



**MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH
AND STUDIES**

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

**FACULTY OF COMPUTER APPLICATIONS
DEPARTMENT OF COMPUTER APPLICATIONS**

**CURRICULUM
AND
SCHEME OF EXAMINATION**

BSc (IT)

BATCH: 2022-25

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 Faculty of Computer Applications of this University. This has been duly vetted and finally approved by the Academic Council of the University vide its 41st meeting held on 13-09-2022 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 2022-25.

Date:

Dean-Academics, MRIIRS

Preamble

The programme BSc(IT) 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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FACULTY 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- learning 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 know 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 120 credits during the 3 year duration of the programme in 6 semesters.

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

SEMESTER WISE STUDY SCHEME WITH CONTACT HOURS, ASSIGNED CREDITS & DISTRIBUTION OF MARKS

SEMESTER- I

Course Type	Course Code	Title of Course	Periods/Week				Marks			Duration of Exam	Credits
			L	T	P	Total	Int	Ext	Total		
Compulsory Courses											
Core	BSCIT-DS-101	Programming & Problem-Solving Using C	3	0	0	3	100	100	200	3	3
Core	BSCIT-DS-102	Operating System	3	0	0	3	100	100	200	3	3
Fundamentals	BSCIT-DS-103	Linear Algebra & Statistical Techniques	3	1	0	4	100	100	200	3	4
Fundamentals	BSCIT-DS-104	Business Communication	3	0	0	3	100	100	200	3	3
Core	BSCIT-DS-151	C Programming Lab	0	0	4	4	50	50	200	3	2
Total Credits BSc IT											15
* Under Elective Courses, beside the mentioned Domain Specific Elective Courses, other Inter-disciplinary, Generic, on-line Courses (MOOCs etc) and other approved courses shall be offered, which shall be notified well before start of the semester. The student shall be required and allowed to opt the courses out of offered courses as per maximum limit for maximum credits and for the category of Elective Courses under University Rules.											

SEMESTER- II

Course Type	Course Code	Title of Course	Periods/Week				Marks			Duration of Exam	Credits
			L	T	P	Total	Int	Ext	Total		
Compulsory Courses											
Core	BSCIT-DS-201	Data Structure & Algorithm	3	0	0	3	100	100	200	3	3
Core	BSCIT-DS-202	Python Programming	3	0	0	3	100	100	200	3	3
Core	BSCIT-DS-203	Database Management System	3	0	0	3	100	100	200	3	3
Fundamentals	CH-202B	Environmental Studies & Waste Management	3	1	0	4	100	100	200	3	4
Core	BSCIT-DS-251	Data Structure & Algorithm Lab	0	0	4	4	50	50	100	3	2
Core	BSCIT-DS-252	Python Programming Lab	0	0	4	4	50	50	100	3	2
Core	BSCIT-DS-253	Database Management System Lab	0	0	4	4	50	50	100	3	2
Total Credits BSc (IT)											19
* Under Elective Courses, beside the mentioned Domain Specific Elective Courses, other Inter-disciplinary, Generic, on-line Courses (MOOCs etc) and other approved courses shall be offered, which shall be notified well before start of the semester. The student shall be required and allowed to opt the courses out of offered courses as per maximum limit for maximum credits and for the category of Elective Courses under University Rules.											

SEMESTER- III

Course Type	Course Code	Title of Course	Periods/Week				Marks			Duration of Exam	Credits
			L	T	P	Total	Int	Ext	Total		
Compulsory Courses											
Core	BSCIT-DS-301	Object Oriented Programming using Java	3	0	0	3	100	100	200	3	3
Core	BSCIT-DS-302	Computer Networks	3	0	0	3	100	100	200	3	3
Core	BSCIT-DS-303	Computer Architecture & Organization	3	0	0	3	100	100	200	3	3
Fundamentals	BSCIT-DS-304	Soft Skills and Aptitude Development-I	2	0	0	2	50	50	100	2	2
Core	BSCIT-RIC-I	Research Innovation Catalyst-I	0	1	0	1	50	-	50	3	0.5
Core	BSCIT-DS-351	Object Oriented Programming using Java Lab	0	0	4	4	50	50	100	3	2
Domain Specific Elective	BSCIT-DS-305	Artificial Intelligence	3	0	0	3	100	100	200	3	3
	BSCIT-DS-306	System Programming									
Total Credits (BSc(IT) General)											16.5
<p>* Under Elective Courses, beside the mentioned Domain Specific Elective Courses, other Inter-disciplinary, Generic, on-line Courses (MOOCs etc) and other approved courses shall be offered, which shall be notified well before start of the semester. The student shall be required and allowed to opt the courses out of offered courses as per maximum limit for maximum credits and for the category of Elective Courses under University Rules.</p>											

Semester IV

Course Type	Course Code	Title of Course	Periods/Week				Marks			Duration of Exam	Credits
			L	T	P	Total	Int	Ext	Total		
Compulsory Courses											
Core	BSCIT-DS-401	Software engineering	3	0	0	3	100	100	200	3	3
Core	BSCIT-DS-402	Cloud Computing	3	0	0	3	100	100	200	3	3
Core	BSCIT-DS-403	Relational Database Management system	3	0	0	3	100	100	200	3	3
Fundamentals	BSCIT-DS-404	Soft Skills and Aptitude Development-II	2	0	0	2	50	50	100	2	2
Core	BSCIT-DS-452	Cloud Computing Lab	0	0	4	4	50	50	100	3	2
Core	BSCIT-DS-453	Relational Database Management System Lab	0	0	4	4	50	50	100	3	2
Core	BSCIT-RIC-II	Research Innovation Catalyst-II	0	1	0	1	50	-	50	3	0.5
Core	BSCIT-DS-454	Vocational Training	4 Weeks				100		100	2	2
Domain Specific Elective	BSCIT-DS-405	Information System Security	3	0	0	3	100	100	200	3	3
	BSCIT-DS-406	Data Mining									
Total Credits (BSc(IT) General)											20.5
<p>* Under Elective Courses, beside the mentioned Domain Specific Elective Courses, other Inter-disciplinary, Generic, on-line Courses (MOOCs etc) and other approved courses shall be offered, which shall be notified well before start of the semester. The student shall be required and allowed to opt the courses out of offered courses as per maximum limit for maximum credits and for the category of Elective Courses under University Rules.</p>											

SEMESTER- V											
Course Type	Course Code	Title of Course	Periods/Week				Marks			Duration of Exam	Credits
			L	T	P	Total	Int	Ext	Total		
Compulsory Courses											
Core	BSCIT-DS-501	Big Data Analytics	3	0	0	3	100	100	200	3	3
Core	BSCIT-DS-502	Cyber Security	3	0	0	3	100	100	200	3	3
Fundamentals	BSCIT-DS-503	Soft Skills and Aptitude Development-III	2	0	0	2	50	50	100	2	2
Core	BSCIT-DS-551	Big Data Analytics Lab	0	0	4	4	50	50	100	3	2
Core	BSCIT-RIC-III	Research Innovation Catalyst-III	0	0	2	2	100	-	100	3	1
Domain Specific Elective	BSCIT-DS-504	Mobile Applications Development	3	0	0	3	100	100	200	3	3
	BSCIT-DS-505	Introduction to Computer Graphics									
Domain Specific Elective	BSCIT-DS-554	Mobile Applications Development Lab	0	0	4	4	50	50	100	3	2
	BSCIT-DS-555	Introduction to Computer Graphics Lab									
Total Credits (BSc(IT) General)											16
<p>* Under Elective Courses, beside the mentioned Domain Specific Elective Courses, other Inter-disciplinary, Generic, on-line Courses (MOOCs etc) and other approved courses shall be offered, which shall be notified well before start of the semester. The student shall be required and allowed to opt the courses out of offered courses as per maximum limit for maximum credits and for the category of Elective Courses under University Rules.</p>											

