MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

(Deemed to be University under section 3 of the UGC Act, 1956)

SCHOOL OF COMPUTER APPLICATIONS

DEPARTMENT OF COMPUTER APPLICATIONS

CURRICULUM

AND

SCHEME OF EXAMINATION

**BACHELOR OF SCIENCE
INFORMATION TECHONOLOGY**

BATCH: 2023-26

FOREWORD

This is to certify that this booklet contains the entire Curriculum and Scheme of Examination of Bachelor of Science (Information Technology) being offered at School of Computer Applications of this University. This has been duly vetted and finally approved by the Academic Council of the University vide its 42nd meeting held on 03-03-2023 and changes, if any deemed appropriate, shall be duly incorporated after the necessary approval by the Academic Council.

This Curriculum and Scheme of Examination of Bachelor of Science (Information Technology) shall be implemented w.e.f. AY 2023-26.

Date: **Dean-Academics, MRIIRS**

Preamble

The programme BSc(IT) dual specialization is adapted to an outcome based education system which would enable the students to acquire the capabilities to meet the demands of society and industry at regional, national and global level. The Programme Education Objectives (PEOs) of BSc(IT) are consistent with the Vision and Mission of the Department as well as the University, and aim to produce globally successful IT professionals who are empowered to contribute to nation building through sound knowledge, technical skills and research aptitude. The POs and PSOs address the PEOs and aim to produce innovators, IT professionals, entrepreneurs and technocrats with high professional and social ethics.

The curriculum exhibits the requisite balance among the fundamental, core and elective subjects. This is to create a BSc(IT) student talent pool that can serve the IT technological needs of the national and global software industry. Many courses are meant to meet the IT technological needs such as Mobile Applications Development, Java Programming, RDBMS using Oracle, Network System Security, Introduction to Cloud Computing etc. Also subject like Linear Algebra and Statistical Techniques is offered to enhance the basic mathematical skills of regional students.

The curriculum includes courses focusing on employability, entrepreneurship and skill development which map strongly with the POs defining demonstration of technical knowledge and engagement in independent and life- long learning. Examples of such courses are Employability Augmentation, Employability Skills, Entrepreneurship Development and various lab courses based on numerous dimensions of computer applications.

Certain courses are meant to create awareness about the environment and sustainability and inculcate professional ethics, like Environmental Studies, Social Media Norms & Etiquette. Also various activities are organized to inculcate human values and respect for the other genders.

The design of curriculum is done in accordance with the predetermined Programme Education Objectives. The syllabus content of each course is meticulously created to develop thorough understanding and gain in-depth knowledge. A number of theory courses are accompanied with laboratory courses to inculcate the practical skills. In order to ensure the effectiveness of teaching-learning process and true implementation of the curriculum, the course outcomes of each course are developed to meet the programme outcomes and programme specific outcomes, which are also reflected in the Course Articulation Matrix. Course outcome and program outcome attainment is measured through direct and indirect tools including internal assessments, assignments, end semester examinations, dissertations, projects etc.

Although the curriculum has been designed after thorough deliberations involving experts from academia and industry, and considering the feedbacks obtained from various stakeholders, there is always a scope of regular revision and updation of the syllabus keeping in view the changing needs of the industry and society. Thus a well-articulated process is followed to revise the curriculum from time to time. The process begins with obtaining feedbacks from various stakeholders i.e. students, faculty, alumni, parents and industry experts. The feedbacks are analyzed and relevant suggestions are incorporated in the curriculum through a curriculum revision workshop under the supervision of Departmental Academic Committee (DAC).The revised curriculum is scrutinized by the Board of Studies (BOS) and suggestions of the BOS are also incorporated. The revised curriculum is then placed before the Board of Faculty for consideration which is further reviewed and approved by the Academic Council.

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SCHOOL OF COMPUTER APPLICATIONS

DEPARTMENT OF COMPUTER APPLICATIONS

VISION AND MISSION OF THE DEPARTMENT VISION

To be a reputed source for globally competent professionals in computer applications through strong research and teaching environment; to empower them to become socially and economically responsible citizens for the betterment of society.

MISSION

1.   To impart theoretical and practical training in advanced areas of computer applications and contribute new knowledge through analytical learning which encourages creativity, insight development and a passion for information technology.

2.   To provide better ambience for research in order to enhance the performance of faculty members and scholars while continually providing conducive teaching- leaning and research environment.

3.   To provide learning ambience to generate innovative and problem-solving skills with professionalism.

ABOUT THE DEPARTMENT

Department of Computer Applications is one of the oldest departments of the university engaged in teaching and research in computer applications. Currently, it is offering BCA, B.Sc (IT) and MCA programmes with latest, industry-ready curriculum which is being kept regularly updated in the light of latest developments in the IT industry. There is great thrust on practical applications. We provide a highly interactive learning environment so that the students get a full feel of the subject and get fully involved in the acquisition of computer skills. Students are encouraged in innovative and critical thinking in various computer languages, platforms and protocols. They are exposed to live industry projects to enable them to gain insights into the working of the industry.

PROGRAM EDUCATION OBJECTIVES (PEOs)

The objective of the programme is to develop students to work in fields of Computer Applications in various sectors together with internet technologies, e-business applications etc. The BSc IT program is focused on exposing students to business application areas. The program provides a strong foundation with an integrated understanding of Information Technology based applications. The program is designed to impart the concepts, values, challenges, opportunities and latest trends in the field of Computer Science to develop a broad practical understanding of its context, purpose, and underlying functional areas. The BSc IT programme tends more towards software application development and exposure to the latest software tools and techniques to develop the applications.

1. To prepare graduates who will be successful professionals in industry, government, academia, research, entrepreneurial pursuit and consulting firms in the field of Computer Applications.

2. To provide students a solid foundation in computing fundamentals and techniques required to solve related problems and also to pursue higher studies and research.

3. To inculcate students in professional and ethical attitude, effective communication skills, multidisciplinary approach and an ability to relate computing issues to broader social context.

4. To provide students an academic environment for excellence, leadership and continuous learning, on technology and trends needed for a successful career.

When the above objectives are achieved, the graduates will be:

1. Well-prepared for successful careers in industry / consultancy / research & development /teaching and allied areas related to the subjects of Computer Applications.

2. Academically prepared to lead organizations they join or start.

3. Engage in professional and extension activities in the field of Computer Applications & its allied areas and contribute to the profession and society at large by pushing the frontier in technology.

4. Successful in higher education in allied areas and in management, if pursued, leading to masters and research programs.

5. Groomed as software developers, enabling them to contribute effectively to the growth and development of the knowledge body.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1. Explore technical comprehension in varied areas of Computer Applications and experience a conducive environment in cultivating skills for thriving career and higher studies.

PSO2. Comprehend, explore and build up computer programs in the allied areas like Algorithms, System Software, Multimedia, Web Design and Data Analytics for efficient design of computer-based systems of varying complexity.

PROGRAM OUTCOMES (POs)

Programme outcomes are attributes of the graduates from the programme that are indicative of the graduates' ability and competence to work as an IT professional upon graduation. These Outcomes are statements that describe what students are expected to now or do by the time of graduation. They must relate to knowledge and skills that the students acquire from the programme. The achievement of all outcomes indicates that the student is well prepared to achieve the program educational objectives down the road.

The programme outcomes are the following:

PO1. Computational Knowledge: Understand and apply mathematical foundation, computing and domain knowledge for the conceptualization of computing models from defined problems.

PO2. Problem Analysis: Ability to identify, critically analyze and formulate complex computing problems using fundamentals of computer science and application domains.

PO3. Design / Development of Solutions: Ability to transform complex business scenarios and contemporary issues into problems, investigate, understand and propose integrated solutions using emerging technologies.

PO4. Conduct Investigations of Complex Computing Problems: Ability to devise and conduct experiments, interpret data and provide well informed conclusions.

PO5. Modern Tool Usage: Ability to select modern computing tools, skills and techniques necessary for innovative software solutions

PO6. Professional Ethics: Ability to apply and commit professional ethics and cyber regulations in a global economic environment.

PO7. Life-long Learning: Recognize the need for and develop the ability to engage in continuous learning as a Computing professional.

PO8. Project Management: Ability to understand management and computing principles with computing knowledge to manage projects in multidisciplinary environments

PO9. Communication Efficacy: Communicate effectively with the computing community as well as society by being able to comprehend effective documentations and presentations.

PO10. Societal & Environmental Concern: Ability to recognize economical, environmental, social, health, legal, ethical issues involved in the use of computer technology and other consequential responsibilities relevant to professional practice.

PO11. Individual & Team Work: Ability to work as a member or leader in diverse teams in multidisciplinary environment.

PO12. Innovation and Entrepreneurship: Identify opportunities, entrepreneurship vision and use of innovative ideas to create value and wealth for the betterment of the individual and society.

MAPPING OF PEOs WITH POs and PSOs

	Program Outcome(PO)/ Program Specific Outcome (PSO)	PEOs that are attained through concerned PO
PO1	Computational Knowledge: Understand and apply mathematical foundation, computing and domain knowledge for the conceptualization of computing models from defined problems.	**1,2**
PO2	Problem Analysis: Ability to identify, critically analyze and formulate complex computing problems using fundamentals of computer science and application domains.	**1,2**
PO3	Design / Development of Solutions: Ability to transform complex business scenarios and contemporary issues into problems, investigate, understand and propose integrated solutions using emerging technologies..	**1,2,3**
PO4	Conduct Investigations of Complex Computing Problems: Ability to devise and conduct experiments, interpret data and provide well informed conclusions.	**2,3**
PO5	**Modern Tool Usage:** Ability to select modern computing tools, skills and techniques necessary for innovative software solutions	**2**
PO6	Professional Ethics: Ability to apply and commit professional ethics and cyber regulations in a global economic environment.	**3**
PO7	Life-long Learning: Recognize the need for and develop the ability to engage in continuous learning as a Computing professional	**3,4**
PO8	Project Management: Ability to understand management and computing principles with computing knowledge to manage projects in multidisciplinary environments.	**2,3**
PO9	Communication Efficacy: Communicate effectively with the computing community as well as society by being able to comprehend effective documentations and presentations.	**3,4**
PO10	Societal & Environmental Concern: Ability to recognize economical, environmental, social, health, legal, ethical issues involved in the use of computer technology and other consequential responsibilities relevant to professional practice.	**3,4**
PO11	Individual & Team Work: Ability to work as a member or leader in diverse teams in multidisciplinary environment	**3,4**
PO12	Innovation and Entrepreneurship: Identify opportunities, entrepreneurship vision and use of innovative ideas to create value and wealth for the betterment of the individual and society.	**1,3**
PSO1	Explore technical comprehension in varied areas of Computer Applications and experience a conducive environment in cultivating skills for thriving career and higher studies.	**2,4**

PSO2	Comprehend, explore and build up computer programs in the allied areas like Algorithms, System Software, Multimedia, Web Design and Data Analytics for efficient design of computer-based systems of varying complexity.	**1**	

Semester System and Choice Based Credit System (CBCS)

Credit based system of study and student's performance/progress is measured by the number of credits that he/she has earned, i.e. completed satisfactorily. Based on the course credits and grade obtained by the student, grade point average is calculated

(a) Course credits assignment

Each course has a certain number of credits assigned to it depending upon its duration in periods for lecture, tutorial and laboratory/clinical practice in a week. A few courses/activities are without credit (s) and are referred to as Audit Pass Courses (APC) but are mandatory to pass as a partial fulfillment of award of degree.

(b) Earning of credits

At the end of every course, a letter "Grade" shall be awarded in each course for which a student has registered. On obtaining a minimum Pass Grade, student shall accumulate the course credits as Earned Credits. A student's performance shall be measured by the number of credits that he/she has earned and by the weighted grade point average. Grades obtained in the audit courses shall not be counted for computation of grade point average, however shall be mandatory to pass as a partial fulfillment of award of degree.

