of spring pendulum and simple pendulum, damped oscillations and resonance, waves and types, propagation of waves (mechanical and non-mechanical waves), velocity of sound wave- factors affecting velocity of sound wave
<b>Block-2</b>
<b>Unit-3: Light:</b> Qualitative explanation of theories of light, reflection, refraction, TIR and its applications, interference and diffraction (brief explanation), scattering of light, blue colour of sky, red colour of sun at dawn and dusk.
<b>Unit-4: Heat:</b> Heat and temperature , different measuring scales of temperature, newton's law of cooling and applications, thermodynamic processes and examples, specific heat capacity, phase transition, melting point and boiling point, latent heat of fusion and latent heat of vapourisation.
<b>Block-3</b>
<b>Unit-5: Radiation:</b> Electromagnetic spectra, uses of electromagnetic waves, sources of e.m. waves, Importance of ozone layer, hazards of UV radiation, IR thermometer, working of microwave oven
<b>Unit-6: Radioactivity:</b> Classification of radioactive rays, properties, types of radioactivity, radiation hazards, radiation level detection and radiation safety.

**DEPARTMENT: FOOD AND NUTRITION**

**CULINARY FOOD SCIENCE**

## **BLOCK I: Basic Culinary Science**

**Unit 1:** Introduction to cookery, Culinary history, aims and objectives of cooking.

**Unit 2:** Food ingredients and their nutritional value – cereals, legumes, fruits and vegetables, eggs, fish and marine foods, milk and milk products, fats and oils

**Unit 3:** Introduction to Cookery: Aims and objectives of cooking food; Various textures; Techniques used in pre-preparation; Techniques used in preparation. Methods of heat transfer; Classification; Moist heat methods; Dry heat methods;

**Unit 4:** Medium of fat. Personal Hygiene; Environmental Hygiene; Food storage and causes of contamination; Food borne illnesses; Food poisoning; Garbage disposal

## **BLOCK II: Applications of Culinary Science**

**Unit 5:** Origin of modern cookery; Continental cuisine: Indian cuisine; Various sections of kitchen: Levels of skills: Attitude and behavior in the kitchen: Uniform and protective clothing; Classification of equipment; Care and maintenance

**Unit 6:** Dining services methods, techniques & styles: Table service: Silver service/ English service; American/ Plated; Family; Russian; Butler; Gueridon Bar Counter; Assisted Service: Carvery; Buffets Self Service: Cafeteria: - Straight Line; Free-flow; Echelon; Supermarket Single point service: Take-away; Drive through; Fast food; Vending; Kiosk; Food court; Bar Specialized (in-situ): Tray; Trolley; Home delivery; Lounge; In Room; Drive in

**Unit 7:** Introduction to Indian Cuisine: Introduction; Growth of Indian cuisine; Introduction to various styles of Indian cookery; Development of Indian cuisine; History of Indian Cuisine: History, Ancient, Medieval and modern history of Indian cuisine

**Unit 8:** Indian Culture and Food: Festival food, Culture related to food, Importance of Indian herbs and spices, Influence of foreign food culture on Indian cuisine. Equipment and Fuels used in the Indian Kitchen: Classification of Indian equipments; drawings; Care and maintenance.

## **DEPARTMENT: BOTONY**

### **Plant Tissue Culture and its Biotechnological Applications**

**Plant Tissue Culture:** Historical perspective, Composition of media; Nutrient and hormone requirements (role of vitamins and hormones); Plasticity and Totipotency; Organogenesis; Embryogenesis (somatic and zygotic);

Protoplast isolation, culture and fusion; Tissue culture applications (micropropagation, androgenesis, virus elimination, secondary metabolite production, haploids, triploids and cybrids; Cryopreservation; Germplasm Conservation).

**Recombinant DNA Technology:** Restriction Endonucleases (History, Types I-IV, biological role and application); Restriction Mapping (Linear and Circular); Cloning Vectors: Prokaryotic (PUC 18 and pUJC19, pBR322. Ti plasmid, BAC); Lambda phage, M13 phagemid, Cosmid, Shuttle vector; Eukaryotic Vectors (YAC and briefly PAC,).

**Gene Cloning (Recombinant DNA.** Bacterial Transformation and selection of recombinant clones, PCR and RT-PCR mediated gene cloning); Gene Construct; construction of genomic and cDNA libraries, screening DNA libraries to obtain gene of interest by genetic selection; complementation, colony hybridization; Probes-oligonucleotide, heterologous, PCR; Methods of gene transfer- Agrobacterium-mediated, Direct gene transfer by Electroporation, Microinjection, Microprojectile bombardment: Selection of transgenics— selectable marker and reporter genes (Luciferase, GUS, GFP). DNA fingerprinting by RAPD and RFLP;

**Applications of Biotechnology:** Engineering plants to overcome abiotic (drought and salt stress) and biotic stress Pest resistant (Bt-cotton) and herbicide resistant plants (RoundUp Ready soybean); Transgenic crops with improved quality traits (FlavrSavr tomato. Golden rice); Improved horticultural varieties (Moondust carnations); Role of transgenics in bioremediation (Superbug)

Molecular farming (Plants as bioreactors) for edible vaccines, antibodies, polymers, biodegradable plastics (PHA), biomass utilization and industrial enzymes) (- amylase, phytase, lignocelluloses degrading enzymes); Biosafety concerns.