SEMESTER- VI											
Course Type	Course Code	Title of Course	Periods/Week				Marks			Duration of Exam	Credits
			L	T	P	Total	Int	Ext	Total		
Compulsory Courses											
Core	BSCIT-DS-601	Basics of MIS and ERP	3	0	0	3	100	100	200	3	3
Core	BSCIT-DS-602	.Net Programming using C#	3	0	0	3	100	100	200	3	3
Core	BSCIT-DS-652	.Net Programming using C# Lab	0	0	4	4	50	50	100	3	2
Core	BSCIT-DS-655	Project	0	0	12	12	300	200	500	2	4
Domain Specific Elective	BSCIT-DS-603	Multimedia & Animation									
	BSCIT-DS-604	Software Testing	3	0	0	3	100	100	200	3	3
	BSCIT-DS-653	Multimedia & Animation Lab									
	BSCIT-DS-654	Software Testing Lab	0	0	4	4	50	50	100	3	2
Total Credits (BSc(IT) General)											17
**For Successful completion of the degree, the students need to earn 104 credits of compulsory courses and at least 16 of Open Elective/MOOC/ Coursera Courses											120
<p>* Under Elective Courses, beside the mentioned Domain Specific Elective Courses, other Inter-disciplinary, Generic, on-line Courses (MOOCs etc) and other approved courses shall be offered, which shall be notified well before start of the semester. The student shall be required and allowed to opt the courses out of offered courses as per maximum limit for maximum credits and for the category of Elective Courses under University Rules.</p>											

**FIRST
SEMESTER**

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

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BSCIT-DS-101: Programming & Problem-Solving Using C

Periods/week Credits
L :3 T: 1 3
Duration of Exam: 3 Hrs

Max. Marks 200
Continuous Evaluation: 100
End Semester Evaluation : 100

Pre-Requisite: Basic Knowledge of Computers

Course Type: Program Core

Learning Outcomes

BSCIT-DS-101.1: Formulate simple algorithms for arithmetic and logical problems

BSCIT-DS-101.2: Test and execute the programs and correct syntax and logical errors.

BSCIT-DS-101.3: Implement conditional branching, iteration and recursion

BSCIT-DS-101.4: Decompose a problem into functions and synthesize a complete program using divide and conquer approach

BSCIT-DS-101.5: Use arrays, pointers and structures to formulate algorithms and programs

BSCIT-DS-101.6: Apply advanced C programming techniques such as pointers, dynamic memory allocation, structures to develop solutions for particular problems.

PART- A

Unit-1: Introduction to Programming

- 1.1 Introduction to programming and Programming Languages
- 1.2 Idea of Algorithm: steps to solve logical and numerical problems.
- 1.3 Representation of Algorithm: Flowchart/ Pseudo code with examples.
- 1.4 From algorithms to programs; source code, variables (with data types), keywords, Input/output statement
- 1.5 Program Structure, Notion of Compilation and Debugging

Unit-2: Conditional Statements and Looping constructs

- 2.1 Arithmetic operators, Expressions and Precedence
- 2.2 Conditional Branching (If statement and its Types)
- 2.3 Writing and evaluation of conditionals (Switch-Case, Break, Continue, Goto)
- 2.4 Iteration and loops (For loop, While loop, Do-While loop)

Unit-3: Arrays and Strings

- 3.1 Arrays (1-D, 2-D)
- 3.2 Character Arrays and Strings
- 3.3 Operations on Arrays
- 3.4 Operations on Strings

PART –B

Unit-4: Functions

- 4.1 Basics of Functions (Built-in and User-defined)
- 4.2 Function Declaration, Function Definition and Function Calling
- 4.3 Parameter passing in functions; Call by value.
- 4.4 Passing arrays to functions: idea of call by reference;
- 4.5 Recursion, Example programs, such as finding Factorial, Fibonacci series

Unit-5: Structures

- 5.1 Introduction to Structures
- 5.2 Structure Definition, Accessing Structures members
- 5.3 Union Definition, Accessing Union Members
- 5.4 Difference between Structure and Union

Unit-6: Pointers and File Handling

- 6.1 Idea of pointers, defining pointers
- 6.2 Use of Pointers, Example program using Pointers
- 6.3 Basics of File Handling, and file operations
- 6.4 File Handling, Example Programs

Text Books / Reference Books:

- 1. Schaum's Outline of Programming with C: Byron Gottfried, 2nd Ed.,2015, McGraw-Hill
- 2. Programming in ANSI C: E. Balaguruswamy, 2nd Ed.,1998, Tata McGraw-Hill
- 3. The C Programming Language: Brian W. Kernighan and Dennis M. Ritchie, 2nd Ed., PHI

Software required/Weblinks:

Turbo C
www.tutorialpoint.com
www.nptel.com
www.w3schools.com

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-101.1	2	1	3	2	3	-	3	-	-	-	-	-	2	2
BSCIT-DS-101.2	2	3	3	3	1	-	1	-	3	-	-	-	2	1
BSCIT-DS-101.3	3	2	3	3	2	3	-	-	-	3	-	-	1	2
BSCIT-DS-101.4	2	2	3	2	2	-	3	-	-	-	3	-	2	2
BSCIT-DS-101.5	-	2	2	-	-	3	2	-	1	2	3	2	1	1

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BSCIT-DS-102: OPERATING SYSTEMS

Periods/week Credits
L: 3 T:0 P:0 3

Duration of Examination: 3 Hrs

Max. Marks : 200
Continuous Evaluation : 100
End Semester Examination: 100

Pre-requisite: Basic Knowledge of fundamental of Computer System

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, Round Robin Scheduling
- 3.4 Thread Scheduling
- 3.5 Multi-Processor Scheduling
- 3.6 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: Milenkovic M, McGraw Hill, Second Edition, 2009
2. Operating System Incorporating With Unix & Windows: Colin Ritchie, TMH, 1974
3. Operating Systems A Concept Based Approach 3rd Edition: Dhamdhare, McGraw Hill, India, 3rd edition, 2003
4. Operating System Concepts: [Silberschatz](#), Wiley India, 9th edition, 2005

Weblinks:

1. https://www.tutorialspoint.com/operating_system/index.htm
2. <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	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
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-	-	-	-	-	-	-	2	-	1	1	2	2	1	1

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

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

BSCIT-DS-103: Linear Algebra & Statistical Techniques

Periods/week Credits

L: 4 T:0 P:0 4

Duration of Examination: 3 Hrs

Max. Marks : 200

Continuous Evaluation: 100

End Semester Examination: 100

Pre-requisites: The students must have the basic knowledge of Mathematics.

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
- 2.3 Eigenvectors

UNIT 3: Spaces

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

PART - B

UNIT4: 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
- 5.3 Probability distribution: Binomial distribution, Poisson distribution,
- 5.4 Normal distribution.

UNIT 6: Hypothesis Testing

- 6.1 Simple sampling of Attributes: Large samples
- 6.2 Test of significance for small samples, Standard error
- 6.4 Null Hypothesis, Confidence Limits
- 6.5 Student's-t-distribution
- 6.6 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	PSO 1	PSO 2
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	--

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

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

BSCIT-DS-104: BUSINESS COMMUNICATION

Periods/week Credits
L: 03 3
Duration of Examination: 3 Hrs

Max. Marks: 200
Internal/Continuous Assessment: 100
End Semester Examination: 100

Course Outcomes:

By the end of course, the students should be able to:

- BSCIT-DS-104.1. Gain an in-depth knowledge of how formal communication is done at the workplace;
- BSCIT-DS-104.2. Understand the impact of communication skills in a professional scenario;
- BSCIT-DS-104.3. Hone their formal writing skills;
- BSCIT-DS-104.4. Create impressive first impressions at the workplace by writing good business reports;
- BSCIT-DS-104.5. Understand business practices through an integrated curriculum.