For Award of Degree of a programme BSc (IT) , he/she has to earn minimum 136 credits during the 3 year duration of the programme in 6 semesters.

The students going for 4th year of the programme can pursue for 4 year Degree programme (Honours/Research) by earning additional 30 credits in 4th year of the programme. Such students shall be at par with level 8 as per NEP 2020 and can further pursue one year of the programme.

The total credits required to be earned have been further classified under two baskets of courses: "Compulsory Courses Basket", and "Elective Courses Basket". The total 104 credits required to be earned under "Compulsory Courses Basket" and 32 credits under "Elective Courses Basket".

All courses under "Compulsory Courses Basket", are required to be qualified and cleared/pass by each and every student enrolled under the programme and are semester-wise listed in the study scheme along with credits assigned to each course.

Under Elective Courses Basket, there will be three types of courses:

·   Semester-wise courses offered by the department itself

·   Open/Inter-disciplinary courses offered at the Institute/University level notified from the office of Dean Academics.

·   Massive Open Online Courses (MOOCs) available on SWAYAM Platform or any other platform as recommended by UGC/AICTE and notified from the office of Dean-Academics.

Each course shall have credits assigned to it. Student shall be required to register courses every semester for as many courses/credits specified under "Elective Courses Basket" depending upon his/her interest, capability/pace of learning and availability of time slot (without any clash in time table) so as to earn all required total credits under the "Elective Courses Basket" during the entire programme duration.

However, for registration of courses [including courses under "Compulsory Courses Basket", "Elective Courses Basket" and Previous Semester Courses (wherein he/she was declared in-eligible on the basis of attendance or he/she could not clear the course within permissible given chances)], if any, the maximum limit in a semester shall be 30 credits.

Definition of key words

- Program: An educational program leading to the award of a Degree, diploma or certificate.

- Academic Year: Two consecutive (one odd + one even) semesters constitute one academic year.

- Semester: Each semester consists of 15-18 weeks of academic work equivalent to 90 days of actual teaching days. The odd semester may be scheduled from July to December and even Semester from January to June.

- CBCS: It provides choice for students to select from the prescribed courses.

- Course: It is usually referred to as "Papers". All courses need not carry the same weight/ credit. A course may comprise lectures/ tutorials/ practicals, field work, outreach activities/ project work/ vocational training/ viva/ seminars etc., or a combination of a few of these.

- Credit: A unit by which the course work is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching or two hours of practical work.

- Semester Grade Point Average (SGPA): It is a measure of performance of work done in a semester. It is ratio of total credit points secured by a student in various courses registered in a semester and the total course credits taken during that semester. It is expressed up to two decimal points.

▪ Cumulative Grade Point Average (CGPA): It is a measure of overall cumulative performance of a student over all the semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters and the sum of total credits of all courses in all the semesters. It is also expressed up to two decimal points

▪ Grade Point: It is the numerical weight allotted to each letter grade on a 10 point scale.

- Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by letters O, A+, A, B+, B, C, P and F.

- Transcript or Grade Card: Based on the grades earned, a grade certificate is issued to all registered students after every semester. The certificate displays the course details along with SGPA of that semester and CGPA earned till that semester

B.Sc IT - SEMESTER WISE STUDY SCHEME WITH CONTACT HOURS, ASSIGNED CREDITS & DISTRIBUTION OF MARKS

S. No	Course Type	Course Name	Course Code	L	T	P	Total	Int marks	Ext marks	Total	Duration of Exam	Credits
			First Semester									
1	Core	Python Programming	BSCIT-DS-110	3			3	100	100	200	3	3
2	Core	Operating System	BSCIT-DS-102	3			3	100	100	200	3	3
3	Fundamentals	Linear Algebra and Statistical Techniques	BSCIT-DS-103	3			3	100	100	200	3	3
4	Fundamentals	Placement Competency Enhancement-I	CDC-111		4		4	50	50	100	3	2
5	Core	Python Programming Lab	BSCIT-DS-151B			4	4	50	50	100	3	2
			Total Credits									**13**

S. No	Course Type	Course Name	Course Code	L	T	P	Total	Int marks	Ext marks	Total	Duration of Exam	Credits
			Second Semester									
1	Core	Data Structure & Algorithm	BSCIT-DS-201	3			3	100	100	200	3	3
2	Core	Web Applications Development	BSCIT-DS-211	3			3	100	100	200	3	3
3	Core	Database Management System	BSCIT-DS-203	3			3	100	100	200	3	3
4	Fundamentals	Environmental Studies	CH-202B	3	1		4	100	100	200	3	3+1*
5	Core	Data Structure & Algorithm Lab	BSCIT-DS-251A			4	4	50	50	100	3	2
6	Core	Web Applications Development Lab	BSCIT-DS-261			4	4	50	50	100	3	2
7	Core	Database Management System Lab	BSCIT-DS-253A			4	4	50	50	100	3	2
8	Core	Placement Competency Enhancement-II	CDC-112		4		4	50	50	100	3	2
			Total Credits									**21**

Third Semester												
S. No	Course Type	Course Name	Course Code	L	T	P	To tal	Int mark s	Ext mark s	Tota l	Duratio n of Exam	Credi ts
1	Core	Object Oriented Programming using Java	BSCIT-DS-301	3			3	100	100	200	3	3
2	Core	Computer Networks	BSCIT-DS-302	3			3	100	100	200	3	3
3	Core	Computer Architecture & Organization	BSCIT-DS-303	3			3	100	100	200	3	3
4	Fundamental s	Placement Competency Enhancement-III	CDC- 211		4		4	50	50	100	3	2
5	Core	Research Innovation Catalyst- I	BSCIT-RIC- I		1		1	50	-	50	3	0.5
6	Core	Object Oriented Programming using Java Lab	BSCIT-DS-351			4	4	50	50	100	3	2
7	Domain Elective	Elective-I		2			2	100	100	200	3	2
8	Domain Elective	Elective-II		2			2	100	100	200	3	2
9	Core	System Programming	BSCIT-DS-306	3			3	100	100	200	3	3
Total Credit												20.5

	CC/IoT	CS/ Blockchain	FSD/DevOps	MM/ Gaming	MC/ Networking
	Cloud Computing	Cyber Security	FSD	Multimedia	Mobile Computing
Elective -I	Introduction to Cloud Services (BSCIT-CC-001)	Introduction to Cyber Security (BSCIT-CS-001)	Beginner Full Stack Web Development: HTML, CSS, React and Node (BSCIT-FSD-001)	Introduction to Graphic Design (BSCIT-MM-001)	Mobile Ad-hoc Networks (BSCIT-MC-001)
	Virtualisation Concepts (BSCIT-CC-002)	Cyber Security for Everyone (BSCIT-CS-002)	FSD and Social Network: PHP, MySQL, JS (BSCIT-FSD-002)	Multimedia and Web Design (BSCIT-MM-002)	Introduction to Mobile Computing and Wireless Computing (BSCIT-MC-002)
	IoT	BlockChain	DevOps	Gaming with AR VR	Networking
Elective -II	Introduction to Internet of Things (BSCIT-IOT-	Introduction to Blockchain (BSCIT-BC-001)	Introduction to DevSecOps (BSCIT-DO-001)	Game Art and Design Fundamentals (BSCIT-AR-001)	Network Design and Modelling (BSCIT-CN-001)

	001)				
	Data Analytics for Internet of Things (BSCIT-IOT-002)	Blockchain Foundations and Digital Currencies (BSCIT-BC-002)	DevOps Foundations: Software Development Optimization (BSCIT-DO-002)	Computer Aided Engineering Graphics (BSCIT-AR-002)	Network Virtualization (BSCIT-CN-002)

Fourth Semester

S. No	Course Type	Course Name	Course Code	L	T	P	To tal	Int marks	Ext marks	Total	Duration of Exam	Credits
1	Core	Software engineering	BSCIT-DS- 401	3			3	100	100	200	3	3
2	Core	Cloud Computing	BSCIT-DS- 402	3			3	100	100	200	3	3
3	Core	Relational Database Management system	BSCIT-DS- 403	3			3	100	100	200	3	3
4	Fundamentals	Placement Competency Enhancement-IV	CDC- 212		4		4	50	50	100	3	2
5	Core	Cloud Computing Lab	BSCIT-DS- 452			4	4	50	50	100	3	2
6	Core	Relational Database Management System Lab	BSCIT-DS- 453A			4	4	50	50	100	3	2
7	Domain Elective	**Elective-III**		2			2	100	100	200	3	2
8	Domain Elective	**Elective-IV**		2			2	100	100	200	3	2
9	Core	Research Innovation Catalyst-II	BSCIT-RIC-II		1		1	50	-	50	3	0.5
10	Core	Vocational Training (6 Weeks)	BSCIT-DS- 454					200	-	200	3	2
11	Core	Data Mining	BSCIT-DS- 406	3			3	100	100	200	3	3
Total Credit												**24.5**

		CC/IoT	CS/ Blockchain	FSD/ DevOps	MM/ Gaming	MC/ Networking
		Cloud Computing	**Cyber Security**	**FSD**	**Multimedia**	**Mobile Computing**
Elective-III		Cloud Architecture (BSCIT-CC-003)	IT fundamentals for Cyber Security (BSCIT-CS-003)	FSD with Django (BSCIT-FSD-003)	Multimedia and Visual Communication (BSCIT-MM-003)	Wireless Networks Architecture and Protocols (BSCIT-MC-003)
		Cloud & Machine Learning (BSCIT-CC-004)	Cyber Security Tools and Cyber Attacks (BSCIT-CS-004)	FSD with Angular (BSCIT-FSD-004)	2-D and 3-D Animation (BSCIT-MM-004)	TCP/IP Protocols (BSCIT-MC-004)
		IoT	**BlockChain**	**DevOps**	**Gaming with AR VR**	**Networking**

Elective-IV	IoT Architecture and Protocols (BSCIT-IOT-003)	Blockchain Architecture (BSCIT-BC-003)	DevOps and Environments (BSCIT-DO-003)	Understanding AR and VR concepts and Technologies (BSCIT-AR-003)	Network Configuration and Troubleshooting (BSCIT-CN-003)
	IoT Programming Languages (BSCIT-IOT-004)	Bitcoin and Crypto currency Technologies (BSCIT-BC-004)	DevOps and Cloud Virtualization (BSCIT-DO-004)	Composing of Objects using AR and VR (BSCIT-AR-004)	Cryptography and Network Security (BSCIT-CN-004)

Fifth Semester

S.No	Course Type	Course Name	Course Code	L	T	P	Total	Int marks	Ext marks	Total	Duration of Exam	Credits
1	Core	Big Data Analytics	BSCIT-DS-501	3			3	100	100	200	3	3
2	Core	System Administration and Maintenance	BSCIT-DS-511	3			3	100	100	200	3	3
3	Core	Big Data Analytics Lab	BSCIT-DS-551A			4	4	50	50	100	3	2
4	Core	Research Innovation Catalyst-III	BSCIT-RIC-III			2	2	100	-	100	3	1
5	Domain Elective	**Elective-V**		2			2	100	100	200	3	2
6	Domain Elective	**Elective-VI**		2			2	100	100	200	3	2
7	Core	Mobile Applications Development	BSCIT-DS-504	3			3	100	100	200	3	3
8	Core	Mobile Applications Development Lab	BSCIT-DS-554A			4	4	50	50	100	3	2
Total Credits												**18**

	CC/IoT	CS/ Blockchain	DevOps/FSD	MM/ Gaming	MC/ Networking
	Cloud Computing	**Cyber Security**	**FSD**	**Multimedia**	**Mobile Computing**
Elective-V	Cloud Computing Environments (BSCIT-CC-005)	CyberSecurity in Cloud (BSCIT -CS-005)	Principles of UI Design (BSCIT -FSD-005)	Digital Editing and Motion Graphics (BSCIT-MM-005)	Security in Wireless and Mobile Systems (BSCIT-MC-005)
	Cloud-Based Solutions for IoT Infrastructure (BSCIT-CC-006)	CyberSecurity Analyst Fundamentals (BSCIT-CS-006)	Spring Framework (BSCIT-FSD-006)	Production Process (BSCIT-MM-006)	Distributed Systems (BSCIT-MC-006)
	IoT	**Block Chain**	**DevOps**	**Gaming with AR VR**	**Networking**