## References

1. Bhojwani, S.S., Bhatnagar, S.P. (2011). The Embryology of Angiosperms, 5th edition. New Delhi, Delhi: Vikas Publication House Pvt. Ltd.
2. Bhojwani, S.S., Razdan, M.K., (1996). Plant Tissue Culture: Theory and Practice. Amsterdam, Netherlands: Elsevier Science.
2. Glick, B.R., Pasternak, J.J. (2010). Molecular Biotechnology: Principles and Applications. Washington, U.S.: ASM Press.
4. Snustad, D.P., Simmons, M.J. (2010). Principles of Genetics, 5th edition. Chichester, England: John Wiley and Sons.
- 5.. Stewart, C.N. Jr. (2008). Plant Biotechnology and Genetics: Principles, Techniques and Applications. New Jersey, U.S.: John Wiley & Sons Inc.

## DEPARTMENT : MICROBIOLOGY

### Microbiome and Human Health

**Microbiome** – definition –History of microbiome perspective, environmental genomics-microbiomes of oceans, lakes and terrestrial ecosystems, Microbiome ecology, the fungal and viral microbiomes, Microbiome evolution. Earth Microbiome project.

**Human microbiome:** biodiversity and major genera of human-microbiome, humanmicrobiome system as a "holobiont" or "superorganism", microbiome distributions in healthy individuals; composition of specific body sites' microbiome (nose, skin, oral, urogenital, etc.) - fecal transplants- designer probiotics, Symbiosis- Dysbiosis -Rebiosis,

Dynamics microbiome changes from birth to death; pregnancy and the microbiome; personnel microbiome concepts.

**Microbiome and disease biology:** gut-brain conversation, obesity and gut microbiome, infectious diseases and gut microbiome, non-infectious diseases and gut microbiome,

Phylogeography of epidemics, microbiome's role in diseases such as Inflammatory bowel disease (IBD), colitis, obesity, diabetes; effects of diet on microbiome; interactions with the immune system and resistance to pathogens;

Drug delivery using microbes engineered to secrete peptides, Microbes as neuromodulators, Microbes as cancer therapeutics, impacts of antibiotics on the development of resistomes.

## References

1. Angela E. Douglas (2018). Fundamentals of Microbiome Science – how microbes shape animal biology, Princeton University Press, New Jersey, United States.
2. Rob DeSalle and Susan L. Perkins (2015). Welcome to the microbiome. getting to know the trillions of bacteria and other microbes in, on, and around you. Yale University Press.
3. Suggested Readings
4. Rodney Dietert (2016). The Human Super organism: how the microbiome is revolutionizing the pursuit of a healthy life. Dutton Books.
5. Justin Sonnenburg and Erica Sonnenburg (2014). The good gut: taking control of your weight, your mood, and your long-term health. Penguin Press.
6. Emeran Mayer (2016). The Mind-Gut Connection: How the Astonishing Dialogue Taking Place in Our Bodies Impacts Health, Weight, and Mood. eBook, Harper Wave Books.
7. Martin J. Blaser (2014). Missing Microbes: How the Overuse of Antibiotics Is Fuelling Our Modern Plagues. Harper Collins Publishers. Toronto.
8. Diana Marco (2014). Metagenomics of the Microbial Nitrogen Cycle: Theory, Methods and Applications Book: 978-1-908230-48-5. ebook: 978-1-908230-60-7, Caister Academic Press.
9. Pilar Francino, M (2012). Horizontal Gene Transfer in Book: 978-1-908230-10-2. ebook:978-1-908230-72-0, Caister Academic Press.

## **DEPARTMENT: LIBRARY INFORMATION AND SCIENCE**

### **PERSONALITY DEVELOPMENT AND SOFT SKILLS FOR PROFESSIONALS**

#### **BLOCK-1: Presentation and Interview Skills for Library and Information**

## **Science Professionals**

**UNIT-1:** Professional Skills, Communication Skills, Administrative, Managerial, Interpersonal, Human Relation Skills, Soft Skills, Legal Skills, Decision Making Skills,

**UNIT-2:** Analytical Skills, Team Building, Time Management Skills, Motivation Skills, Leadership Skills, Negotiation Skills, Problem Solving Skills, Information Technology Skills, Computer and Network Literacy, Stress Management, Innovative and Recreational Skills

**UNIT-3:** Presentation, Preparing Curricular Vitae , Online Application, Job Portals for LIS, Interview Types, Preparation (Job based), Panel and Board, Group Discussion, Personal Interview, General Awareness