PART-A

Unit 1: Introduction: Business Communication

- 1.1 Nature, process and types of communication
- 1.2 Role of communication skills in business
- 1.3 Communication networks
- 1.4 Barriers to communication
- 1.5 How to make communication effective

Unit 2: Communication Skills

- 2.1 Listening skills –process and types of listening
- 2.2 Barriers to listening
- 2.3 Reading skills
- 2.4 Speaking skills

Unit 3: Speech Delivery

- 3.1. Voice modulation
- 3.2 Body language
- 3.3 Oral presentation
- 3.4 Seven Cs of effective communication

PART-B

Unit 4: Writing Skills of Intra-office Communication

- 4.1 Types of intra-office communication
- 4.2 Notices and circulars
- 4.3 Agenda and minutes of a meeting
- 4.4 Memo

Unit 5: Inter-office Communication

- 5.1 Layout of business letters
- 5.2 Claim and sales letters
- 5.3 Employment letters
- 5.4 Complaint letters
- 5.5 E mail etiquettes

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

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

BSCIT-DS-151: C PROGRAMMING LAB

Periods/week Credits

P: 4 T:0 2

Duration of Examination: 3 Hrs

Max. Marks 100

Continuous Evaluation :50

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-151.1. Explain the concepts of Procedural programming.

BSCIT-DS-151.2. Solve basic programming problems using the building blocks of C Language.

BSCIT-DS-151.3. Design programs involving decision structures and loops.

BSCIT-DS-151.4. Create programs using the concept of dynamic memory management.

BSCIT-DS-151.5. Design an application to solve a simple real life or mathematical problem.

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 to perform arithmetic operations (Addition, Subtraction, Multiplication, Division) on two numbers.
 2. Write a Program to calculate gross salary of an employee
[using formula: $\text{gross_sal} = \text{basic_sal} + \text{hra} + \text{da}$].
 3. Write a program to find sum and reverse of three digit number.
 4. Write a Program to swap two numbers without using third variable.
 5. Write a Program to print a table of any number.
 6. Write a Program to find greatest in 3 numbers.
 7. Write a Program to find that entered year is leap year or not.
 8. Write a Program to find whether given no is even or odd.
 9. Write a program to find the roots of a Quadratic Equation.
 10. Write a Program to use switch statement. Display Monday to Sunday.
 11. Write a Program to calculate power of a number using #DEFINE
 12. Write a Program to display first 10 natural no & their sum.
 13. Write a program to find the factorial of n number.
 14. Write a program to generate the Fibonacci series up to n terms.
 15. Write a Program to print stars Sequence1.

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*****
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16. Write a Program to check whether given number is palindrome or not.

17. Write a Program to find the maximum no in an array.
18. Write a Program to search a number in an array.
19. Write a Program to find sum of two matrices.
20. Write a Program to find subtraction of two matrices.
21. Write a Program to find multiplication of two matrices.
22. Write a Program to find transpose of a matrix.
23. Write a Program to concatenate two strings without using strcat function.
24. Write a Function to Check Prime and Armstrong Number by making function
25. Write a Function to Convert binary number to decimal and vice-versa
26. Write a Program to create, initialize, assign and access a pointer variable.
27. Write a function that reverses the elements of an array in place. The function must accept only one pointer value and return void.
28. Write a Program to Create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks.
29. Write a Program to Add Two Distances (in inch-feet) System Using Structures
30. Write a Program to Add Two Complex Numbers by Passing Structure to a Function
31. Make a mini project based on above mentioned list of practical. Suggested mini projects are:
 - a) Puzzle Game
 - b) Hangman Game
 - c) Weather widget
 - d) Contacts Management

Suggested Readings:

1. E.Bala guru swami, 2010, Programming in ANSI 'C', Tata McGraw- Hill.
2. AshokKamthane,2006, Programming with ANSI and TURBO C , Pearson Education.
3. K R. Venugopal, 2016, Mastering C, Tata McGraw Hill.
4. Herbert Schildt, 2017, The Complete Reference, Tata McGraw Hill.

Note: Only latest editions of the books are recommended.

Software Required

<https://sourceforge.net/projects/orwelldevcpp/>

<http://www.codeblocks.org/>

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:

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-151.1	2	2	2	3									3	3
BSCIT-DS-151.2	1	2	2										1	1
BSCIT-DS-151.3		1	2	2									1	1
BSCIT-DS-151.4	2	2	3	3	3								1	1
BSCIT-DS-151.5	1	2	3	3			2	1					2	2

SECOND SEMESTER

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH & STUDIES

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

BSCIT-DS-201: DATA STRUCTURE & ALGORITHM

Periods/week Credits
L :3 T: 1 3
Duration of Exam: 3 Hrs

Max. Marks 200
Continuous Evaluation: 100
End Semester Examination: 100

Pre-Requisite: Knowledge of C programming

Course Type: Core

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 Threads
- 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	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	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				2	2
BSCIT-DS-201.4	3	3	3	2	2		1					
BSCIT-DS-201.5	2	2	2					2				

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

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

BSCIT-DS 202 : PYTHON PROGRAMMING

Periods/week Credits
L :3 T: 1 3
Duration of Exam: 3 Hrs

Max. Marks : 200
Continuous Evaluation: 100
End Semester Examination: 100

Pre -Requisite: Fundamentals of Information Technology

Course Type: Core

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

BSCIT-DS 202.1. 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 202.2. Understand and apply the simple and nested selection/decision control structure when writing program code to make a decision.

BSCIT-DS 202.3. Apply the knowledge of pre & post tested loop/repetitive control structure when writing program code to process same sequence of tasks/activities.

BSCIT-DS 202.4. Familiarise with the concept of divide & conquer, and use the technology of "method" for writing effective, efficient and reusable computer program.

BSCIT-DS 202.5. 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 202.6. Demonstrate an understanding of text file operation (reading/writing) and develop the appropriate program code for such operation including exception handling and data validation.

BSCIT-DS 202.7. Develop workplace soft-skills including working in groups, writing formal reports, carrying out individual research and/or delivering oral presentation

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 202.1	1				2	1	3	2	1	-	1	1	2	1
BSCIT-DS 202.2		3	2	1			3			3		2		3
BSCIT-DS 202.3	1	3	2	2	2				1		1	1	2	1
BSCIT-DS 202.4				2			1			3		3		2
BSCIT-DS 202.5		3		2		3		2		3				3
BSCIT-DS 202.6		1				2			2		3	2		2
BSCIT-DS 202.7	1	3	3			3		2			3		2	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

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

BSCIT-DS-203 : DATABASE MANAGEMENT SYSTEM

Periods/week Credits
L :3 T: 1 3
Duration of Exam: 3 Hrs

Max. Marks : 200
Continuous Evaluation: 100
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, Carlos. London: Macmillan, 2006 (7th edition)
2. Fundamentals of Database Systems : Navathe , Pearson Education, 2002 (3rd edition)
3. An Introduction to Database Systems : Desai Bipin , Galgotia Publications, 1990 (6th edition)
4. 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.

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-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

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

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

CH-202B: ENVIRONMENTAL STUDIES AND WASTE MANAGEMENT

Periods/week Credits
L :3 T: 1 3
Duration of Exam: 3 Hrs

Max. Marks : 200
Continuous Evaluation: 100
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 -161.2. 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.