Elective VI	IoT Security (BSCIT-IOT-005)	Blockchain and Smart Contracts (BSCIT-BC-005)	DevOps with Linux Cloud (BSCIT-DO-005)	Gaming and VR and AR (BSCIT-AR-005)	Networking Services (BSCIT-CN-005)
	IoT and Arduino (BSCIT-IOT-006)	Blockchain Platforms (BSCIT-BC-006)	DevOps, Cloud & Agile Foundations (BSCIT-DO-006)	Gaming With AI (BSCIT-AR-006)	Networking Essentials for Cloud Computing (BSCIT-CN-006)

Sixth Semester

S.No	Course Type	Course Name	Course Code	L	T	P	Total	Int marks	Ext marks	Total	Duration of Exam	Credits
1	Core	PHP Programming	BSCIT-DS-611	3			3	100	100	200	3	3
2	Core	Internet Technologies	BSCIT-DS-612	3			3	100	100	200	3	3
3	Core	PHP Programming Lab	BSCIT-DS-661			4	4	50	50	100	3	2
4	Core	Internet Technologies Lab	BSCIT-DS-662			4	4	50	50	100	3	2
5	Domain Elective	**Elective-VII**		2			2	100	100	200	3	2
6	Domain Elective	**Elective-VIII**		2			2	100	100	200	3	2
7	Core	Software Testing	BSCIT-DS-604	3			3	100	100	200	3	3
8	Core	Software Testing Lab	BSCIT-DS-654			4	4	50	50	100	3	2
9	Core	Project	BSCIT-DS-655	0	0	12	12	300	200	500	2	4
Total Credits												**23**

	CC/IoT	CS/ Blockchain	FSD/ DevOps	MM/ Gaming	MC/ Networking
	Cloud Computing	**Cyber Security**	**FSD**	**Multimedia**	**Mobile Computing**
Elective-VII	Cloud DevOpSec (BSCIT-CC-007)	CyberSecurity, IDS, Firewalls and HoneyPots (BSCIT-CS-007)	Test Automation (BSCIT-FSD-007)	Multimedia and Game Development (BSCIT-MM-007)	Mobile Applications Development Platforms (BSCIT-MC-007)
	Agile Cloud Automation (BSCIT-CC-008)	CyberSecurity Forensics (BSCIT-CS-008)	Advanced Web Technologies (BSCIT-FSD-008)	Special Effects (SFX) (BSCIT-MM-008)	Wireless Sensor Networks (BSCIT-MC-008)
	IoT	**Block Chain**	**DevOps**	**Gaming with AR VR**	**Networking**

Elective-VIII	Cloud and IoT Integration (BSCIT-IOT-007)	Introduction to Cryptography (BSCIT-BC-007)	DevOps Tools and Services (BSCIT-DO-007)	Immersive Technology and Media (AR/VR) (BSCIT-AR-007)	Network Management (BSCIT-CN-007)
	IoT and Embedded Systems (BSCIT-IOT-008)	Implementation of Blockchain and Smart Contracts (BSCIT-BC-008)	DevOps Culture and Mindset (BSCIT-DO-008)	Game Design Document: Define the Art & Concepts (BSCIT-AR-008)	Network Architecture and Solutions (BSCIT-CN-008)

Seventh Semester											
S.No	Course Type	Course Name	Course Code	L	T	P	Total	Int marks	Ext marks	Total	Duration of Exam	Credits
1	Core	Digital Marketing	BSCIT-DS-701	2			2	100	100	200	3	2
2	Core	Advanced Computer Architecture	BSCIT-DS-702	2			2	100	100	200	3	2
3	Core	**Entrepreneurship/ Dissertation (Minor)/Academic Project on CC/AI/CS/FSD/ MM/MC**	BSCIT-DS-703					100	100	200	3	10
Total Credits											**14**

Eight Semester											
S.No	Course Type	Course Name	Course Code	L	T	P	Total	Int marks	Ext marks	Total	Duration of Exam	Credits
1	Core	Deep Learning	BSCIT-DS-801	2			2	100	100	200	3	2
2	Core	Network Management System	BSCIT-DS-802	2			2	100	100	200	3	2
3	Core	**Entrepreneurship/ Dissertation (Major)/Academic Project on IoT/DS/BC/DO/ AR/CN**	BSCIT-DS-803					100	200	300	3	12
Total Credits											**16**

Note: For Successful completion of the 3-year BSc IT degree, the students need to earn 104 credits of compulsory courses, 16 credits of MOOC courses and Open Electives and 16 credits of Specialization Courses.

*The eligible students with 7.5 CGPA in the programme can go for 4th year of the programme and can pursue for 4 year Degree programme (Honours/Research) by earning

additional 30 credits in 4th year of the programme. Such students shall be at par with level 8 as per NEP 2020 and can further pursue one year of the programme.

FIRST SEMESTER

First Semester

S. No	Course Type	Course Name	Course Code	L	T	P	Total	Int marks	Ext marks	Total	Duration of Exam	Credits
1	Core	Python Programming	BSCIT-DS-110	3			3	100	100	200	3	3
2	Core	Operating System	BSCIT-DS-102	3			3	100	100	200	3	3
3	Fundamentals	Linear Algebra and Statistical Techniques	BSCIT-DS-103	3			3	100	100	200	3	3
4	Fundamentals	Placement Competency Enhancement-I	CDC-111		4		4	50	50	100	3	2
5	Core	Python Programming Lab	BSCIT-DS-151B			4	4	50	50	100	3	2
Total Credits												**13**

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES
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BSCIT-DS-110: PYTHON PROGRAMMING

Periods/week   Credits

L :3   T: 0   3

Duration of Exam: 3 Hrs

Max. Marks: 200

Continuous Evaluation: 100

End Semester Examination: 100

Pre -Requisite: Fundamentals of Programming
Course Type: Core

Course Outcomes: At the end of the course, students will be able to

BSCIT-DS-110.1. Understand and construct structured programming designs for a given business requirement including basic elements of computer programming such as variables, data and error types, statements, expressions, operators and graphical user-interface.

BSCIT-DS 110.2. Understand and apply the simple and nested selection/decision control structure when writing program code to make a decision.

BSCIT-DS 110.3. Apply the knowledge of pre & post tested loop/repetitive control structure when writing program code to process same sequence of tasks/activities.

BSCIT-DS 110.4. Familiarize with the concept of divide & conquer, and use the technology of "method" for

writing effective, efficient and reusable computer program.

BSCIT-DS 110.5. Demonstrate an understanding of static & dynamic arrays, single & multi-dimensional arrays which are frequently used in writing program code for searching and sorting data.

BSCIT-DS 110.6. Demonstrate an understanding of text file operation (reading/writing) and develop the appropriate program code for such operation including exception handling and data validation.

PART - A

UNIT 1: Introduction to Programming
1.1   History of Programming,
1.2   Difference b/w Programming Languages
1.3   System Development Life Cycle
1.4   Introduction to OOP
1.5   Introduction to Python: Installation, Python IDE
1.6   Syntax Rules and Basic Program
1.7   Numbers and Math Functions

UNIT 2: Programming Standards
2.1   Flow Chart
2.2   Pseudo Code and Hierarchy Chart
2.3   Syntax Errors
2.4   Logical Errors and Runtime Errors

UNIT 3: Programming Controls
3.1 Controls and Properties
3.2 Variables and Arithmetic Operations
3.3 Writing Program that Handle a Control Events
3.4 Strings
3.5 Data type conversions
3.6 Built –in functions

PART - B
UNIT 4: Program Routines
4.1 Modularization
4.2 Sub Procedure
4.3 User Defined Functions
4.4 Passing by Value and by Reference
4.5 Relational and Logical Operations
4.6 If Blocks
4.7 Select Case Blocks
4.8 Do Loops
4.9 Reading Data from Text File
4.10 Processing List of Data with a Do Loop (reading from file)
4.11 For….Next Loops

UNIT 5: Array Techniques
5.1 Creating and Accessing Array
5.2 Using Array
5.3 Array Sorting and Searching
5.4 Processing and Modifying Text File Contents
5.5 Additional Control

UNIT 6: Error Handling Techniques
6.1 Error handling (Try Catch)
6.2 Keyboard Events and Data Validation
6.3 Recursive Procedures
6.4 Finalize the Case Study

Suggested Readings:

1.   Think Python: How to Think Like a Computer Scientist. Allen Downey, Green Tea Press, June 2014.
2.   Tkinter 8.5 reference: a GUI for Python. John W. Shipman,2019
3.   Python Programming:Using Problem Solving Approach, Reema Thareja, Oxford University Press, 2017

Software Required / Weblinks:
  Python 2.6 or above https://www.continuum.io/downloads http://bit.ly/Rana-Python http://python.swaroopch.com/ https://www.scipy.org/docs.html

Note: Only latest editions of the books are recommended.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Distribution of Continuous Evaluation Table:

Sessional-I	30%
Sessional-II	30%
Assignment	20%
Class performance	10%
Attendance	10%

Assessment Tools: Assignment/Tutorials Sessional tests
Surprise questions during lectures/Class Performance Term end examination

COURSE ARTICULATION MATRIX:

CO-PO Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BSCIT-DS 110.1	1			2	1	3	2	1	-	1	1	2	1	
BSCIT-DS 110.2		3	2	1			3			3		2		3
BSCIT-DS 110.3	1	3	2	2	2				1		1	1	2	1
BSCIT-DS 110.4				2			1			3		3		2
BSCIT-DS 110.5		3		2		3		2		3				3
BSCIT-DS 110.6		1				2			2		3	2		2

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BSCIT-DS-102: OPERATING SYSTEM

Periods/week	Credits	Max. Marks: 200
L: 3 T:0 P:0	3	Continuous Evaluation : 100
Duration of Examination: 3 Hrs		End Semester Examination: 100

Pre-requisite: Basic Knowledge of Fundamentals of Computer System
Course Type: Core

Course Outcomes: At the end of the course, students will be able to:
BSCIT-DS-102.1. Demonstrate an in-depth knowledge of the core concepts of operating systems.
BSCIT-DS-102.2. Explain resource management techniques and address the issues related to performance, fairness, synchronization and deadlocks.
BSCIT-DS-102.3. Deploy and test operating systems concepts like scheduling algorithms in a simulation environment.
BSCIT-DS-102.4. Install, deploy, configure and maintain Windows and/or Linux operating systems.
BSCIT-DS-102.5. Develop workplace soft-skills including carrying out individual research and/or delivering oral presentations.