**UNIT-4:** Extra-curricular activities, Personality Development, Positive Attitude, Body Language

### **BLOCK-2: Drafting Letters in LIS context and Writing Skills**

**UNIT-5:** Types of Letter: Formal, Informal, Drafting Rules, Agenda, Minutes, Recommendations

**UNIT-6:** Confidential Reports of the Staff, Report Writing: Progress, Annual Reports, Budget, User Statistics, Drafting Project Proposals, Writing Research Papers

**UNIT-7:** Files Records: Management and Maintenance, RTI Skills and Answering Queries

**UNIT-8:** E-learning Tools, Courseware, Software, Content Management Student Teacher Relations, Student Performance, Feedback Mechanism, Curriculum Development, Innovative Assessment Method, Use of Teaching Tools

## **DEPARTMENT: PUBLIC ADMINISTRATION**

### **INTRODUCTION TO PUBLIC ADMINISTRATION**

#### **BLOCK – 1**

UNIT – 1 Public Administration – Meaning, Definitions, Nature and Scope, Whether Public Administration is a Science or an Art.

UNIT – 2 Significance of Public Administration. Public Administration and Private Administration, Similarities and Dissimilarities.

UNIT – 3 Growth of Public Administration and its Relationship with other Social Sciences.

UNIT – 4 New Public Administration – Meaning and Features Development Administration – Meaning and Features.

#### **BLOCK – 2**

UNIT – 5 New Public Management – Perspective and Public Choice Approach.

UNIT – 6 Comparative Public Administrations. Concept of Good Governance and its Application.

UNIT – 7 Public Financial Administration – Meaning, Nature, Objectives, Principles, Scope and Importance.

UNIT – 8 Public and Private Finance – Differences and Similarities Agencies involved in Financial Administration in India.  
The Principles of Maximum Social Advantage, Values and Limitations.

## DEPARTMENT OF COMMERCE

### ELBCO1: Fundamentals of Accountancy

Credits: 2

**Objective:** To make the students to acquaint with the fundamental concepts of Accountancy which assist them to develop proficiency in the field of Accounting.

**Pedagogy:** A Combination of Lectures, Group Discussion, Assignments.

Examination Duration: 2 and Maximum Marks: 50

(Internal Assessment Marks = 10 and Semester-end Examination =40)

#### **Block-I: Introduction to Financial Accounting:**

**Unit-1: Introduction to Accounting :** Meaning & Definition – Need and Scope for Accounting; Importance and objectives of accounting. Differences between book keeping and accounting. Accounting systems-cash and mercantile.

**Unit-2: Accounting concepts and conventions:** Introduction, Accounting concepts, Accounting Conventions, Important Accounting Terms, Transaction, Goods, Capital and Drawings, Debtors and Creditors, Expenses and Income, Assets and Liabilities, Debt and Credit, Types of Accounts, Books of Accounts, Rules for Recording of Transaction.

**Unit-3: Journal:** Meaning and Definitions, Features of Journal, Need for Journal, Importance, Journalizing, Points to be noted while passing Journal Entries, Illustrations.

**Unit-4: Ledger:** Meaning and Definitions, Features, Need and Importance, Differences between Journal & Ledger, Format of Ledger, Ledger Posting, Balancing of Ledger Accounts, Procedure for Balancing of an Account, Illustrations.

#### **Block-II: Accounting Process:**

**Unit-5: Subsidiary Books:** Introduction, Meaning, Features, Advantages, Usual Subsidiary Books, Journal Proper.

**Unit-6 Trial Balance:** Introduction, Meaning and Definitions, Features, Objectives, Advantages, Methods of Preparing Trail Balance, Format of a Trial Balance, Steps in the Preparation of a Trial Balance, Specimen of a Trial Balance.

**Unit-7: Profit and Loss Account:** Introduction, Meaning, Format, and Explanation to format of Profit and Loss Account, Illustrations.

**Unit-8: Balance Sheet:** Introduction, Meaning, Preparation of Balance Sheet, Marshalling or Grouping of Assets and Liabilities, Table Showing Treatment of Certain Ledger Balances appearing in Trial Balance, Table Showing Treatment of Some Adjustment Items given in Trial Balance. Treatment of Adjustment Item given in the Problem, Illustration.