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Assessment Tools:

Assignment/Tutorials

Sessional tests

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
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		

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH & STUDIES

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

BSCIT-DS-251: DATA STRUCTURE & ALGORITHM LAB

Periods/week Credits

P: 4 T:0 2

Duration of Examination: 3 Hrs

Max. Marks :100

Continuous Evaluation :50

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-251.1. Analyze the asymptotic performance of various algorithms.

BSCIT-DS-251.2. Design and implement various algorithms with use of arrays, records, linked structures, stacks, queues.

BSCIT-DS-251.3. Demonstrate different methods for traversing trees.

BSCIT-DS-251.4. Compare alternative implementations of data structures with respect to performance.

BSCIT-DS-251.5. 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. 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

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	PO 10	PO 11	PO 12	PSO1	PSO2
BSCIT-DS-251.1	1	1	1		2		2						2	3
BSCIT-DS-251.2	1	1	1				2						3	3
BSCIT-DS-251.3	1	1	2	2	1		1	2					1	2
BSCIT-DS-251.4	1	1	2	2	1		2	2				3	2	2
BSCIT-DS-251.5	1	1	1	1	2		2	3				3	2	1

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH & STUDIES

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BSCIT-DS-252: PYTHON PROGRAMMING LAB

Periods/week Credits

P: 4 T:0 2

Duration of Examination: 3 Hrs

Max. Marks :100

Continuous Evaluation :50

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-252.1. Develop simple Python programs for solving problems.

BSCIT-DS-252.2. Develop Python programs with conditions and loops.

BSCIT-DS-252.3. Create, define and call Python functions.

BSCIT-DS-252.4. Use Python data structures, lists, tuple & dictionaries.

BSCIT-DS-252.5. Understand the various data structures available in Python and apply them in solving computational problems.

BSCIT-DS-252.6. Test and debug the code written in Python.

BSCIT-DS-252.7. Apply error handling techniques in python.

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 paper
 - 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>

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Assessment Tools:

Experiments in lab
 File work/Class Performance
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 End Term Practical Exam

COURSE ARTICULATION MATRIX:

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BSCIT-DS-252.2	2			2		2			2	2		2		2
BSCIT-DS-252.3	2		1		3	3	2	1				3		1
BSCIT-DS-252.4	2			2			3		3	2		3	2	3
BSCIT-DS-252.5	3		2			3		1			3		3	2
BSCIT-DS-252.6	3			2			3		3					2
BSCIT-DS-252.7	3	3	1	1	3	3				1	2	2	2	2

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH & STUDIES

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BSCIT-DS-253: DATABASE MANAGEMENT SYSTEM LAB

Periods/week Credits

P: 4 T:0 2

Duration of Examination: 3 Hrs

Max. Marks :100

Continuous Evaluation :50

End Semester Examination :50

Pre -Requisite: NA

Course Type: Fundamental

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

BSCIT-DS-253.1. Identify types & features of database systems and database management systems (DBMS).

BSCIT-DS-253.2. Analyse a given business requirement and produce the logical database design using entity relationship diagram (ERD).

BSCIT-DS-253.3. Apply the normalization process to logical database design up to 3NF.

BSCIT-DS-253.4. Produce a physical database design from logical design using SQL DDL to maintain schema, tables and constraints.

BSCIT-DS-253.5. Construct both single and multi-table queries using SQL DML for inserting, updating, deleting and selecting the required data.

BSCIT-DS-253.6. Demonstrate basic knowledge of creating / using programmatic SQL (procedural or transact SQL).

BSCIT-DS-253.7. Develop workplace soft-skills including working in groups, writing formal reports, carrying out individual research and/or delivering oral presentations.

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.

Suggested Readings:

1. Simplified approach to DBMS :Parteek Bhatia, Gurvinder Singh, Kalyani Publishers,2016
2. 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-253.1	1	1		2	3			2	2			3		2
BSCIT-DS-253.2	1	3	2			3		3		1	3			
BSCIT-DS-253.3			1	2		3						3		3
BSCIT-DS-253.4	1	1	2	2			2		3		2	2	3	
BSCIT-DS-253.5	1	1	2	2	1					2		3		3
BSCIT-DS-253.6	1	1	2	1	1	1	1							

BSCIT-DS- 253.7	2			2	3		1		1	3	1	1	1	3
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THIRD SEMESTER

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

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

BSCIT-DS-301: Object Oriented Programming using Java

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

Max. Marks: 200
Continuous Evaluation: 100
End Semester Examination: 100

Pre-Requisite: Basic Concepts of Object Oriented Programming

Course Type: Core

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

BSCIT-DS-301.1. Explain basic syntaxes of control Structures of Java Programming Language.

BSCIT-DS-301.2. Understand various object-oriented paradigms in the context of Java Programming Language.

BSCIT-DS-301.3. Design solutions to basic problems using concepts of Exception Handling.

BSCIT-DS-301.4. Analyze various controls available in AWT library and choose controls on the basis of requirement.

BSCIT-DS-301.5. Identify, Design and develop complex Graphical user interfaces using principal Java AWT classes.

BSCIT-DS-301.6. Design GUI based solution to small Business Problems using Concepts of Event-Handling and Database Programming.

PART –A

Unit 1: Concepts of Java

- 1.1 Introduction: C++ vs Java
- 1.2 Java and Internet
- 1.3 Java and WWW
- 1.4 Java support systems
- 1.5 Java environment
- 1.6 Java program structure
- 1.7 Tokens; Statements;
- 1.8 Java Virtual machine
- 1.9 Constant & Variables
- 1.10 Data Types;
- 1.11 Symbolic Constants
- 1.12 Type Casting Operators.

Unit 2: Control Statements

- 2.1 Simple if statement
- 2.2 If...else... statement
- 2.3 Nesting if...else... statement
- 2.4 else...if Ladder
- 2.5 Switch statement
- 2.6 Conditional Operator
- 2.7 Loops –While; Do; For
- 2.8 Jumps in Loops; Labelled Loops

Unit 3: Arrays and Classes

- 3.1 Arrays: One Dimensional and two Dimensional arrays
- 3.2 Classes: Fundamentals; objects; methods
- 3.3 Constructors: Method overloading; constructor overloading
- 3.4 Inheritance: Super class; sub class;
- 3.5 This and super operator
- 3.6 Method overriding; use of final keyword
- 3.7 Abstract class
- 3.8 Interface.

PART –B

Unit 4: Exception Handling and Packages

- 4.1 Packages: Creation and implementation
- 4.2 Exception Handling: Exception Class
- 4.3 Built in checked and unchecked exceptions
- 4.4 User defined exceptions; Try; Catch; Throw; Throws; Finally.
- 4.5 Java Library: String handling (only main functions); String Buffer class.

Unit 5: Applet

- 5.1 Applets: Introduction
- 5.2 Local and Remote Applets Vs Application
- 5.3 Writing Applet
- 5.4 Applet Life Cycle; Creating an Executable Applet
- 5.5 Designing a Web Page; Applet Tag
- 5.6 Adding Applet to HTML File; Running the Applet
- 5.7 Passing Parameters to Applets; Aligning the Display; HTML Tags & Applets
- 5.8 Getting Input from the User

Unit 6: AWT Controls

- 6.1 AWT controls: Button; Label; Text Field; Text Area; Choice lists; list; scrollbars; check boxes; Layout managers;
- 6.2 Elementary concepts of Event Handling
- 6.3 Delegation Event Model
- 6.4 Event classes and listeners
- 6.5 Adapter classes
- 6.6 Inner classes

Suggested Readings:

1. Cay S. Horstmann, Gary Cornell, 2020, Core Java™, Volume I : Fundamentals, Pearson Education.
2. E. Balaguruswami, 2017, Core Java, TMH.
3. HebertSchild, C. S, Gray Cornel, 2013, Core Java Reference, TMH.
4. Brett Spell, 2015, Professional Java Programming, WROX Publication

Note: Only latest editions of the books are recommended.