PART - A
UNIT 1: Introduction
1.1 Operating Systems Concepts
1.2 Overview of Computer -System Organisation and Architecture
1.3 Process Concepts
1.4 Process Scheduling
1.5 Operation On process
1.6 Interprocess Communication
1.7 Install, deploy, configure and maintain Linux Operating System
1.8 Install, deploy, configure and maintain Windows 8.1 operating System

UNIT 2: Threads & Process Synchronization
2.1 Threads Overview
2.2 Multicore programming
2.3 Multithreading Models
2.4 Process Synchronization Concepts
2.5 The Critical-Section problem
2.6 Synchronization hardware
2.7 Semaphores

UNIT 3: CPU Scheduling
3.1 CPU Scheduling Concepts

3.2 Scheduling Criteria

3.3 Scheduling Algorithm: First Come First Serve (FCFS),Shortest Job First(SJF),Priority Scheduling,

3.4 Round Robin Scheduling

3.5 Thread Scheduling

3.6 Multi-Processor Scheduling

3.7 Real-Time CPU Scheduling

PART - B

UNIT 4: Deadlock

4.1 Deadlocks Concepts

4.2 Deadlocks Characterization

4.3 Methods for handling Deadlocks

4.4 Deadlock Prevention, avoidance and detection

4.5 Recovery from Deadlocks

UNIT 5: Memory Management

5.1 Memory management

5.2 Swapping

5.3 Contiguous memory allocation

5.4 Segmentation

5.5 Paging

5.6 Page Table

5.7 Virtual Memory

5.8 Demand paging

5.9 Page Replacement Algorithms: First in First Out (FIFO) , Least Recently Used(LRU), Optimal Page Replacement Algorithm

5.10   Allocation of Frames

5.11   Thrashing and memory – mapped files

UNIT 6: Mass Storage System

6.1 Overview of Mass Storage Systems

6.2 Disk Structure, Scheduling and management

6.3 File Concept

6.4 File Access methods

6.5 Disk & Directory Structure

6.6 File Sharing and Protection

Suggested Readings:

1.   Operating System: Concept & Design: Milenkovie M, McGraw Hill, Second Edition,2009

2.   Operating System Incorporating With Unix & Windows: Colin Ritche, TMH,1974

3.   Operating Systems A Concept Based Approach 3rd Edition: Dhamdhere ,McGraw Hill, India, 3rd edition ,2003

4.   Operating System Concept s:Silberschatz, Wiley India, 9th edition ,2005

Weblinks:

https://www.tutorialspoint.com/operating_system/index.htm

https://www.studytonight.com/operating-system/

Note: Only latest editions of the books are recommended.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Distribution of Continuous Evaluation Table:

Sessional-I	30%
Sessional-II	30%
Assignment	20%
Class performance	10%
Attendance	10%

Assessment Tools: Assignment/Tutorials Sessional tests
Surprise questions during lectures/Class Performance
Term end examination

COURSE ARTICULATION MATRIX:

CO-PO Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BSCIT-DS-102.1	2	1	2	2	2	-	-	-	-	-	-	-	2	2
BSCIT-DS-102.2	2	3	3	2	1	-	1	-	-	-	-	-	2	1
BSCIT-DS-102.3	3	2	3	3	2	-	-	-	-	-	-	-	1	2
BSCIT-DS-102.4	2	2	2	2	2	-	-	-	-	-	-	-	2	1
BSCIT-DS-102.5	-	-	-	-	-	-	2	-	1	1	2	2	1	1

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BSCIT-DS-103: Linear Algebra & Statistical Techniques

Periods/week	Credits	Max. Marks : 200
L: 3 T:1 P:0	4	Continuous Evaluation: 100
Duration of Examination: 3 Hrs		End Semester Examination: 100

Pre-requisites: Basic Knowledge of Mathematics.
Course Type: Core

Course Outcomes: At the end of the course more precisely, the outcomes are students will be able to:

BSCIT-DS-103.1 Understand and apply the concepts of algebraic skills essential for the study of systems of linear equations, matrix algebra, eigenvalues, eigenvectors, diagonalization and their uses in various fields of technology.

BSCIT-DS-103.2 Demonstrate understanding the concepts in vector spaces, namely, basis, dimension etc.

BSCIT-DS-103.3 Demonstrate understanding of the theoretical foundations of linear algebra, such as linear transformations, transition matrix and similarity.

BSCIT-DS-103.4 Apply correlation and regression techniques to check the dependency in data.

BSCIT-DS-103.5 Apply the concept of probability theory, probability distributions and sampling theory to solve, analyse and interpret given data.

PART - A

UNIT 1 Matrices

1.1 Introduction to Matrices
1.2 Operation of Matrices
1.3 Determinant
1.4 Solution of Linear Equations
1.5 Elementary Row Transformations
1.6 Rank of Matrix

UNIT 2 Systems of Linear Equations

2.1 Homogeneous Linear Systems
2.2 Eigen values
2.3 Cayley-Hamilton Theorem
2.4 Eigenvectors

UNIT 3: Spaces

3.1 Introduction of Groups, Rings, Field
3.2 Vector space and its examples
3.3 Subspaces
3.4 Linear combinations
3.5 Linear dependence and Linear Independence

PART - B

UNIT 4: Linear transformations

4.1 Introduction to Linear Transformations Definition and examples

4.2 Elementary properties

4.3 The matrix of a linear transformation

4.4 Linear operator and similarity

4.5 Algebra of linear transformations

4.6 Transpose of a linear transformation.

UNIT 5: Statistics

5.1 Mean and standard deviation of Data set

5.2 Correlation and Regression

5.3 Fitting a straight line, Parabola

5.4 Probability distribution: Binomial distribution, Poisson distribution,

5.5 Normal distribution**.**

UNIT 6: Hypothesis Testing

6.1 Simple sampling of Attributes: Large samples

6.2 Test of significance for small samples, Standard error

6.3 Null Hypothesis, Confidence Limits

6.4 Student's-t-distribution

6.5 Chi-Square Test

Suggested Readings:

1. Linear Algebra A Geometric Approach, S. KUMARESAN, Prentice Hall of India Private Limited, New Delhi.
2. Kolman, Bernard, & Hill, David R. (2001). Introductory Linear Algebra with Applications (7th ed.). Pearson Education, Delhi. First Indian Reprint 2003. I
3. Introduction to Linear Algebra, SERGE LANG, Springer Verlag
4. Fundamentals of Mathematical Statistics, S.C. Gupta and V.K. Kapoor, Sultan Chand

Additional Reading:

1. Lay, David C., Lay, Steven R., & McDonald, Judi J. (2016). Linear Algebra and its Applications (5th ed.). Pearson Education
2. John E. Freund's Mathematical Statistics with Applications, Irwin Miller Marylees Miller, Eighth Edition, Pearson Publications

Note: Only latest editions of the books are recommended.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Distribution of Continuous Evaluation Table:

Sessional-I	30%
Sessional-II	30%
Assignment	20%
Class performance	10%
Attendance	10%

Assessment Tools:
Assignment/Tutorials
Sessional tests
Surprise questions during lectures/Class Performance
Term end examination

Course Articulation Matrix:

CO-PO Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BSCIT-DS-103.1	1	2	3	2	1	--	--	--	--	--	--	2	1	--
BSCIT-DS-103.2	3	3	1	2	1	--	--	--	--	--	--	1	-1	--
BSCIT-DS-103.3	3	3	2	2	1	--	--	--	--	--	1	1	1	--
BSCIT-DS-103.4	3	2	1	3	1	--	--	--	--	--	--	1	1	--
BSCIT-DS-103.5	3	3	2	3	1	--	--	--	--	--	--	1	1	--

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CDC-111-Placement Competency Enhancement - I

Periods/week Credits	Max. Marks : 100
L:0 T:4 2	Continuous Evaluation : 50
Duration of Examination: 3 Hrs	End Semester Examination : 50

Pre-Requisite: NA
Course Type: Core

By the end of this course the:
CO 1: Students will be able to develop all-round personality by mastering interpersonal skills to function effectively in different circumstances.
CO 2: Students will be able to demonstrate effective communication through grammatically correct language.
CO 3: Students will be able to apply effective listening and speaking skills in real life scenarios.
CO 4: Students will be able to recognize problems based on arithmetic & number system.
CO 5: Students will be able to solve problems based on verbal reasoning & simplification.
CO 6: Students will be able to calculate the correct answers to the problems within given time.

Part A
Unit 1: Attitudinal Communication
1.1 Attitude and its Impact on Communication
1.2 Courtesy & Politeness in Communication
1.3 Diversity & Inclusion – Bullying, Cultural Sensitivity, Stereotypes, Sexual Harassment, LGBTQ, Respect, Chivalry, Racial & Gender Discrimination, Disability Harassment, Inclusion.
1.4 Power Dressing

Unit 2: Syntactical Communication - I
2.1 Common errors in communication
2.2 Identification of word class
2.3 Errors & rectifications in
    2.3.1 Article usage
    2.3.2 Tenses usage - Present Perfect vs. Past Simple vs. Past Perfect
    2.3.3 Subject Verb Agreement

Unit 3: Phonetics
3.1 Impact of First Language Influence
3.2 Tone
3.3 Intonation
3.4 Rate of Speech
3.5 Pronunciation: Vowels & Consonant sounds

Unit 4: Developing Communication Skills –I (Listening & Speaking)
4.1 Concept of LSRW: Importance of LSRW in communication.
4.2 Listening Skills : Real Life challenges, Barriers to Listening
4.3 Speaking : Self Introduction, Interview, GD, Resume

Part B

Unit 5: Number System
5.1 Vedic Mathematics
       5.1.1 Basic of mathematics
       5.1.2 Addition and subtraction using Vedic Mathematics
       5.1.3 Multiplication of two and three numbers.
5.2 Simplification
       5.2.1 BODMAS rule
       5.2.2 Fractions and recurring decimals
       5.2.3 Surds and indices
5.3 Numbers
       5.3.1 Types of numbers and number tree
       5.3.2 Divisibility Rule
       5.3.3 HCF & LCM
       5.3.4 Factors and Multiples
       5.3.5 Unit Digits & Cyclicity
       5.3.6 Remainders
       5.3.7 Factorials

Unit 6: Arithmetic 1
6.1 Averages
6.2 Progressions
6.3 Logarithm

Unit 7: Logical Reasoning 1
7.1 Direction Sense Test
7.2 Blood Relation Test
7.3 Ranking

SUGGESTED READINGS:
1. Koneru, Arun, Professional Communication, Tata McGraw Hill, New Delhi
2. Monipally, M.M., Business Communication Strategies, Tata McGraw Hill, New Delhi
3. McGrath, E.H., Basic Managerial Skills for All, Prentice Hall of India, New Delhi
4. Rai, Urmila and S.M. Rai, Business Communication, Himalaya Publishing House

Only latest available editions of the books are recommended

Distribution of Continuous Evaluation Table

Sessional I	30
Sessional II	30
Assignment	20
Class Performance	10
Attendance	10

Assessment Tools:
Assignment/Tutorials
Sessional tests
Surprise questions during lectures/Class Performance
Term end examination

Course Articulation Matrix

CO-PO Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CDC-111.1	2	3	3	2	2	1	2	2	2	3
CDC-111.2	2	3	3	2	1	1	2	2	2	3
CDC-111.3	2	3	3	2	1	1	2	2	2	3
CDC-111.4	2	3	2	1	-	-	-	1	1	2
CDC-111.5	2	3	2	1	-	-	-	1	1	2
CDC-111.6	2	3	3	2	1	1	2	2	2	3

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BSCIT-DS-151B: PYTHON PROGRAMMING LAB

Periods/week	Credits	Max. Marks :100
P: 2 T:0	1	Continuous Evaluation :50
Duration of Examination: 3 Hrs		End Semester Examination :50

Pre-Requisite: NA
Course Type: Core

Course Outcomes: At the end of the course, students will be able to:
BSCIT-DS-151B.1. Develop simple Python programs for solving problems.
BSCIT-DS-151B.2. Develop Python programs with conditions and loops.
BSCIT-DS-151B.3. Create, define and call Python functions.
BSCIT-DS-151B.4. Use Python data structures, lists, tuple & dictionaries.
BSCIT-DS-151B.5. Understand the various data structures available in Python and apply them in solving computational problems.
BSCIT-DS-151B.6. Test and debug the code written in Python.
BSCIT-DS-151B.7. Apply error handling techniques in Python.
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List of Practical:

1. Create a program that asks user to enter their name and their age. Print out a message addressed to them that tells them the year that they will turn 100 years old.

2. Ask the user for a number. Depending on whether the number is even or odd, print out an appropriate message to the user. Hint: how does an even / odd number react differently when divided by 2?