**Books for References:**

1. Maheshwari S.N. – Advanced Accountancy –Vikas Publishing House Pvt. Ltd. – New Delhi – 9<sup>th</sup> Edition – Vol.II – 2007.
2. Jain S.P. and Narang K.L. - Practical Problems in Advanced Accountancy – Kalyani Publishers – Ludhiyana – New Delhi.
3. Arulanandam M.A and Raman K.S. – Advanced Accounting (Financial Accounting) – HPH – 2012.
4. Arulanandam M.A and Raman K.S. – Advanced Accounting (Corporate Accounting) – HPH – 2012.
5. Mukherjee A and Hanif M – Modern accountancy – Tata McGraw Hill – New Delhi – Vol.II - 2012

## DEPARTMENT OF COMPUTER SCIENCE

### BCAGE-1 Android APP Development

#### Block – I

**Unit-1** Introduction to Android: The Android Platform, Android SDK, Eclipse Installation, Android Installation, Building you First Android application,

**Unit-2** Understanding Anatomy of Android Application, Android Manifest file. Android Application Design Essentials: Anatomy of an Android applications, Android terminologies,

**Unit-3** Application Context, Activities, Services, Intents, Receiving and Broadcasting Intents, Android Manifest File and its common settings, Using Intent Filter, Permissions.

**Unit-4** Android User Interface Design Essentials: User Interface Screen elements, Designing User Interfaces with Layouts, Drawing and Working with Animation.

#### Block-2

**Unit-5:** Testing Android applications, Publishing Android application, Using Android preferences, Managing Application resources in a hierarchy, working with different types of resources.

**Unit-6:** Using Common Android APIs: Using Android Data and Storage APIs, Managing data using Sqlite,

**Unit-7** Sharing Data between Applications with Content Providers, Using Android Networking APIs,

**Unit-8:** Using Android Web APIs, Using Android Telephony APIs, Deploying Android Application to the World.

**TEXT BOOKS:**

1. T1. Lauren Darcey and Shane Conder, “Android Wireless Application Development”, Pearson Education, 2nd ed. (2011)

**REFERENCE BOOKS:**

1. R1. Reto Meier, “Professional Android Application Development”, Wiley India Pvt Ltd
2. R2. Mark L Murphy, “Beginning Android”, Wiley India Pvt Ltd
3. Android Application Development All in one for Dummies by Barry Burd, Edition: I

**DEPARTMENT: MATHEMATICES**

**Objective mathematics-1**

<b>Block-I</b>	<b>Number Theory and Progressions</b>
<b>Unit-1</b>	Number System, Types of Numbers, series (AP ,GP and HP)
<b>Unit-2</b>	Algebraic operations BODMAS
<b>Unit-3</b>	Divisibility, LCM and HCF
<b>Unit-4</b>	Fraction, Simplification.

**Reference Books:**

1. R.S. Aggarwal, “Quantitative Aptitude for Competitive Examinations”, Revised Edition, S. Chand and Co. Ltd, New Delhi, 2018.
2. Quantitative Aptitude and Reasoning by R V Praveen, PHI publishers.
3. Quantitative Aptitude : Numerical Ability (Fully Solved) Objective Questions, Kiran Prakashan, Pratogita prakasan, Kic X, Kiran Prakasan publishers.
4. Quantitative Aptitude for Competitive Examination by Abhijit Guha, Tata Mc Graw hill publications.

<b>Block-II</b>	<b>Number Theory and Progressions</b>
<b>Unit-1</b>	Time and Distance

<b>Unit-2</b>	Problems based on Trains
<b>Unit-3</b>	Time, work and wages, Pipes and Cistern
<b>Unit-4</b>	Problems on Clock, Problems on Calendar.

**Reference Books:**

1. R.S. Aggarwal, “Quantitative Aptitude for Competitive Examinations”, Revised Edition, S. Chand and Co. Ltd, New Delhi, 2018.
2. Quantitative Aptitude and Reasoning by R V Praveen, PHI publishers.
3. Quantitative Aptitude : Numerical Ability (Fully Solved) Objective Questions, Kiran Prakashan, Pratogitaprakasan, Kic X, Kiran Prakasan publishers.
4. Quantitative Aptitude for Competitive Examination by Abhijit Guha, Tata Mc Graw hill Publications

**DEPARTMENT : MANAGEMENT**

**COURSE NAME : OFFICE MANAGEMENT**

**COURSE CODE: BMG-01**

**CREDITS: 2**

**Course Objectives**

**The Objectives of this course are**

1. To provide basic orientation about maintenance of front office
2. To develop skills require to manage a front office

**Course Outcomes**

**After studying this course the students should be able to**

1. Manage a front office of 4-5 people
2. Utilize the skills of managing a front office

**Course Contents**

**BLOCK-I INTRODUCTION TO OFFICE MANAGEMENT**

- |        |  |
|--------|--|
| Unit-1 | Office Management, meaning and definition, nature, scope of office, Requisites of a good office, Office building, size, layout, safety and security measures, Management skills – Planning, organizing, staffing, motivating and controlling                 |
| Unit-2 | Reception - Importance, shape and size, control, Arrangement and adjustment of Furniture, allotment of seats, chambers, cabins rooms etc. Handling of correspondence and market registers, filling forms and stationery, File management, Record maintenance |
| Unit-3 | Office Machines, manuals, charts and reports, Kind of office machines, Objectives and advantages of various machines, Objectives and advantages of various machines, stores management   |
| Unit-4 | Personnel Management, Supervision, Control and coordination, companies – Personnel Management, Supervision, Control and coordination, Personnel  |