Software required/Weblinks :

- JDK 1.8
- <https://www.tutorialspoint.com/java/index.htm>
- <https://www.javatpoint.com/java-tutorial>

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:

PO-CO Statement	PO1	P O2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BSCIT-DS-301.1	1	2	2		1		2	2	1	2	2		3	
BSCIT-DS-301.2	2	2	1					2	3	1	3	1		
BSCIT-DS-301.3			2	2			3	1	1	2	1		2	1
BSCIT-DS-301.4		1		2		2			2		3			
BSCIT-DS-301.5			3					2	1	1		2	1	2
BSCIT-DS-301.6	1			3	3		2			2	3			3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

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

BSCIT-DS-302: COMPUTER NETWORKS

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: Fundamentals of Computer Networking

Course Type: Domain Specific

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

BSCIT-DS-302 Employ good practice network infrastructure plan, design methods and techniques to align infrastructure design with institutional requirements.

BSCIT-DS-302 Understand the importance of Signal Encoding Techniques, Error Detection and Correction, Multiplexing

BSCIT-DS-302 Design and plan network infrastructure that includes network topology, TCP/IP, IPv6 and security.

BSCIT-DS-302 Manage routing and remote access services.

BSCIT-DS-302 Manage and maintain high server availability and introduction to the fundamentals and concepts of server cluster and Cloud computing.

BSCIT-DS-302 Develop workplace soft-skills including working in groups, writing formal reports, carrying out individual research and/or delivering oral presentations.

PART –A

UNIT 1: Signal Encoding Techniques

- 1.1 Data and Signals
- 1.2 Channel Characteristics
- 1.3 Digital Data, Digital Signals
- 1.4 Digital Data, Analog Signals
- 1.5 Analog Data, Digital Signals
- 1.6 Synchronous and Asynchronous Communication

UNIT 2: Error Detection and Correction

- 2.1 Types of Errors
- 2.2 Error Detection
- 2.3 Parity Check
- 2.4 The Internet Checksum
- 2.5 Cyclic Redundancy Check
- 2.6 Forward Error Correction

UNIT 3: Multiplexing & Subnetting

- 3.1 Frequency division Multiplexing
- 3.2 Synchronous time division multiplexing
- 3.3 Cable Modems
- 3.4 ADSL
- 3.5 xDSL
- 3.6 Multiple Channel Access
- 3.7 IPv6, IPv6 sub-netting

PART – B

UNIT 4: Domain Controller & DNS

- 4.1 Introduction to Domain Controllers
- 4.2 Deploying Domain Controllers
- 4.3 Introduction to Active Directory
- 4.4 Introduction to Domain Server
- 4.5 Manage Active Directory Objects
- 4.6 Active Directory Administration

UNIT 5: File and Print Services

- 5.1 Network File Services
- 5.2 File Storage in network servers
- 5.3 File Sharing in network servers
- 5.4 Implement File servers
- 5.5 File server Security
- 5.6 Print Service & sharing in network servers

UNIT 6: Server Administration

- 6.1 Introduction to Group Policy
- 6.2 Implement Group Policy
- 6.3 Secure Windows servers by using Group Policy Objects (GPOs).
- 6.4 Configuring windows Firewall and IPsec
- 6.5 Maintaining server availability and reliability
- 6.6 Introduction to server clustering
- 6.7 Introduction to Cloud Computing

Suggested Readings:

1. Tamara Dean, Network+ Guide to Networks, 7th Edition. Course Technology - Cengage Learning, 2010, ISBN-13: 9781423902454
2. Hyper Transport System Architecture: MindShare, Inc.: Don Anderson, Jay Trodden , Addison-Wesely Professional
3. Et Stallings, W. (2010), Data and Computer Communications, 10/E, Prentice Hall,
4. Tulloch, Mitch. Training Guide Installing and Configuring Windows Server 2012 R2 (MCSA): MCSA 70-410. Pearson (Intl), 05/2014. VitalBook file.
5. Computer Networks: Tanenbaum, A.S. , Prentice Hall

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:

PO -CO statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
BSCIT-DS-302		2	3		2	1	1					1		3
BSCIT-DS-302		2	2				1						2	3
BSCIT-DS-302		2	2	2			1						3	2
BSCIT-DS-302	2						2						2	2
BSCIT-DS-302		1	2		2		1						2	3
BSCIT-DS-302	2		3	1	3				1	3	3	1	3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH & STUDIES

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BSCIT-DS-303: COMPUTER ARCHITECTURE & ORGANIZATION

Periods/week Credits

L:3 T: 0 3

Duration of Examination: 3 Hrs

Max. Marks :200

Continuous Evaluation :100

End Semester Examination : 100

Pre-Requisite: NA

Course Type: Core

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

- BSCIT-DS-303.1. Understand the structure of various number systems, logic gates and its application in digital design
- BSCIT-DS-303.2. Describe problem solving related to number systems and Boolean algebra along with its simplification technique.
- BSCIT-DS-303.3. Use the concept of memory hierarchy to analyze problem.
- BSCIT-DS-303.4. Compare the operations of various combinational and sequential circuits.
- BSCIT-DS-303.5. Construct logics of micro programming in digital designing.

PART-A

UNIT 1: Information Representation

- 1.1 Number Systems; Arithmetic (binary; decimal; octal; hexadecimal)
- 1.2 One's complement and Two's Complement Representation
- 1.3 Arithmetic Operation: Addition, Subtraction, Multiplication and Division
- 1.4 Fixed-point and Floating-point representation of numbers
- 1.5 Binary Codes: Weighted codes; Non-weighted codes; BCD Codes, Gray Codes
- 1.6 Error detecting and correcting codes; Parity Checker; Hamming code
- 1.7 Character Representation – ASCII; EBCDIC

UNIT 2: Logic Gates

- 2.1 Introduction to Logic gates
- 2.2 Basic Gates – AND; OR; NOT
- 2.3 Universal Gates – NAND; NOR;
- 2.4 Other Gates – XOR; XNOR
- 2.5 Circuit Diagram using Basic Gates
- 2.6 Circuit Diagram using Universal Gates
- 2.7 Multilevel NAND and NOR circuits

UNIT 3: Boolean algebra

- 3.1 Binary Logic: Boolean algebra
- 3.2 Boolean Theorems
- 3.3 Boolean Functions and Truth Tables
- 3.4 Canonical and Standard forms of Boolean functions
- 3.5 Simplification of Boolean Functions – Karnaugh Maps.

PART-B

UNIT 4: Combinational Circuit

- 4.1 Concept of Combinational Circuit
- 4.2 Half-Adder
- 4.3 Full-Adder
- 4.4 Half-Subtractor
- 4.5 Full-Subtractor
- 4.6 Encoders
- 4.7 Decoders
- 4.8 Multiplexers
- 4.9 Demultiplexers
- 4.10 Comparators

UNIT 5: Sequential Circuit

- 5.1 Concept of Sequential Circuit
- 5.2 Difference between Combinational and Sequential Circuit
- 5.3 Flip Flop (RS; D, JK, and Master Slave & T flip flops)
- 5.4 Registers
- 5.5 Shift registers
- 5.6 Synchronous Counter
- 5.7 Asynchronous counters.