3. Take a list, say for example this one:

a = [1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89]

and write a program that prints out all the elements of the list that are less than 5. Extras:
   a.   Instead of printing the elements one by one, make a new list that has all the elements less than 5 from this list in it and print out this new list.
   b.   Write this in one line of Python.
   c.   Ask the user for a number and return a list that contains only elements from the original list   a that are smaller than that number given by the user.
4. Create a program that asks the user for a number and then prints out a list of all the divisors of that number. (If you don't know what a divisor is, it is a number that divides evenly into another number. For example, 13 is a divisor of 26 because 26 / 13 has no remainder.)
5. Take two lists, say for example these two:

a = [1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89]
b = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13]

and write a program that returns a list that contains only the elements that are common between the lists (without duplicates). Make sure your program works on two lists of different sizes.

6. Ask the user for a string and print out whether this string is a palindrome or not. (A palindrome is a string that reads the same forwards and backwards.)

7. Let's say I give you a list saved in a variable: a = [1, 4, 9, 16, 25, 36, 49, 64, 81, 100]. Write one line of Python that takes this list a and makes a new list that has only the even elements of this list in it.

8. Make a two-player Rock-Paper-Scissors game. (Hint: Ask for player plays (using input), compare them, print out a message of congratulations to the winner, and ask if the players want to start a new game)
    Remember the rules:
    *   Rock beats scissors
    *   Scissors beats pape
    *   Paper beats rock

9. Generate a random number between 1 and 9 (including 1 and 9). Ask the user to guess the number, then tell them whether they guessed too low, too high, or exactly right. (Hint: remember to use the user input lessons from the very first exercise)

10. Ask the user for a number and determine whether the number is prime or not. (For those who have forgotten, a prime number is a number that has no divisors.).

11. Write a program (function!) that takes a list and returns a new list that contains all the elements of the first list minus all the duplicates.

12. Write a password generator in Python. Be creative with how you generate passwords - strong passwords have a mix of lowercase letters, uppercase letters, numbers, and symbols. The passwords should be random, generating a new password every time the user asks for a new password. Include your run-time code in a main method.

13. Write a function that takes an ordered list of numbers (a list where the elements are in order from smallest to largest) and another number. The function decides whether or not the given number is inside the list and returns (then prints) an appropriate boolean.

14. Implement a function that takes as input three variables, and returns the largest of the three. Do this without using the Python max() function!

15. For this exercise, we will keep track of when our friend's birthdays are, and be able to find that information based on their name. Create a dictionary (in your file) of names and birthdays. When you run your program it should ask the user to enter a name, and return the birthday of that person back to them. The interaction should look something like this:

Welcome to the birthday dictionary. We know the birthdays of: Albert Einstein Benjamin Franklin Ada Lovelace

Who's birthday do you want to look up? Benjamin Franklin

Benjamin Franklin's birthday is 01/17/1706. Happy coding!

16. Write a Python Program to implement inheritance and operator overloading
17. Implement exception handling in python
18. Make a mini project based on above mentioned list of practical. Suggested mini projects are:

a. Text Based Adventure Game

The Goal: Remember Adventure? Well, we're going to build a more basic version of that. A complete text game, the program will let users move through rooms based on user input and get descriptions of each room. To create this, you'll need to establish the directions in which the user can move, a way to track how far the user has moved (and therefore which room he/she is in), and to print out a description. You'll also need to set limits for how far the user can move. In other words, create "walls" around the rooms that tell the user, "You can't move further in this direction.

b. Hangman

The Goal: Despite the name, the actual "hangman" part isn't necessary. The main goal here is to create a sort of "guess the word" game. The user needs to be able to input letter guesses. A limit should also be set on how many guesses they can use. This means you'll need a way to grab a word to use for guessing. (This can be grabbed from a pre-made list. No need to get too fancy.) You will also need functions to check if the user has actually inputted a single letter, to check if the inputted letter is in the hidden word (and if it is, how many times it appears), to print letters, and a counter variable to limit guesses.

c. Guess the Number

The Goal: Similar to the first project, this project also uses the random module in Python. The program will first randomly generate a number unknown to the user. The user needs to guess what that number is. (In other words, the user needs to be able to input information.) If the user's guess is wrong, the program should return some sort of indication as to how wrong (e.g. The number is too high or too low). If the user guesses correctly, a positive indication should appear. You'll need functions to check if the user input is an actual number, to see the difference between the inputted number and the randomly generated numbers, and to then compare the numbers.

Suggested Readings:

1. Think Python: How to Think Like a Computer Scientist : Allen B . Downey, Shroff/O'Reilly Publishers,2015

2. An Introduction to Python – Revised and updated for Python 3.2: Guido van Rossum and Fred L. Drake Jr, Network Theory Ltd., 2011.

3. Introduction to Programming in Python: An Inter-disciplinary Approach: Robert Sedge wick, Kevin Wayne, Robert Dondero, Pearson India Education Services Pvt. Ltd.,2015

4. Exploring Python: Timothy A. Budd, Mc-Graw Hill Education (India) Private Ltd.2011

Note: Only latest editions of the books are recommended Software required/ Web links:
Python 3.6.4
https://www.tutorialspoint.com/python/index.htm
https://www.programiz.com/python-programming/first-program

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Distribution of Continuous Evaluation Table:

Viva-I	30%
Viva-II	30%
File/ Records	20%
Class performance	10%
Attendance	10%

Assessment Tools:
Experiments in lab
File work/Class Performance
Viva (Question and answers in lab)
End Term Practical Exam

COURSE ARTICULATION MATRIX:

PO-CO Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BSCIT-DS-151B.1	1	2		3	3	3			3		2	2	2	1
BSCIT-DS-151B.2	2			2		2			2	2		2		2
BSCIT-DS-151B.3	2		1		3	3	2	1				3		1
BSCIT-DS-151B.4	2			2			3		3	2		3	2	3
BSCIT-DS-151B.5	3		2			3		1			3		3	2
BSCIT-DS-151B.6	3			2			3		3					2
BSCIT-DS-151B.7	3	3	1	1	3	3				1	2	2	2	2

SECOND SEMESTER

S. No	Course Type	Course Name	Course Code	L	T	P	Total	Int marks	Ext marks	Total	Duration of Exam	Credits
		Second Semester										
1	Core	Data Structure & Algorithm	BSCIT-DS-201	3			3	100	100	200	3	3
2	Core	Web Applications Development	BSCIT-DS-211	3			3	100	100	200	3	3
3	Core	Database Management System	BSCIT-DS-203	3			3	100	100	200	3	3
4	Fundamentals	Environmental Studies	CH-202B	3	1		4	100	100	200	3	3+1*
5	Core	Data Structure & Algorithm Lab	BSCIT-DS-251A			4	4	50	50	100	3	2
6	Core	Web Applications Development Lab	BSCIT-DS-261			4	4	50	50	100	3	2
7	Core	Database Management System Lab	BSCIT-DS-253A			4	4	50	50	100	3	2
8	Core	Placement Competency Enhancement-II	CDC-112		4		4	50	50	100	3	2
		Total Credits										21

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BSCIT-DS-201: DATA STRUCTURE & ALGORITHM

Periods/week	Credits	Max. Marks: 200
L :3 T: 0	3	Continuous Evaluation: 100
Duration of Exam: 3 Hrs		End Semester Examination: 100

Pre-Requisite: Knowledge of C programming
Course Type: Core

Course Outcomes: At the end of the course, students will be able to
BSCIT-DS-201.1. Define the concepts of data structures and its applications.
BSCIT-DS-201.2. Understand the concept of Dynamic memory management, data types, algorithms, Big O notation.
BSCIT-DS-201.3. Apply data structures in solving real life problems.
BSCIT-DS-201.4. Analyze the complexity of different data structures such as stacks, queues and Linked list.
BSCIT-DS-201.5. Evaluate the complexity of various sorting algorithms in best, average and worst case scenarios.

PART -A

UNIT 1: Introduction to Data Structure
1.1 Concept and Definition of Data and Information
1.2 Concepts of Data type –primitive and non-primitive
1.3 Performance analysis and measurement (Time and space analysis of algorithms-average; best and worst-case analysis)
1.4 Types of Data Structures: Linear & nonlinear data structures
1.5 Array: Representation of one and multidimensional arrays in memory
1.6 Operations: traversing; insertion; deletion; reversing; searching; sorting; merging two arrays
1.7 Sparse matrices: representation

UNIT 2: Linear Data Structure
2.1 Stacks: Stack-definitions; concepts and representation
2.2 Operations of Stack
2.3 Applications: Matching Parenthesis; Recursion; Towers of Hanoi;
2.4 Polish Notation; infix to postfix notation; evaluating postfix expression
2.5 Queues: Representation
2.6 Operations on Queues: Insert; delete
2.7 Circular queues
2.8 Types of queue: Deque and Priority Queues
2.9 Applications of Queue

UNIT 3: Introduction to Linked List
3.1 Linked List: Representation
3.2 Operations of Linked List
3.3 Circular Linked List
3.4 Polynomial Representation
3.5 Double Linked List and operations

PART-B

UNIT 4: Trees

4.1 Trees: Some definitions
4.2 Representing a general tree
4.3 Types of Trees
4.4 Representation of Binary Tree
4.5 Traversing Binary Tree
4.6 Convert general tree into binary tree
4.7 Thread
4.8 Operations on BST
4.9 AVL Tree
4.10   B tree
4.11   B+ tree

UNIT 5: Graph Theory

5.1 Graph Definition
5.2 Graph representation (Adjacency List and Adjacency Matrix)
5.3 Multi graphs
5.4 Directed Graphs
5.5 Sequential and Linked Representation of Graphs
5.6 Traversing a Graph: BFS; DFS
5.7 Spanning trees
5.8 Minimum Spanning Tree: Prim's method and Kruskal's method
5.9 Single source shortest path

Unit 6: File Organization

6.1 Introduction to File Organization
6.2 Hashing Techniques
6.3 Collision Resolution Techniques
6.4 Sorting: Bubble sort; Selection sort; Quick sort; Merge sort; Insertion sort; Heap sort
6.5 Searching: Linear search and Binary search

Suggested Readings:

1.   Data Structure , Seymour Lipschutz,
2.   Data Structure, McGraw Hill Education
3.   Jean-Paul Tremblay & Paul G. Sorenson, An Introduction to Data Structures with Applications, Tata McGraw Hill Publishing.
4.   Rashmi Agrawal, Sachin Sharma, Seema Sharma, Data Structure, Manav Rachna Publishing House.
5.   Ten Baum, Data Structures using C & C++, Prentice-Hall International.

Note: Only latest editions of the books are

Recommended. Software required/ Web links:
Dev C/ Turbo C++
https://www.tutorialspoint.com/design_and_analysis_of_algorithms/
https://www.youtube.com/watch?v=1PI58Q3Ne2w

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Distribution of Continuous Evaluation Table:

Sessional-I	30%
Sessional-II	30%
Assignment	20%
Class performance	10%
Attendance	10%

Assessment Tools:
Assignment/Tutorials
Sessional tests
Surprise questions during lectures/Class Performance
Term end examination

COURSE ARTICULATION MATRIX:

CO-PO STATEMENT	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
BSCIT-DS-201.1	3	1	2	2	2		3	2	1			
BSCIT-DS-201.2	2	2	3	1	1		2					
BSCIT-DS-201.3	2	2	2	2	3		3					
BSCIT-DS-201.4	3	3	3	2	2		1					
BSCIT-DS-201.5	2	2	2					2				

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BSCIT-DS-211: WEB APPLICATIONS DEVELOPMENT

Periods/week   Credits   Max. Marks: 200
L: 3   T: 3   Continuous Evaluation: 100
Duration of Examination: 3 Hrs   End Term Examination: 100

Pre-Requisite: Knowledge of Information Technology and Programming Concepts
Course Type: Core

Course Outcomes: At the end of the course, the student will be able to:
BSCIT-DS-211.1 Understand the concept of World Wide Web and its applications
BSCIT-DS-211.2 Learn the basics of HTML and its structure
BSCIT-DS-211.3 Compare Client side and Server side technologies to develop web applications.
BSCIT-DS-211.4 Apply basic syntax and semantics of JavaScript to create a dynamic web pages
BSCIT-DS-211.5 Integrate CSS with HTML for designing interactive web pages.