Management, Supervision, Control and coordination, Personnel Management, Supervision, Control and coordination, Managing difficult people, Office Politics  
Online Office Management

## **BLOCK-II SKILLS FOR OFFICE MANAGEMENT**

- Unit-5 Secretary - Definition, need and importance, appointment and dismissal, work, duties, rights and liabilities, memorandum of association and secretary, articles of association and secretary, prospectus and secretary. Banking skills
- Unit-6 Company- Definition, nature and kinds, Company formation and incorporation, promoter, capital subscription, company and association, memorandum and articles, prospectus and statements, meetings and Company Act.
- Unit-7 MS OFFICE- Word for letter correspondence, Excel for salary management, power point for business presentation, Email, Information systems and software, project management, tally
- Unit-8 Communication, verbal and non-verbal communication, telephone and email etiquette, body language,

### Reference

1. Office Management , Dr. R.K. Chopra, Priyank Gauri, Himalaya Publications
2. Office Management , M. Thatheya, Charulatha Publications
3. Office Management , RSN Pillai, Bhagavathi. S. Chand Publications
4. Administrative Office Management, patte Gibson

**Annexure VII**

**Open Elective: 2<sup>nd</sup> semester:**

## DEPARTMENT :PHYSICS

### Energy Resources

<b>Block-1</b>
<b>Unit-1: Introduction to Non-renewable energy sources:</b> Energy concept-sources in general, its significance & necessity. Classification of energy sources: Primary and Secondary energy, Commercial and Non-commercial energy, Renewable and Non-renewable energy, Conventional and Non-conventional energy, Based on Origin-Examples and limitations. Importance of Non-commercial energy resources.
<b>Unit-2: Conventional energy sources:</b> Fossil fuels & Nuclear energy- production & extraction, usage rate and limitations. Impact on environment and their issues& challenges. Overview of Indian & world energy scenario with latest statistics- consumption & necessity. Need of eco-friendly & green energy & their related technology.
<b>Block-2</b>
<b>Unit-3: Introduction to Renewable energy sources:</b> Need of renewable energy, non-conventional energy sources. An overview of developments in Offshore Wind Energy, Tidal Energy, Wave energy systems, Ocean Thermal Energy Conversion, solar energy, biomass, biochemical conversion, biogas generation, geothermal energy tidal energy, Hydroelectricity.
<b>Unit-4: Solar energy:</b> Solar Energy-Key features, its importance, Merits & demerits of solar energy, Applications of solar energy. Solar water heater, flat plate collector, solar distillation, solar cooker, solar green houses, solar cell -brief discussion of each. Need and characteristics of photovoltaic (PV) systems, PV models and equivalent circuits, and sun tracking systems.
<b>Block-3</b>
<b>Unit-5: Wind and Tidal Energy harvesting:</b> Fundamentals of Wind energy, Wind Turbines and different electrical machines in wind turbines, Power electronic interfaces, and grid interconnection topologies. Ocean Energy Potential against Wind and Solar, Wave Characteristics and Statistics, Wave Energy Devices. Tide characteristics and Statistics, Tide Energy Technologies, Ocean Thermal Energy.
<b>Unit-6: Geothermal and hydro energy:</b> Geothermal Resources, Geothermal Technologies. Hydropower resources, hydropower technologies, environmental impact of hydro power sources. Carbon captured technologies, cell, batteries, power consumption

## DEPARTMENT OF FOOD AND NUTRITION

### FOOD AND SOCIETY

## **BLOCK I: Role of Food in Society**

**Unit 1:** Introduction to food and food ways

**Unit 2:** Food biographies and sociality

**Unit 3:** Food, culture & society in India.

**Unit 4:** Social stratification, food production, and culinary practices

## **BLOCK II: Applications of Food in Nutrition and Society**

**Unit 5:** Food and Health

**Unit 6:** Nutritional guidelines for health and fitness

**Unit 7:** Nutritional Problem of Community

**Unit 8:** Mapping food waste

## **DEPARTMENT OF BOTANY**

### **Plant-Microbe Interactions**

Overview of plant microbes interactions,

Introduction, beneficial microbes, Rhizobium bacterium and nitrogen fixation, mycorrhizal fungi.

Plant pathogens, Agrobacterium tumefaciens and crown gall disease,

Mechanisms of plant disease mechanism, some bacterial plant diseases,

Plant viruses and mechanism of plant against viruses attacks.

Fungal pathogen- mechanism of plant disease,

Oomycete pathogens, Fungal mediated plant.

General concept of plant immunity,

PAMP-triggered immunity (PTI) and effectors-triggered immunity (ETI).

Transcription activator like effector and their role in virulence and disease resistance.