UNIT 6: Memory and Introduction to Microprocessor

- 6.1 Classification of memory –Volatile; Non-Volatile; RAM; ROM; EPROM
- 6.2 Virtual memory and Cache memory
- 6.3 Associative Memory
- 6.4 Microprocessor: Basic Components of a Microprocessor (Introductory ideas)
- 6.5 Processor and its types
- 6.6 Parallel processing

Suggested Readings:

1. M. Mano. 2017, Computer System and Architecture, Pearson
2. N. S. Gill, 2016, Digital Design and Computer Organization, University Science Press
3. Bartee,2001, Digital Computer Fundamentals, TMH Publication
4. Malvino,2011, Digital Computer Electronic,TMH Publication
5. A .Anand Kumar, 2016, Fundamentals of Digital Circuit , PHI publication

Note: Only latest editions of the books are recommended.

Weblinks:

- <https://nptel.ac.in/courses/106103068/pdf/coa.pdf>
- https://www.tutorialspoint.com/computer_logical_organization/index.htm

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:

PO-CO statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BSCIT-DS-303.1	3	2	2	2	2		2					1	3	2
BSCIT-DS-303.2	3	2	2	2	2		2						3	2
BSCIT-DS-303.3	1	1	1	1			1			1		1	1	1
BSCIT-DS-303.4	2	2	3	2			2			1		1	2	2
BSCIT-DS-303.5	1	2		2			2					1	1	2

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH & STUDIES

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BSCIT-DS-304 : Soft Skills and Aptitude Development-I

Periods/week Credits
L:2 T:0 0
Duration of Exam: 2 hrs

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

Course Outcomes:

- BSCIT-DS-304.1.** Students will be able to recognize problems based on arithmetic & number system.
- BSCIT-DS-304.2.** Students will be able to solve problems based on verbal reasoning & simplification.
- BSCIT-DS-304.3.** Students will be able to calculate the correct answers to the problems within given time.
- BSCIT-DS-304.4.** Students will be able to plan their career meticulously by setting their time oriented goals.
- BSCIT-DS-304.5.** Students will be able to introspect and enhance their personality.
- BSCIT-DS-304.6.** Students will be able to develop cultural sensitivity and communicate respectfully across cultures.

PART – A

Unit 1: Number System 1

- 1.1 Vedic Mathematics
 - 1.1.1 Basic of mathematics
 - 1.1.2 Addition and subtraction using Vedic Mathematics
 - 1.1.3 Multiplication of two and three numbers.
- 1.2 Simplification
 - 1.2.1 BODMAS rule
 - 1.2.2 Fractions and recurring decimals
 - 1.2.3 Surds and indices
- 1.3 Numbers
 - 1.3.1 Types of numbers and number tree
 - 1.3.2 Divisibility Rule
 - 1.3.3 HCF & LCM

Unit 2: Verbal Reasoning 1

- 2.1 Direction Sense Test
- 2.2 Blood Relation Test

Unit 3: Arithmetic 1

- 3.1 Problem on Ages
- 3.2 Problem on Numbers
- 3.3 Averages

Part B

Unit 4: Career Planning

- 4.1 **Career Planning Process** - Self Assessment, Research, Decision Making, Action and Employability
- 4.2 **Goal Setting:** Relevance, SMART goals, The Dos & Don'ts

Unit 5: Personality Enhancement

- 5.1 **Emotional Intelligence:** Emotional Self -Awareness, Self- Control, Emotional Management
- 5.2 **Stress Management:** What is Stress, Types of Stress, Stress Response Example, Vulnerability to Stress, Why do we Stress out, Stress Warning Symbols, Suggestions for Reducing Stress,
- 5.3 **Time Management:** Setting Priorities, Managing Time, Four Quadrants of Time Management
- 5.4 **Team Building:** Definition –Team, Characteristics of effective Teams, Competence, Clear and Compelling goal, Supportive Environment, Alignment, Designing the Team, Identifying Roles and Responsibilities, Determining Reward, Troubleshooting Guide, Good Team member

Unit 6: Effective Communication

6.1 **Courtesy in Communication:** Being Polite, Self -Discipline, Respecting Others and understanding other's perspective in communication

6.2 **Inter cultural Communication:** Breaking Stereotypes, Diversity Inclusion and Cultural Sensitivity

Text Books/Reference Books:

1. Quantitative Aptitude for Competitive Examinations: R S Aggarwal, S Chand & Company Pvt Ltd, Edition 2017
2. A Modern Approach to Verbal& Non Verbal Reasoning: R S Aggarwal, S Chand & Company Pvt. Ltd, Edition 2018
3. College to Career: The Student Guide to Career and Life Navigation by Mark A Griffin
4. Effective Communication in the Workplace by Anthony Gutierrez

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

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BSCIT-RIC-I: RESEARCH INNOVATION CATALYST-I

Periods/week	Credits	Max. Marks	50
T: 1	0.5	Continuous Evaluation	: 50

Pre-requisites: Basic knowledge of Research and Innovation

Course Type: Research & Training

Course Outcomes:

BCA-RIC.I.1. The students will be able to understand what is Research and Innovation.

BCA-RIC.I.2. To be in a position to describe the process and the procedure to carry out research/ innovation

BCA-RIC.I.3. To understand the research documentation that is needed for, journals publication, conferences etc.

BCA-RIC.I.4. To understand and adopt the ethical practice in the research / Innovation activities.

BCA-RIC.I.5. To comprehend the benefits obtained by means of systematic research/ Innovation

BCA-RIC.I.6. To inculcate Team building and collaborative approach.

Unit 1: What is Research?

1.1 Capturing the current research/ Innovation trends

1.2 Insight about scientific research/ Innovation performed by renowned experts in the related field.

1.3 Exploration and excavation of in-house and commercially available facilities

1.4 Model design about framing the research/ Innovation question – A motivational Approach

1.5 Do's and Don'ts pertaining to research/ Innovation

Unit 2: Insight about Scientific Documentation

2.1 Different types of Journals/Conferences

2.2 Different components of a research paper

2.3 Indexing of Journals

2.4 Parameters involved in publication

2.5 Scientific/technical writing and ethical practice

Unit 3: Understanding the Literature Survey (LS)

3.1 Finding research papers related to a topic

3.2 Understanding the different aspects of Literature search and Databases.

3.3 Usage of different sources like Google scholar, WoS, PubMed, Scopus, ABDC, EBSCO etc.

3.4 Exploration of online library-Deepdyve for research/ Innovation.

3.5 Usage of scholarly networking sites like Research Gate, Mendeley, Academia.edu etc.

3.6 Demo sessions on the usage of above mentioned sources

Unit 4: Implementation of Process

4.1 Understanding and selection of the research/ Innovation theme.

4.2 Finding out the specific research/ Innovation problem in the relevant area

4.3 Seeking information through published work w.r.t the problem

4.4 Reading & categorizing the downloaded/referred papers or articles and structuring of the idea.

Unit 5: Report Writing and Presentation skill Development

5.1 Report making on the surveyed literature to cater the basic idea of the author/ inventor

5.2 Compiling and analyzing the published results to justify and understand the proposed ideas

5.3 Usage of MS-PowerPoint and other technical resources for the presentation

5.4 Development of presentation skills and group addressing

References:

1. <http://nptel.ac.in/courses/121106007/>
2. <http://public.wsu.edu/~taflinge/research.html>

Evaluation Criteria: The following evaluation parameters shall be considered for internal assessment by both research coordinators and faculty coordinator or research mentors:-