PART-A
UNIT 1: Introduction to Networks, Protocols and World Wide Web
1.1 History of Networks
1.2 Network & its types
1.3 Internet and its essentials
1.4 Applications of Internet
1.5 Internet Addressing
1.6 E-mail Architecture and Services
1.7 Simple Mail Transfer Protocol, File Transfer Protocol, Uniform Resource Locator, Telnet and Internet Relay Chat
1.8 World Wide Web
1.9 Different Web Browsers and their Characteristics
1.10   Search Engines and their Features
1.11   Web Client and Server

UNIT 2: Effective User Interface Design using HTML
2.1 Introduction to HTML
2.2 Different HTML Documents
2.3 Basic Structure of HTML Document
2.4 Markup Tags used in HTML
2.5 Heading-Paragraphs and Line Breaks
2.6 Elements of HTML: Working with Text
2.7 Working with Hyperlinks: Internal and End Semester Examination
2.8 Images and Multimedia used in HTML

UNIT 3: Lists and Tables in HTML
3.1 Lists in HTML
   3.1.1 Ordered and Unordered List
   3.1.2 Definition List
   3.1.3 Directory List
   3.1.4 Menu List
3.2 Tables in HTML
   3.2.1 HTML table and its Structure
   3.2.2 Aligning the HTML Table
   3.2.3 Alignment within row and within a cell in table
   3.2.4 Table Formatting
   3.2.5 Spanning of multiple rows and columns.
   3.2.6 Advantages of using HTML Tables

UNIT 4: Modern Web Applications using Frames and Forms
4.1 Frames in HTML
 4.1.1 Frames and its usages in HTML
 4.1.2 Applications of Frames
 4.1.3 <FRAMESET> and Nesting <FRAMESET> tag
 4.1.4 Placing Content in Frames with the <FRAME> tag
 4.1.5 Targeting Named Frames
 4.1.6 Different Frames Documents
4.2 Forms in HTML
 4.2.1 Creating Forms using <FORM> tag
 4.2.2 Named Input Fields
 4.2.3 Text Box; Radio Button; Check Box; List Box; Combo Box
 4.2.4 Creating Submit and Reset Button
 4.2.5 Multiple Line Text Windows
4.3 Introduction to XML and XHTML.

UNIT 5: Cascading Style Sheets (CSS)
5.1 Introduction to Cascading Style Sheets
5.2 The Need for Style Sheets
5.3 Basic Syntax and Structure of Style Sheets
5.4 Inline Style sheets; Internal Style sheets; External Style sheets; Embedding Style sheets
5.5 Linking External Style sheets
5.6 Background; Manipulating Text; Margins and Padding
5.7 Positioning using CSS

UNIT 6: Web Programming using Java Script
6.1 Introduction to JavaScript
6.2 Basic Programming Structure of JavaScript
6.3 Data Types; Variables and Constants
6.4 Operators; Operator Precedence; Expressions
6.5 Functions in JavaScript
6.6 Arrays and its types
6.7 Concept of Objects
6.8 Different Events in JavaScript
6.9 Dialogue Boxes and their Usages

Suggested Readings:
1. Ivan Bayross,HTML, DHTML, PERL, CGI, BPB Publications.
2. Behrouz A. Forouzan, Data Communication and Networking, McGraw Hill.
3. Stuart Langridge, DHTML Utopia - Modern Web Design Using JavaScript & DOM, Sitepoint.
4. Elizabeth Castro,HTML 4 for World Wide Web: Visual Quick Start Guide, Peachpit Press.

Note: Only latest editions of the books are recommended.

Software required/ Weblinks:
 Notepad
 Web Browser
 https://www.tutorialspoint.com/html/
 https://www.csstutorial.net/
 https://javascript.info/

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Distribution of Continuous Evaluation Table

Sessional I	30%
Sessional II	30%
Assignment	20%
Class Performance	10%
Attendance	10%

Assessment Tools:
Assignment/Tutorials
Sessional tests
Surprise questions during lectures/Class Performance
Term end examination

COURSE ARTICULATION MATRIX:

CO-PO STATEMENT	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P12	PSO1	PSO2
BSCIT-DS-211.1	3						2		3			1	3	3
BSCIT-DS-211.2		3		2					2		3		3	3
BSCIT-DS-211.3	2			3	1		3						3	3
BSCIT-DS-211.4	3					2			3			1	3	
BSCIT-DS-211.5	2			2							3		3	3

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BSCIT-DS-203: DATABASE MANAGEMENT SYSTEM

Periods/week	Credits	
L :3 T: 0	3	Max. Marks : 200
		Continuous Evaluation: 100
Duration of Exam: 3 Hrs		End Semester Examination: 100

Pre-Requisite: NA
Course Type: Core

Course Outcomes: **At the end of the course, students will be able to:**
BSCIT-DS-203.1. Identify types & features of database systems and database management systems (DBMS).
BSCIT-DS-203.2. Analyse a given business requirement and produce the logical database design using entity relationship diagram (ERD).
BSCIT-DS-203.3. Apply the normalization process to logical database design up to 3NF.
BSCIT-DS-203.4. Produce a physical database design from logical design using SQL DDL to maintain schema, tables and constraints.
BSCIT-DS-203.5. Construct both single and multi-table queries using SQL DML for inserting, updating, deleting and selecting the required data.
BSCIT-DS-203.6. Demonstrate basic knowledge of creating / using programmatic SQL (procedural or transact SQL).
BSCIT-DS-203.7. Develop workplace soft-skills including working in groups, writing formal reports, carrying out individual research and/or delivering oral presentations.

PART -A

UNIT 1: Introduction to Data and Database Concepts
1.1 Introduction to Data Base Management System
1.2 Data versus Information Records Files
1.3 Data Dictionary
1.4 Database Administrator: Functions and Responsibilities
1.5 File-Oriented System versus Database System
1.6 Business Requirements

UNIT 2: Database System Architecture
2.1 Introduction
2.2 Schemas
2.3 Sub schemas and Instances
2.4 Codd's Rules
2.5 Data Base Architecture
2.6 Data Independence
2.7 Database Forms and Reports

UNIT 3: Database Models and ER Diagrams
3.1 Mapping Data Models
3.2 ER diagrams, Case Studies to represent E-R Diagram
3.3 Types of Database Systems
3.4 Normalization: 1NF, 2NF, 3NF, BCNF
3.5 Case study to Implement Normalization on Data

PART - B

UNIT 4: Introduction to Structured Query Language

4.1 Data Definition Language (DDL)

4.2 Data Manipulation Language (DML)

4.3 Data Control Language (DCL)

4.4 Introduction to Database Design (Logical &Physical)

4.5 Operators, Keys

4.6 Constraints: Relational Constraints, Domain Constraints, Key Constraints, Integrity Constraints

4.7 Functions

4.8 Clauses (group by, order by etc.)

UNIT 5: Implementing Structured Query Language

5.1 Creating Tables

5.2 Relating tables

5.3 SQL Select for Query Construction

5.4 Views, Joins

5.5 Union

5.6 Intersection

5.7 Cartesian product

5.8 Index

5.9 Stored Procedures, Triggers

5.10   Database Maintenance with SQL

UNIT 6: Concurrency Control

6.1 Transaction Management: Introduction; Transaction Properties; Transaction States

6.2 Introduction to Concurrency Control

6.3 Problems of Concurrent Transaction

6.4 Locks: Introduction; Types of Locks

6.5 Algorithms of Concurrency Control

Suggested Readings:

1.   Database Systems: Design, Implementation and Management : Rob. Peter and Coronel,

2.   Carlos. London: Macmillan,2006 (7th edition)

3.   Fundamentals of Database Systems :Navathe , Pearson Education,2002 (3rd edition)

4.   An Introduction to Database Systems : Desai Bipin , Galgotia Publications,1990 (6th edition)

5.   SQL,PL/SQL: Bayross Ivan, BPB Publications,2009 (4th edition)

Software Required / Weblinks: Oracle 10g or above https://www.tutorialspoint.com/dbms https://www.w3schools.in › DBMS

Note: Only latest editions of the books are recommended.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

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Surprise questions during lectures/Class Performance
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COURSE ARTICULATION MATRIX:

CO-PO Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BSCIT-DS-203.1	1	1		2	3			2	2			3		2
BSCIT-DS-203 .2	1	3	2			3		3		1	3			
BSCIT-DS-203 .3			1	2		3						3		3
BSCIT-DS-203 .4	1	1	2	2			2		3		2	2	3	
BSCIT-DS-203.5	1	1	2	2	1					2		3		3
BSCIT-DS-203.6	1	1	2	1	1	1	1							
BSCIT-DS-203 .7	2			2	3		1		1	3	1	1	1	3

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CH-202B: ENVIRONMENTAL STUDIES AND WASTE MANAGEMENT

Periods/week Credits	Max. Marks : 200
L :3 T: 1 3+1*	Continuous Evaluation: 100
Duration of Exam: 3 Hrs	End Semester Examination: 100

Pre-Requisite: The students should have the knowledge of environment, biodiversity, atmospheric pollution and importance of environmental studies. They should have the knowledge of causes and effects of disasters and various environmental problems.
Course Type: Fundamental

Course Outcomes: At the end of the course, students will be able to:
CH-202B.1. Understand the significance of equitable use of natural resources and will be able to utilize the knowledge of biodiversity conservation and protection of environment.
CH-202B.2. Learn about atmospheric pollution and global issues related to environment like natural disasters and will be able to understand the different acts for pollution control.
CH-202B.3. Able to develop an understanding to major health issues of women and children will gain knowledge of Mortality and Mortality rate.
CH-202B.4. Have the knowledge of different ecosystems and energy flow in ecosystem.
CH-202B.5. Gain knowledge of disaster management

PART- A

Unit 1: Multidisciplinary Nature of Environmental Studies
1.1 Definition, scope and importance.
1.2 Need for Public awareness.

Unit 2: Natural Resources Renewable and non-renewable resources:
2.1 Natural resources and associated problems.
2.2 Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.
2.3 Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
2.4 Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
2.5 Food resources: World food problems, changes caused by agriculture and over-grazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
2.6 Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.
2.7 Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
2.8 Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

Unit 3: Ecosystems
3.1 Concept of an ecosystem, Structure and function of an ecosystem
3.2 Producers, consumers and decomposers, Energy flow in the ecosystem
3.3 Ecological succession
3.4 Food chains, food webs and ecological pyramids
3.5 Introduction, types, characteristic features, structure and function of the following eco-system: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

Unit 4: Biodiversity and its Conservation

4.1 Introduction – Definition: Genetic, species and ecosystem diversity

4.2 Bio geographical classification of India,

4.3 Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values

4.4 Biodiversity at global, National and local levels

4.5 India as a mega-diversity nation, Hot-spots of biodiversity

4.6 Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India

4.7 Conservation of biodiversity: In- situ and Ex-situ conservation of biodiversity.

PART-B

Unit 5: Environmental Pollution

5.1 Definition, causes, effects and control, measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal Pollution

5.2 Nuclear hazards

5.3 Solid waste management: Causes effects and control measures of urban and industrial wastes.

5.4 Role of an individual in prevention of pollution.

5.5 Pollution case studies.

5.6 Disaster management: Floods, earthquake, cyclone and landslides.

Unit 6: Social Issues and the Environment

6.1 From unsustainable to sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, watershed management

6.2 Resettlement and rehabilitation of people; its problems and concerns, Case Studies.

6.3 Environmental ethics: Issues and possible solutions.

6.4 Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Case studies.

6.5 Wasteland reclamation.

6.6 Consumerism and waste products.

6.7 Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and Control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act.