### **References**

1. Lautenberg, B. (2015). Principles of Plant-Microbes Interactions: Microbes for sustainable Agriculture, Springer.
2. Stacey, G. and Keen, N. T. (1997). Plant-Microbes Interactions, Vol 4, . Springer.
3. Ramasamy, K, (2015). Plant Microbes Interactions, New India Publishing Agency.
4. Martin, F. and Kamoun, S. (2014). Effectors in Plant-Microbes Interactions 1st Edition, Wiley Blackwell

## **DEPARTMENT: MICROBIOLOGY**

### **Food Microbiology**

- i. Intrinsic and extrinsic factors that affect growth and survival of microbes in foods, natural flora and source of contamination of foods in general.

- ii. Principles, Spoilage of vegetables, fruits, meat, eggs, milk and butter, bread, canned Foods.
- iii. Principles of food preservation: temperature, canning, drying, irradiation, microwave processing and aseptic packaging, chemical methods of food preservation: salt, sugar, organic acids, SO<sub>2</sub>, citrates, benzoates, nitrite and nitrates etc.
  - i. Dairy starter cultures, fermented dairy products: yogurt, acidophilus milk, kumiss, kefir, dahi and cheese, other fermented foods: dosa, sauerkraut, soy sauce and tampeh,
  - ii. Probiotics: Health benefits, types of microorganisms used, probiotic foods available in market. Utilization and disposal of dairy by-product – whey.
- i. Food borne diseases (causative agents, foods involved, symptoms and preventive measures)- Food intoxications: Staphylococcus aureus, Clostridium botulinum and mycotoxins;
  - ii. Food infections: Bacillus cereus, Vibrio parahaemolyticus, Escherichia coli, Salmonellosis, Shigellosis, Yersinia enterocolitica, Listeria monocytogenes and Campylobacter jejuni
- i. Food sanitation and control; HACCP, Indices of food sanitary quality and sanitizers.
  - ii. Cultural and rapid detection methods of food borne pathogens in foods and introduction to predictive microbiology.
  - iii. Genetically modified foods, Nutraceuticals, Biosensors in food, Applications of microbial enzymes in dairy industry [Protease, Lipases].

### References:

1. Stanbury, PF., Principles of Fermentation Technology. Whittaker, A and Hall, S.J 2nd Edition. Pergamon Press (1995).
2. Banwart, GJ. Basic Food Microbiology. CBS Publishers and Distributors, Delhi. (1989).
3. Hobbs BC and Roberts D. Food poisoning and Food Hygiene. Edward Arnold (A division of Hodder and Stoughton) London.
4. Joshi. Biotechnology: Food Fermentation Microbiology, Biochemistry and Technology. Volume 2.
5. John Garbult. Essentials of Food Microbiology. Arnold International.
6. John C. Ayres. J. Orwin Mundt. William E. Sandinee. Microbiology of Foods. W.H. Freeman and Co.
7. D. J. Bagyaraj and G. Rangaswami. AGRICULTURAL MICROBIOLOGY. Prentice Hall of India Pvt Ltd. 2005
8. N S Subba Rao. Soil Microbiology. Oxford and IBH publishing Company 2009
9. Photis Papademas. Dairy Microbiology: A Practical Approach. CRC Press
10. Rao M.K.. Food and Dairy Microbiology. Manglam Publishers
11. William Frazier. Food Microbiology. McGraw Hill Education
12. Jay, James M., Loessner, Martin J., Golden, David A. Modern Food Microbiology. Springer

## DEPARTMENT OF LIBRARY SCIENCE

### Electronic Sources And E-Publishing

#### Block-1: Electronic Sources

**UNIT-1:** Electronic Information: Concept, structure, features, Information industry. Role of librarian in information industry.

**UNIT-2:** Electronic information products: e-books, e-journals, e-zines, e-reference sources, ETDs.

**UNIT-3:** Electronic sources: Internet Information resources, Databases (Bibliographic, Numeric and Full text). E-books, Open Access Resources. List servers, Subject gateways. Mini Project: Study of the features and functionality of any one source ( E.g. Dictionary. com, Encyclopedia Britannica, Wikipedia, ACM digital Library, IEEE / IEE Electronic Library Online (IEL), Emerald, EBSCO, PsycINFO, Elsevier Science, PubMed Central, J-Gate , J-Store, Web of Science, SCOPUS, SciFinder Scholar, PLOS, DOAJ, RePEc, etc.)

**UNIT-4:** Plagiarism: Social, legal issues and usability issues. Plagiarism detection software, online plagiarism checkers

## **BLOCK-2: ELECTRONIC PUBLISHING**

**UNIT-5:** Electronic Publishing: Concept, categories – commercial, open access, self e-publishing, scholarly communication

**UNIT-6:** E-Publishing Process: peer reviewing, editing, proofreading, designing, typesetting, and printing.

**UNIT-7:** E-publishing software: features and use. Study of select e-publishing software: MS Publisher and OJS.

**UNIT-8:** IPR and Copyright issues in e-publishing

## **DEPARTMENT : PUBLIC ADMINISTRATION**

### **LOCAL GOVERNMENTS OF INDIA**

#### **BLOCK – 1**

UNIT - 1 Local Government – Meaning, Nature, Importance, Values and Limitations. Distinction between Central and Local Government.