Criteria	Evaluation parameters	Weightage (Marks)	
Online and offline Attendance	<ul style="list-style-type: none"> Percentage of classes attended by the students 	3+2	5
Group participation and response of the students to a given task	<ul style="list-style-type: none"> Judge individual student in the group Meeting timelines as per lesson plan 	5 10	15
Selection of research/ Innovation topics and Literature Survey	<ul style="list-style-type: none"> Student interaction with faculty mentors <ul style="list-style-type: none"> Relevance of the topic Usage of Scientific Literature Databases. e.g., Scopus/ Web of Science/ etc. <ul style="list-style-type: none"> Scientific/Technical writing Number of relevant papers referred for the given topic 	3 2 1 2 2	10
Presentation and Report Making	<ul style="list-style-type: none"> Report structure and Slide sequence, Contribution of individual group member towards the presentation and report <ul style="list-style-type: none"> Reference listing Plagiarism/Authenticity of the report 	5 5 5 5	20

Course Articulation Matrix:

CO Statement (XX-300)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BSCIT.I.1	√	√	√	√	√	√			√		√		√	√
BSCIT.I.2			√	√	√				√				√	√
BSCIT.I.3		√		√					√	√			√	√
BSCIT.I.4								√					√	√
BSCIT.I.5	√					√	√					√	√	√
BSCIT.I.6	√	√							√			√	√	√

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

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BSCIT-DS-351:Object Oriented Programming using Java Lab

Periods/week Credits

P: 4 T:0 2

Duration of Examination: 3 Hrs

Max. Marks : 100

Continuous Evaluation :50

End Semester Examination :50

Co-Requisite: Basics of Object-Oriented Programming

Course Type: Core

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

BSCIT-DS-351.1. Demonstrate the use of basic programming constructs.

BSCIT-DS-351.2. Solve basic problems using flow control constructs.

BSCIT-DS-351.3. Create Reusable objects conforming to the object-oriented paradigms.

BSCIT-DS-351.4. Evaluate user requirements and propose a solution to meet the requirements.

BSCIT-DS-351.5. Assess various AWT components and justify their usage in various programming situations.

BSCIT-DS-351.6. Develop a responsive GUI Application to solve a basic business problem.

List of Practical:

1. Write a program to find the average and sum of the N numbers using Command line argument.
2. Write a program to demonstrate type casting.
3. Write a program to generate prime numbers between 1 & given number
4. Write a program to generate pyramid of stars using nested for loops
5. Write a program to reversed pyramid using for loops & decrement operator.
6. Write a program for demonstrate Nested Switch
7. Write a program to calculate area of a circle using radius
8. Write a program to find G.C.D of the number.
9. Write a program to design a class account using the inheritance and static members which show all functions of a bank (Withdrawal, deposit)
10. Write a program to create a simple class to find out the area and perimeter of rectangle using super and this keyword.
11. Write a program to find the factorial of a given number using recursion.
12. Write a program to design a class using abstract methods and abstract classes.
13. Write a program to count the number of objects created for a class using static member function
14. Write a program to demonstrate the use of function overloading.
15. Write a program to demonstrate the use of inheritance
16. Write a program that show the partial implementation of Interface
17. Write a program to design a string class that perform string method(Equal, Reverse the string, change case).
18. Write a program to handle the exception using try and multiple catch block.
19. Write a program that implement the Nested try Statements.
20. Write a program to create a package that access the member of External class as well as same package.

21. Write a program that import the user define package and access the Member variable of classes that contained by package.
22. Write a program to handle the user defined exception using throw keyword.
23. Write a program to create a class component that shows controls and event handling on that controls. (math calc).
24. Write a program to draw the line, Rectangle, oval, text using the graphics method.
25. Write a program to create a menu using the frame.
26. Write a program to create a dialog box.
27. Write a program to implement the flow layout and border layout.
28. Write a program to implement the grid Layout, card Layout.
29. Write a program to create Frame that display the student information

a) Online Cab Booking System :-

Description: This Online Cab Booking project deals with an online system designed for booking cabs as per the requirements of the customers at their convenience. The current system is manual and it is time-consuming. It is also cost-ineffective, and the average return is low and diminishing. We give customer satisfaction the utmost priority and so give ample options to book cab by entering details like their journey date and time, origin, pick-up point, destination and the drop-off point they need to reach.

b) Credit Card Approval System: -

Description: Credit Card Approval System is developed to record the details of various activities of the user. This Credit Card Approval System is used to overcome the entire problem which they are facing currently, and making complete atomization of manual system to computerized system.

c) Vehicle Management System: -

Description: Vehicle Management System is web application developed in Java and it is implemented by using windows appliance. This application provides an easy and simple way to sell or purchase vehicles online. Customers can vie wall the details of the vehicles and can purchase the vehicle. Customers can view all the details of the vehicle and send a request if he wants to purchase the vehicle.

Suggested Readings:

1. Joshua Bloch, 2018, Effective Java, Pearson Education.
2. E Balagurusamy, 2006, Programming with Java, Tata McGraw Hill.
3. Schildt Herbert,2006, Java: The Complete Reference, Tata McGraw Hill.
4. Bruce Eckel,2006, Thinking in Java, Pearson Education

Note: Only latest editions of the books are recommended

Software required/Weblinks:

- JDK 1.8
- <https://www.tutorialspoint.com/java/index.htm>
- <https://www.javatpoint.com/java-tutorial>

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	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
BSCIT-DS-351.1	1	2		2	1	1	3	1	2	1	2	2	2	3
BSCIT-DS-351.2			3	2		1	2	2		2	1		1	1
BSCIT-DS-351.3	1	1	3			2		2		3	3	1	2	2
BSCIT-DS-351.4	1	3		1	2		3	2		3	2	3	3	3
BSCIT-DS-351.5	2	2	1	3	1	2	1	3	1	1`	1	2	1	2
BSCIT-DS-351.6	2	2	1	3	1	2	1	3	1	1`	1	2	1	2

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH & STUDIES

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

BSCIT-DS-305: ARTIFICIAL INTELLIGENCE

Periods/week Credits

P: 3 T:0 3

Duration of Examination: 3 Hrs

Max. Marks 200

Continuous Evaluation :100

End Semester Examination :100

Pre-Requisite: Basics of Data Structure

Course Type: Domain Specific

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

BSCIT-DS-305.1. Understand the fundamental concepts of Artificial Intelligence

BSCIT-DS-305.2. Interpret the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them.

BSCIT-DS-305.3. Apply knowledge representation, reasoning, and machine learning techniques to real-world problems

BSCIT-DS-305.4. Examine various AI search algorithms

BSCIT-DS-305.5. Assess critically the Artificial Intelligence techniques presented and apply them to real world problems

PART-A

Unit 1: Introduction to Artificial Intelligence

- 1.1 Foundations, scope, problems, characteristics, examples and approaches of AI
- 1.2 Application Areas of Artificial Intelligence
- 1.3 Problem solving in Artificial Intelligence: Tic-Tac-Toe, Water Jug problem
- 1.4 Current trends in Intelligent Systems
- 1.5 AI application to robotics
- 1.6 Goal driven Learning agents
- 1.7 Programming Languages of Artificial Intelligence

Unit 2: Problem Solving Concepts and AI Search Techniques

- 2.1 Problem Solving Concepts and Methods
- 2.2 Types of Search techniques: Uninformed (Blind) and Informed (Informed) techniques
- 2.2 Blind search techniques: Breadth-First search and Depth- First search methods
- 2.3 Heuristic search techniques
- 2.5 Best First search, Means-ends Analysis Technique
- 2.6 Problem reduction, Constraint satisfaction