6.8 Issues involved in enforcement of environmental legislation, Public awareness.

Unit 7: Human Population and the Environment

7.1 Population growth, variation among nations

7.2 Population explosion – Family Welfare Programme

7.3 Environment and human health. Human Rights

7.4 Value Education.HIV/ AIDS, Woman and Child Welfare

7.5 Role of Information Technology in Environment and human health, Case Studies.

Unit 8: Chemistry for peaceful purposes

8.1 The duality of chemistry: Chemistry for peaceful purposes versus Chemical Weapons

8.2 Dual – use nature of toxic and precursor chemicals

8.3 Weapons of mass destructions, disarmament

Unit 9: Field work*

9.1 Visit to a local area to document environmental assets river/ Forest/grassland/hill/mountain

9.2 Visit to a local polluted site-Urban/Rural/Industrial/Agricultural

9.3 Study of common plants, insects, birds

9.4 Study of simple ecosystems-pond, river, hill slopes, etc.

Suggested Readings:

1. Text book of Environmental Studies: Sarita Sachdeva, Manav Rachna Publishing House Pvt. Ltd.,2008
2. Textbook of Environmental Studies for Undergraduate Courses: ErachBharucha for University Grants Commission Publication.,2005 (3rd edition)
3. Environmental Studies: R. Rajagopalan, Oxford University Press.,2005
4. Environmental Chemistry: A.K. De, Wiley Eastern Ltd. 2006(6TH edition)
5. Environmental Bio-monitoring: The Biotechnology Eco-toxicology Interface: M. James, Lynch & Alan Wiseman, 1998, Cambridge University Press,1998 (4st edition)
6. Environmental Impact Assessment: R.R BARTHWAL, New age international (p) limited publisher,2002
7. A Text Book in Environmental Science: V. Subramanian, Narosa Pub.,2002

Note: Only latest editions of the books are recommended.

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Distribution of Continuous Evaluation Table:

Sessional-I	30%
Sessional-II	30%
Assignment	20%
Class performance	10%
Attendance	10%

Assessment Tools:
Assignment/Tutorials
Sessional tests
Surprise questions during lectures/Class Performance
Term end examination

COURSE ARTICULATION MATRIX:

CO-PO Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CH-202B.1	3	3	3	3	2	2	1	2	2	3		2		
CH-202B.2		3	3	2	3	2			1	3	1	2		
CH-202B.3		2	3	3	3	2						3		
CH-202B.4		2	2	2	2		2					2		
CH-202B.5		3	3	3	3	3	2			3		2		

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BSCIT-DS-251A: DATA STRUCTURE & ALGORITHM LAB

Periods/week Credits   Max. Marks: 100
P: 4   T:0   2   Continuous Evaluation: 50
Duration of Examination: 3 Hrs   End Semester Examination :50

Co-Requisite: Concepts of data structures
Course Type: Core

Course Outcomes: At the end of the course, students will be able to
BSCIT-DS-251A.1. Analyze the asymptotic performance of various algorithms.
BSCIT-DS-251A.2. Design and implement various algorithms with use of arrays, records, linked structures, stacks, queues.
BSCIT-DS-251A.3. Demonstrate different methods for traversing trees.
BSCIT-DS-251A.4. Compare alternative implementations of data structures with respect to performance.
BSCIT-DS-251A.5. Design and develop non-linear data structures like Trees and Graphs.

List of Experiments:

Every student is required to maintain Practical File and write the following steps in each practical:
a) Problem statement
b) Formula(s) used
c) Algorithm
d) Flow Chart
e) Source codes in student's handwriting
f) Program listing (print-out)
g) Input & Output.

1. Write a program in C to implement insertion in 1-D Arrays
2. Write a program in C to implement deletion in 1-D Arrays
3. Write a program in C to implement linear and binary searching in 1-D Arrays
4. Write a program in C to implement sorting in 1-D Arrays
5. Write a program in C to concatenate two arrays
6. Write a program in C to implement the following Operations on 2-D Array (addition; subtraction; multiplication; transpose)
7. Write a program in C to implement operations on Stack using array
8. Write a program in C to implement operations on Stack using linked list
9. Write a program in C to implement applications of Stack
10. Write a program in C to implement operations on queue using array
11. Write a program in C to implement operations on queue using linked list
12. Write a program in C to implement operations on circular queue using array
13. Write a program in C to implement insertion in a linked list(beg; mid; end)
14. Write a program in C to implement deletion from a linked list(beg; mid; end)
15. Write a program in C to implement insertion in a circular linked list(beg; mid; end)
16. Write a program in C to implement deletion from a circular linked list(beg; mid; end)
17. Write a program in C to implement insertion in a doubly linked list(beg; mid; end)
18. Write a program in C to implement deletion from a doubly linked list(beg; mid; end)
19. Write a program in C to implement insertion in Binary tree
20. Write a program in C to implement deletion from Binary tree
21. Write a program in C to implement recursive tree traversals (Inorder; Preorder; Postorder)
22. Write a program in C to Sort a list using Bubble Sort

23. Write a program in C to Sort a list using Selection Sort
24. Write a program in C to sort a list using Quick Sort
25. Write a program in C to sort a list using Merge Sort
26. Write a program in C to sort a list using Insertion Sort
27. Write a program in C to sort a list using Heap Sort
28. Discuss the External sorting
29. Make a mini project based on above mentioned list of practical. Suggested mini projects are:

a) **Library Management**

Implement the library management system with the help of linked list for 50 books with following functionalities:
1. Add new books
2. Delete outdated books
3. Update Books
4. Make reports for the total no of books
5. Search books
6. Quit

b) **Railway Reservation System**

Develop a system using to reserve the railway tickets with the help of dynamic queue with the help of following functionalities:
1. Book the ticket and confirm
2. Waiting
3. Clear the waiting on FCFS basis
4. Report the number of list confirmed
5. Report the number of waitings
6. Quit

c) **University Management System**

Develop a system using to reserve the railway tickets with the help of dynamic queue with the help of following functionalities:
1. Registration in course
2. Available courses
3. Fee Details
4. Report Registered student details
5. Report Total submitted fee details
6. Quit

Suggested Readings:

1. Seymour Lipschutz, Data Structure , McGraw Hill Education
2. Jean-Paul Tremblay & Paul G. Sorenson, An Introduction to Data Structures with Applications, Tata McGraw Hill Publishing.
3. Rashmi Agrawal, Sachin Sharma, Seema Sharma, Data Structure, Manav Rachna Publishing House.
4. Ten Baum, Data Structures using C & C++, Prentice-Hall International.

Note: Only latest editions of the books are recommended.

Software required/ Web links:
- Dev C/ Turbo C++
- https://www.tutorialspoint.com/design_and_analysis_of_algorithms/
- https://www.youtube.com/watch?v=1PI58Q3Ne2w

Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Distribution of Continuous Evaluation Table:

Viva-I	30%
Viva-II	30%
File/ Records	20%
Class performance	10%
Attendance	10%

Assessment Tools:

Experiments in lab

File work/Class Performance

Viva (Question and answers in lab)

End Term Practical Exam

COURSE ARTICULATION MATRIX:

PO-CO Statement	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO 11	PO 12	PSO1	PSO2
BSCIT-DS-251A.1	1	1	1		2		2						2	3
BSCIT-DS-251A.2	1	1	1				2						3	3
BSCIT-DS-251A.3	1	1	2	2	1		1	2					1	2
BSCIT-DS-251A.4	1	1	2	2	1		2	2				3	2	2
BSCIT-DS-251A.5	1	1	1	1	2		2	3				3	2	1

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BSCIT-DS-261: WEB APPLICATIONS DEVELOPMENT LAB

Periods/week   Credits   Max. Marks :100
P: 2   T: 2   Continuous Evaluation: 50
Duration of Examination: 3 Hrs   End Semester Examination: 50

Co-Requisite: Knowledge of HTML and JavaScript
Course Type: Core

Course Outcomes: At the end of the course, the student will be able to:
BSCIT-DS-261.1 Apply markup language elements in web pages.
BSCIT-DS-261.2 Use Java scripting language to web pages.
BSCIT-DS-261.3 Implement cascading style sheets on web pages.
BSCIT-DS-261.4 Develop websites incorporating web technologies (HTML,CSS and Java script)

List of Experiments:
Every student is required to maintain Practical File and write the following steps in each practical:
a) Problem statement
b) Formula(s) used
c) Algorithm
d) Flow Chart
e) Source codes in student's handwriting
f) Program listing (print-out)
g) Input & Output.

HTML
1. Create a simple HTML page using basic tags.
2. Create a web page that displays your name to the screen.
3. Create a web page and show the output from 1 to 10 in separate lines.
4. Create a web page and show the output from 1 to 10 in separate lines, each number being in different colour.
5. How do I make a picture as a background on my web pages?
6. Create a web page to print a paragraph with 4-5 sentences, each sentence shall have a different font.
7. Write HTML code to print a paragraph that is description of a book, it shall include the title of the book, its author name; name and title should be underlined and all adjectives shall be bold and Italics.
8. Write HTML code to print your name using Heading tag, every letter shall be of different heading size
9. Write HTML code to print the sequence of numbers 1-20. Each number shall be in different line with number 2 next to it as subscript, an equal sign and the result.
10.Write HTML code to display an image with border of size with width 200, height 200 pixels, leaving Hspace and Vspace of your choice with image hanging in the right side on the screen.
11.Write HTML code to create a web page with heading. The heading shall be displayed at the top-center of the page and the image shall be at the center, just below the heading.
12.Write HTML code using Multimedia tags.
13.Create a Table using Rowspan and Colspan taking example of student Record.
14.Write HTML code using table tag <table> and cellpadding and cellspacing as its attributes.
15.Create unordered, ordered and definition Lists taking example of your subjects in MCA IST, IInd and IIIrd Semester.
16.Write HTML code using <frameset> and <frame> tag with all its attributes
17.Write HTML code to design a form in HTML using controls and buttons such as Teaxtbox, Textarea, password, submit button, browse button, drop-down menu

18. Write HTML code to design a Registration Form in HTML.
19. Write HTML code to design a student admission Form in HTML.
20. Create a proper home page of your own using any components and styles.
21. Write HTML code for including Local hyperlinking in a web page.
22. Write HTML code for including Inter hyperlinking in a web page.
23. Write HTML code for including External hyperlinking in a web page.
24. Write code to show External CSS with HTML code.
25. Write code to show Internal CSS with HTML code.
26. Write code to show Inline CSS with HTML code.
27. Write a program to add two numbers using form in Javascript.
28. Write a program in Javascript to swap two images using OnmouseOver event.
29. Write a simple JavaScript program to sort an array.
30. Write a JavaScript program to take as input three numbers from the user. Find the minimum and maximum of the three numbers. Print the following output in BOLD in the following format:
31. MINIMUM =
32. MAXIMUM =
33. Make a mini project based on above mentioned list of practical. Suggested mini projects are:
    a). Student Admission Process for University:
Website will have all the necessary contents and number of web pages pertaining the admission process of any university. The process will inculcate the eligibility criteria, entrance exam and its result, based on the fetched information, a student can get the admission in a particular course in the University.

    b). Movie Ticket Booking System:
The website will facilitate the advance booking of movie tickets, local shows, applying discounts and different payment options for registered users.

    c). Online Food Order System:
The online portal will provide the complete food order from nearby restaurants. The site will be first register the users and further go for processing of orders.

    d). Online Event Booking in Delhi/NCR
The website will show all the events details of Dehi/NCR to the registered users. After taking and interest of the user, an appropriate notification will be send to the user for an event.

Suggested Readings:
1. Ivan Bayross, HTML, DHTML, PERL, CGI, BPB Publications.
2. Behrouz A. Forouzan, Data Communication and Networking, McGraw Hill.
3. Stuart Langridge, DHTML Utopia - Modern Web Design Using JavaScript & DOM, Sitepoint.
4. Elizabeth Castro, HTML 4 for World Wide Web: Visual Quick Start Guide, Peachpit Press.