UNIT – 2 Evolution of Local Governments in India. Balawantroy Mehta, Ashok Mehta, G.V.K. Rao and L.M. Singhvi Committees.

UNIT – 3 Panchayatraj Institutions and 73<sup>rd</sup> Constitutional Amendment Act of 1992.

UNIT – 4 Grama Panchayat – Composition, Organisation, Powers and Functions.

#### **BLOCK – 2**

- UNIT - 5 Taluk Panchayats and Zilla Panchayats – Composition, Organisation, Powers and Functions.
- UNIT – 6 Urban Local Governments in India and 74<sup>th</sup> Constitutional Amendment Act of 1992.
- UNIT – 7 Municipal Corporation – Composition, Organisation, Powers and Functions,
- UNIT – 8 Municipal Council - Composition, Organisation, and Functions,

## **DEPARTMENT OF COMMERCE**

### **ELBCO2: Fundamentals of Marketing**

- **Objective:** To facilitate understanding of the conceptual framework of Marketing and its applications in decision making under various environmental situations.
- **Pedagogy:** A Combination of Lectures, Group Discussion, Assignments.
- **Credits:** 2 ; Examination Duration: 2 and Maximum Marks: 50 (Internal Assessment Marks = 10 and Semester-end Examination =40)

#### **Course Inputs**

##### **Block I**

- **Unit -1: Introduction:** Definitions of Marketing - Various Concepts of Marketing - Marketing as a Concept -Components of Marketing Concept - Implementation of Marketing Concept - Marketing as a Process - Marketing as a Managerial Function- Benefits of Marketing Concept
- **Unit -2: Marketing Environment:** Introduction - Definitions of Environment - Approach to Environment Analysis -Meaning of Marketing Environment - Types of Marketing Environment - Controllable and Uncontrollable Environment- Benefits of Market Scanning.
- **Unit -3: Marketing Mix:** Introduction - Definitions of Marketing Mix - Concept of Marketing Mix -Components of Marketing Mix - Classification of Products -Product Concept Dimension - Product Mix -Price -Promotion - Place Sub-components of four P's - Market Segmentation - Bases of Market Segmentation - Benefits of Market segments - Market Segmentation Strategies.
- **Unit-4: Consumer Behaviour:** Introduction - Definition of Consumer Behaviour Scope of Consumer Behaviour - Buying Motives - Need to Study Consumer Behaviour - Factors Influencing Consumer Behaviour.

##### **Block II**

- **Unit -5: Product Mix:** Introduction - Meaning of Product- Product is something more than a Physical Commodity - Total Product Personality - Managing the Product - Product Policy – Branding Decision - Decision on Packaging.
- **Unit -6: New Product Development:** Introduction - Need for New Product - Classification of New Product - Stages in New Product Development - Definitions of Product Life Cycle - Stages of Product Life Cycle - Factors affecting Product Life Cycle.
- **Unit -7: Branding and Packaging:** Introduction - Meaning and Definitions of Brand - Features or Characteristics of Brand - Merits or Utility of Branding - Classification of Brands. Meaning and Definition of Packaging - Objectives of Packaging - Policies and Strategies of Packaging - Branding Vs Packaging - Labelling
- **Unit -8: Promotion Mix:** Introduction - Meaning and Scope of Promotion- Components of Promotion- Marketing Communications- Promotional Tool & Consumer Response- Determining the Promotional Mix.

### **Books for Reference**

01. S.A. Sherlekar and R Krishnamoorthy., Marketing Management Concepts and Cases, Himalaya Publishing House, Mumbai.
02. V. S. Ramaswamy and S Namakumari, Marketing Management, Macmillan Publishers.
03. David Jobber, John Fahy, Foundations of Marketing, TMH.
04. William D Perreault, E Jerome Mc Carthy, Basic Marketing - A Global Managerial Approach, McGraw-Hill Publishers.
05. Anitha, “Marketing Management,” Current Publications, Agra.

## **DEPARTMENT OF COMPUTER SCIENCE**

### BCADSE-4 Cyber Security

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#### **Block-1**

**Unit-1:** Overview of cyber security, Internet governance- challenges and constraints,

**Unit-2:** cyber threats, cyber warfare, cybercrime, cyberterrorism, cyber Espionage.

**Unit-3:** Need for a Comprehensive cyber security policy, need for a Nodal Authority, Need for an International Convention on Cyberspace.

**Unit-4:** Cyber security vulnerabilities- Overview, vulnerabilities in software, system administration, complex Network Architectures, Open access to Organizational Data, weak Authentication,

#### **Block-2**

**Unit-5:** Unprotected Broadband Communications, Poor cyber security awareness. Cyber security safeguards Overview, Access control, Audit, Authentication, Biometrics, Cryptography, Deception,

**Unit-6:** Denial of service Filters, ethical Hacking, Firewalls, Intrusion detection systems, Response, scanning Security policy, Threat Management.

**Unit-7:** security web application introduction, basic security for HTTP application and services, basic security for SOAP services, identity management and web services, Authorization patterns, Security Considerations, Challenges.

**Unit-8:** Intrusion Physical Theft, abuse of privileges, unauthorized Access by Outsider, Malware infection, Intrusion detection and Prevention Techniques, anti-Malware software, Network based intrusion detection systems, Network based intrusion prevention systems, Host based Intrusion prevention systems, Security information management, Network session Analysis, system Integrity Validation

**Text Books:**

1. John R Vacca, “Computer and Information Security Handbook”, 3<sup>rd</sup> Edition Elsevier,2013, ISBN:
2. William Stallings, “Cryptography and Network Security”, Pearson.

**Reference Books:**

1. George K Kostopoulos, “Cyber space and cyber Security”, second Edition, CRC Group, Taylor and Francis,
2. Behrouz A Frouzan “Cryptography and Network Security”, Tata McGraw Hill

**DEPARTMENT: MATHEMATICES**

**Objective Mathematics-2**

<b>Block-I</b>	<b>Sets and Relations</b>	<b>Page No</b>
<b>Unit-1</b>	Set theory	
<b>Unit-2</b>	simple applications of Venn Diagram	
<b>Unit-3</b>	Relations	
<b>Unit-4</b>	Functions	

**Reference Books:**

1. Basic Mathematics, Allel R.G.A, Macmillan, New Delhi.

2. Mathematics for Economics, Dowling, E.T. , Schaum’s Series, McGraw Hill,

<b>Block-II</b>	<b>Indices and Logarithms</b>	<b>Page No</b>
<b>Unit-1</b>	Surds,indices,.	
<b>Unit-2</b>	Logarithms	
<b>Unit-3</b>	Permutations and combinations	
<b>Unit-4</b>	Examples on commercial mathematics	

**Reference Books:**

1. Basic Mathematics, Allel R.G.A, Macmillan, New Delhi.
2. Mathematics for Economics, Dowling, E.T. Schaum’s Series, McGraw Hill

**DEPARTMENT: MANAGEMENT**

**COURSE NAME : MANAGEMENT SKILLS**

**COURSE CODE: BMG-02**

**CREDITS: 2**

**Course Objectives**

1. To orient students towards various functions of Management.
2. To develop basic management skills

**Course Outcomes**

1. Assist various functions of Management in an organization.
2. Utilize the basic management skills

**Course Contents**

**BLOCK-I INTRODUCTION TO MANAGEMENT**

**UNIT-9** Management-meaning, nature and scope-characteristics of management Functions of Management – Levels of Management.

**UNIT-10** Contributions of select management thinkers F.W.Taylor – Henry Fayol – Elton Mayo.

**UNIT-11** Planning – meaning, nature and importance of planning; forms of planning; types of plans; steps in planning; limitations of planning

**UNIT-12** Decision making – meaning – types of decisions, steps in rational decision making common difficulties in decision making

**BLOCK-II STAFFING AND DIRECTING**

**UNIT-13** Organization – meaning – process of organizing – principles of organizing, steps in organizing; types of organizing; organization structure Staffing-meaning; process; delegation of authority and responsibility

**UNIT-14** Direction-Meaning, features of direction, principles of direction, requirements of effective direction, supervision-concept of supervision, functions of supervisor-qualities of a good supervisor.

**UNIT-15** Leadership-meaning-significance; styles of leadership-qualities of a good leader, motivation-meaning and importance – a brief study of Maslow's and Mc.Gregor

**UNIT-16** Controlling- Nature, Definition; Need for control, Steps in control process, types of controls, Essentials of effective control system;

**Reference:**

1. Business Organization and Management – Y.K.Bhushan.
2. Modern Business Organization and Management – S.A.Sherlekar
3. Principles and Practice of Management – T.N.Chhabra.
4. Organization and Management – C.R.Babu
5. Principles of Management - P.C.Tripathi, P.N.Reddy.
6. Principles of Management - L.M.Prasad.

**ANNEXURE VIII**

**A. Question Paper Pattern(tentative)**

**BITDSC-4**

**II Semester B.Sc (IT) Examination \_\_\_\_\_**

**Data Structure and Applications  
(Freshers)**

**Time: 3 Hours**

**Max. Marks: 80**

**PART – A**

**Answer any four questions. Each question carries 5 marks:**

**4x5=20**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

**PART – B**

**Answer any three questions. Each question carries 10 marks:**

**3x10=30**

- 7.
- 8.
- 9.
- 10.
- 11.

**PART – C**

**Answer any two questions: Each question carries 10 marks**

**2x15=30**

- 12.
- 13.
- 14.
- 15.

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