Note: Only latest editions of the books are recommended.

Software required/Weblinks:
　　　　Notepad
　　　　Web Browser
　　　　https://www.tutorialspoint.com/html/
　　　　https://www.csstutorial.net/
　　　　https://javascript.info/

COURSE ARTICULATION MATRIX:

PO-CO Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BSCIT-DS-261.1	3						3		2			2	2	3
BSCIT-DS-261.2		1			3				3		2		2	3
BSCIT-DS-261.3	3			3	2		2						2	3
BSCIT-DS-261.4	2					1			3			2	2	3

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BSCIT-DS-253A: DATABASE MANAGEMENT SYSTEM LAB

Periods/week Credits   Max. Marks :100
P: 2   T:0   2   Continuous Evaluation :50
Duration of Examination: 3 Hrs   End Semester Examination :50

Pre -Requisite: NA
Course Type: Core

Course Outcomes: the end of the course, students will be able to:
BSCIT-DS-253A.1. Identify types & features of database systems and database management systems (DBMS).
BSCIT-DS-253A.2. Analyse a given business requirement and produce the logical database design using entity relationship diagram (ERD).
BSCIT-DS-253A.3. Apply the normalization process to logical database design up to 3NF.
BSCIT-DS-253A.4. Produce a physical database design from logical design using SQL DDL to maintain schema, tables and constraints.
BSCIT-DS-253A.5. Construct both single and multi-table queries using SQL DML for inserting, updating, deleting and selecting the required data.
BSCIT-DS-253A.6. Demonstrate basic knowledge of creating / using programmatic SQL (procedural or transact SQL).

List of Practical's:

Q1: Create the following tables Student

Column_name	Data type	Size	Constraint
StudentId	Number	4	Primary Key
Student name	Varchar2	40	Not null
Address1	Varchar2	300	
Gender	Varchar2	15	
Course	Varchar2	8	

Course

CourseID	Data type	Size	Constraint
DeptNo	Number	2	Primary Key
Dname	Varchar2	20	
Location	Varchar2	10	

1. Insert five records for each table.
2. List all information about all students from student table
3. List all student numbers along with their Courses.
4. List Course names and locations from the Course table

5. List the details of the Students in MCA Course.

6. List the names of the employees whose employees numbers are 7369, 7777, 2233

7. List the employee names not belonging to the department 10, 40

8. List the employee names who are not eligible for commission.

9. List the employees whose names start with "S" not s.

10. List the employees ending with name "s".

11. Display all the Arithmetic functions used in SQL.

12. List the names, salary and PF amount of all the employees (PF is calculated as 10% of salary)

13. List the employee names having "k" as the second character.

14. List the students not assigned to any department.

15. List the students details in ascending order of course

Q2: Create the tables Customer and Orders as per the following: CUSTOMER

column name	characteristic
SID	Primary Key
Last_Name	
First_Name	

ORDERS

column name	Characteristic
Order_ID	Primary Key
Order_Date	
Customer_SID	Foreign Key
Amount	Check > 20000

1. Insert five records for each table

2. The Customer_SID column in the ORDERS table is a foreign key pointing to the SID column in the CUSTOMER table.

3. List the details of the customers along with the amount.

4. List the customers whose names end with "s".

5. List the orders where amount is between 21000 and 30000

6. List the orders where amount is increased by 500 and replace with name "new amount".

7. Display the order_id and total amount of orders

8. Calculate the total amount of orders that has more than 15000.

9. Display all the contents of s4 and s5 using union clause.

10. Find out the intersection of s4 and s5 tables.

11. Display the names of s4 and s5 tables using left, right, inner and full join.

12. Display the first name of employee and their managers using self-join.

13. Find out the names of s4 which are distinct

14. Write a query to Grant access and modification rights to customer table to user
15. Write a query to revoke access rights to customer table to user
16. Make a mini project based on above mentioned list of practical. Suggested mini projects are:

a) RETAIL APPLICATION DATABASE Management

Consider a situation for online retail application where a customer can register to purchase an item. The customer will provide bank account number and bank name (can have multiple account number). After registration, each customer will have a unique customerid, userid and password. A customer can purchase one or more item in different quantities. The items can of different classes based on their prices. Based on the quantity, the price of the item and discount (if any) on the purchased items, the bill will be generated. A bank account is required to settle the bill. The items can be ordered to one or more suppliers

b) UNIVERSITY DATABASE Management System

Consider the Scenario of a college. A College contains many departments. Each department can offer any number of courses. Many instructors can work in a department, but an instructor can work only in one department. For each department, there is a head, and an instructor can be head of only one department. Each instructor can take any number of courses, and a course can be taken by only one instructor. A student can enroll for any number of courses and each course can have any number of students.

c) HOSPITAL MANAGEMENT SYSTEM

A patient will have unique Patient ID. Maintain the full description about the patient such as personal detail and phone number, Disease and what treatment is going on. The doctor will handle patients, One doctor can Treat more than 1 patient. Also, each doctor will have unique ID. Doctor and Patients will be related. Patients can be admitted to hospital. So different room numbers will be there, also rooms for Operation Theaters and ICU. There are some nurses, and ward boys for the maintenance of hospital and for patient take care. Calculate the treatment bill based on the number of days.

Q3: Consider the schema for Movie Database:
ACTOR(Act_id, Act_Name, Act_Gender)
DIRECTOR(Dir_id, Dir_Name, Dir_Phone)
MOVIES(Mov_id, Mov_Title, Mov_Year, Mov_Lang, Dir_id)
MOVIE_CAST(Act_id, Mov_id, Role)
RATING(Mov_id, Rev_Stars)
Write SQL queries to
1. List the titles of all movies directed by 'Hitchcock'.
2. Find the movie names where one or more actors acted in two or more movies.
3. List all actors who acted in a movie before 2000 and also in a movie after 2015 (use JOIN operation).
4. Find the title of movies and number of stars for each movie that has at least one rating and find the highest number of stars that movie received. Sort the result by movie title. 5. Update rating of all movies directed by 'Steven Spielberg' to 5.

Q4. Consider the schema for College Database:
STUDENT(USN, SName, Address, Phone, Gender)
SEMSEC(SSID, Sem, Sec)
CLASS(USN, SSID)
SUBJECT(Subcode, Title, Sem, Credits)
IAMARKS(USN, Subcode, SSID, Test1, Test2, Test3, FinalIA)

Write SQL queries to
1. List all the student details studying in fourth semester 'C'section.
2. Compute the total number of male and female students in each
semester and in each section.
3. Create a view of Test1 marks of student USN '1BI15CS101' in
all subjects.
4. Calculate the FinalIA (average of best two test marks) and update
the corresponding table for all students.
5. Categorize students based on the following criterion:
If FinalIA = 17 to 20 then CAT = 'Outstanding'
If FinalIA = 12 to 16 then CAT = 'Average'
If FinalIA< 12 then CAT = 'Weak'
Give these details only for 8th semester A, B, and C section students

Case Study:
Develop three different methods to combine data from multiple tables into single result.Tables are:
Event

Column_name	Data type	Size	Constraint
Event_id	Varchar2	6	Primary Key
Duration	Number	20	

Status_code	Varchar2	6	Foreign Key
Reason_code	Varchar2	15	Foreign Key

Status

Column_name	Data type	Size	Constraint
Status_code	Varchar2	6	Primary Key
Name	Char	20	

Ready_Reason

Column_name	Data type	Size	Constraint
Reason_code	Varchar2	15	Primary Key
Name	Char	20	

Delay_Reason

Column_name	Data type	Size	Constraint
Reason_code	Varchar2	15	Primary Key
Name	Char	20	

Method 1: Joining to the Status table to get the status name (using Inner Join).Method 2 : Utilizing
UNION to Combine Reason Table Rows

Suggested Readings:
d) Simplified approach to DBMS :Parteek Bhatia, Gurvinder Singh, Kalyani Publishers,2016
e) Introduction to PL/SQL: IyanByross, BPB Publications, 2002

Software required/Weblinks:
ORACLE 10g
https://www.tutorialspoint.com/sql https://www.w3schools.com/sql/

Note: Only latest editions of the books are recommended.
Instructions for paper setting: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B (one from each unit). Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.

Distribution of Continuous Evaluation Table:

Viva-I	30%
Viva-II	30%
File/ Records	20%
Class performance	10%
Attendance	10%

Assessment Tools:
Experiments in lab
File work/Class Performance
Viva (Question and answers in lab)
End Term Practical Exam

COURSE ARTICULATION MATRIX:

PO-CO Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BSCIT-DS-253A.1	1	1		2	3			2	2			3		2
BSCIT-DS-253A.2	1	3	2			3		3		1	3			
BSCIT- DS-253A.3			1	2		3						3		3
BSCIT-DS-253A.4	1	1	2	2			2		3		2	2	3	
BSCIT-DS-253A.5	1	1	2	2	1					2		3		3
BSCIT-DS-253A.6	1	1	2	1	1	1	1							

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CDC-112 Placement Competency Enhancement- II

Periods/week Credits
L:0   T: 4   2
Duration of Examination: 3 Hrs

Max. Marks   : 100
Continuous Evaluation: 50
End Semester Examination: 50

Learning Outcomes
By the end of this course the:
CO 1: Students will be able to exhibit effective reading and writing skills in a professionally stimulated environment.
CO 2: Students will be able to enhance skills to effectively deliver formal and informal presentations to a variety of audiences in multiple contexts.
CO 3: Students will be able to learn grammatically correct formal writing skills.
CO 4: Students will be able to recognize & solve problems based on non-verbal reasoning.
CO 5: Students will be able to solve complex problems based on arithmetic reasoning.
CO 6: Students will be able to apply short tricks on complex problems of verbal reasoning.

Part A
Unit 1: Developing Communication Skills- II (Reading & Writing)
1.1 Reading Comprehension
1.2 Writing Skills: Specific to AMCAT. Introduction to Writing: Organizing Principles of Paragraph, Precise Writing, Punctuations
1.3 Report Writing
1.4 Note Taking

Unit 2: Syntactical English II
2.1 Indianism & Localism
2.2 Conditionals
2.3 Preposition of Time & Place

Unit 3: Effective Communication
3.1 Concepts of Chronemics: Interpretation of time with business environment
3.2 Monochromic vs. Polychromic Cultures
3.3 Non- Verbal Communication: Kinesics & Proxemics
3.4 Acing virtual (video) interviews

Unit 4: Presentation Skills
4.1 Opening & closing of Presentations
4.2 Audience Analysis
4.3 Structuring the Presentation
4.4 Best Practice in Presentations

Part B
Unit 5: Arithmetic II
5.1 Percentages,
5.2 Ratio & Proportion
     5.2.1. Proportionality
     5.2.2. Variations
     5.2.3 Partnership
      5.2.4 Problem on Ages & Numbers
5.3 Profit & Loss
     5.3.1. Basic terminology & Formulae
     5.3.2. Error in Weights

5.3.3. Marked Price and Discounts
5.4 Mixtures & Allegations
5.5 Interest
     5.5.1 Simple Interest
     5.5.2 Compound Interest
     5.5.3 Relation between SI & CI

Unit 6: Logical Reasoning II
6.1 Syllogism
6.2 Logical Deductions
6.3 Inequalities and Mathematical Operations

Unit 7: Non Verbal Reasoning
7.1 Pictorial Series
7.2 Missing Values
7.3 Analogy and Images

Evaluation Table

Sessional I	30%
Sessional II	30%
Assignment /Field work	20%
Class Performance	10%
Attendance	10%

Assessment Tools:
Assignment/Tutorials
Sessional tests
Surprise questions during lectures/Class Performance
Term end examination

Instructions for paper setting End Semester Examination: Seven questions are to be set in total. First question will be conceptual covering entire syllabus and will be compulsory to attempt. Three questions will be set from each Part A and Part B. Student needs to attempt two questions out of three from each part. Each question will be of 20 marks.