Unit 3: Knowledge Representation

- 3.1 Foundations of knowledge representation and reasoning
- 3.2 Propositional and Predicate logic
- 3.3 Syntax and Semantics for first order logic
- 3.4 Resolution and Unification
- 3.5 Knowledge representation schemes: semantic nets, frames

PART-B

Unit 4: Reasoning and Game Playing

- 4.1 Reasoning about Knowledge, Default Reasoning
- 4.2 Reasoning with uncertain knowledge
- 4.3 Probability Based Reasoning
- 4.4 Reasoning Using Certainty Factors; Bayes Theorem
- 4.5 Fuzzy Based Reasoning Systems
- 4.6 Games playing: Minimax algorithm, Tic-Tac-Toe

Unit 5: Expert Systems & Natural Language Processing

- 5.1 Expert system: Definition and applications
- 5.2 Characteristics of expert system
- 5.3 Basic components & architecture of expert systems
- 5.4 Introduction to Natural Language Processing (NLP)
- 5.5 Parsing techniques

Unit 6: Machine Learning and Neural Networks

- 6.1 Introduction to Machine Learning
- 6.2 Learning techniques
- 6.3 Applications of Machine Learning
- 6.4 Introduction to Neural Network
- 6.5 Artificial and Biological Neurons
- 6.6 Classifications of Neural Network

Suggested Readings:

1. Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, Pearson Education Press
2. Kevin Knight, Elaine Rich, B. Nair, Artificial Intelligence, McGraw Hill.
3. George F. Luger, Artificial Intelligence, Pearson Education

Note: Only latest editions of the books are recommended.

Web links:

- http://www.vssut.ac.in/lecture_notes/lecture1428643004.pdf
- https://epub.uni-regensburg.de/13629/1/ubr06078_ocr.pdf
- <http://www.cs.toronto.edu/~fbacchus/csc384/Lectures/lectures.html>
- <https://www.docsity.com/en/study-notes/computer-science/artificial-intelligence/>
- <https://examupdates.in/artificial-intelligence-pdf/>

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:

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

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

BCA-DS-306: SYSTEM PROGRAMMING

Periods/week Credits

L: 3 T: 3

Duration of Examination: 3 Hrs

Max. Marks: 200

Continuous Evaluation: 100

End Semester Examination: 100

Pre-Requisite: Knowledge of Logical Organization of Computer

Course Type: Domain Specific

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

BCA-DS-306.1. Understand the programming environment, software tools and different translators used in programming environment

BCA-DS-306.2. Define the basics of system programs like editors, compiler, assembler, linker, loader interpreter, macros and debugger.

BCA-DS-306.3 Apply the knowledge and techniques learnt to develop solutions to real world problems;

BCA-DS-306.4 Design and implement system level programs.

BCA-DS-306.5. Write system software with the aid of sophisticated OS services, programming languages and utility tools.

PART –A

UNIT 1: Overview of System Software

- 1.1 Introduction to Software
- 1.2 Software Hierarchy
- 1.3 Systems Programming
- 1.4 Machine Structure
- 1.5 Interfaces
- 1.6 Address Space
- 1.7 Computer Languages
- 1.8 Life Cycle of a Source Program
- 1.9 System Software Development
- 1.10 Recent Trends in Software Development

UNIT 2: Overview of Language Processors

- 2.1 Programming Languages and Language Processors
- 2.2 Causes of Language Semantic Gaps
- 2.3 Language Processing Activities & Program Execution
- 2.4 Fundamental of Language Processing
- 2.5 Symbol Tables
- 2.6 Data Structures for Language Processing: Search Data structures
- 2.7 Allocation of Data Structures.

UNIT 3: Assemblers

- 3.1 Concepts of Assembly Language Programming
- 3.2 Design of an Assembler
- 3.3 Types of Assemblers
- 3.4 Data Structures of One-Pass Assemblers
- 3.5 Data Structures of Two-Pass Assemblers
- 3.6 Single Pass Assembler Algorithm
- 3.7 Multi-Pass Assembler Algorithm

PART-B

UNIT 4: Scanning and Parsing

- 4.1 Grammar in Programming Language
- 4.2 Classification of Grammars
- 4.3 Ambiguity in Grammar Specification
- 4.4 Scanning
- 4.5 Parsing
- 4.6 Top-down Parsing
- 4.7 Bottom-up Parsing
- 4.8 Language Processor Development Tools

UNIT 5: Compilers

- 5.1 Structure of Compiler
- 5.2 Phases of Compiler
- 5.3 Data Structure used in Compiling
- 5.4 Scope Rules
- 5.5 Memory Allocation
- 5.6 Compilation of Expression
- 5.7 Compilation of Control Structure
- 5.8 Code Optimization
- 5.9 Example of Compilers

UNIT 6: Interpreters & Debuggers

- 6.1 Overview and Benefits of Interpreter
- 6.2 Types of Interpreters
- 6.3 The Java Language Environment
- 6.4 Java Virtual Machine
- 6.5 Types of Errors
- 6.6 Debugging Procedures
- 6.7 Classification of Debuggers
- 6.8 Dynamic/Interactive Debugger

Suggested Readings:

1. Dhamdhare, 1999, System Programming and Operating system, Tata McGraw- Hill.
2. John J. Donovan, 2001, System Programming, Tata McGraw- Hill.
3. Beck and Manjula, 2016, System software , Pearson Education
4. R.K Maurya, System Programming and Compiler Construction , Wiley-Dreamtec

Note: Only latest editions of the books are recommended.

Weblinks:

<https://www.docsity.com/en/study-notes/computer-science/system-programming/>

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:

PO-CO Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BCA-DS-306.1	3	2	-	-	1	-	-							3
BCA-DS-306.2	3	2	-	3	2	-	2							
BCA-DS-306.3	2	-	2	1	-	-	-							3
BCA-DS-306.4	3	3	2	-	2	-	-							3
BCA-DS-306.5	-	-	-	-	3	2	2							3

FOURTH
SEMESTER

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH & STUDIES

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BSCIT-DS-401: SOFTWARE ENGINEERING

Periods/week Credits

P: 3 T:0 3

Duration of Examination: 3 Hrs

Max. Marks 200

Continuous Evaluation :100

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-401.1 Define the basic Software engineering methods and practices, and their appropriate application.
- BSCIT-DS-401.2 Understand software process models and software requirements and the SRS documents.
- BSCIT-DS-401.3 Implement project management planning, scheduling, and risk management using real life applications.
- BSCIT-DS-401.4 Classify different software architectural design
- BSCIT-DS-401.5 Compare the various testing strategies at functional level and behavior level.
- BSCIT-DS-401.6 Assess software quality attributes and to integrate software quality control and software quality assurance.

PART -A

UNIT 1: Introduction

- 1.1 Software Engineering, software Characteristics and Software Crisis
- 1.2 Software Engineering Principles and goals
- 1.3 Software Product and Software Process
- 1.4 Software life cycle models: Build and fix model, Waterfall, Prototype, Spiral model, RAD model
- 1.5 Comparison of software life cycle model

UNIT 2: Requirement Analysis and Specification

- 2.1 Engineering,
- 2.2 System modeling and simulation
- 2.3 Analysis principles of modeling
- 2.4 Partitioning software
- 2.5 Prototyping Model
- 2.6 Requirement Software Requirement Specification and Review
- 2.7 Modeling Analysis: functional modeling and information flow
- 2.8 Creating Entity-Relationship diagrams,
- 2.9 Data flow model, control flow model.
- 2.10 Control and process specification, Data dictionary.

UNIT 3: Software Project Planning and Management

- 3.1 Software Project Management Concept, Planning Goals and Activities
- 3.2 Cost- Benefit Analysis
- 3.3 COCOMO model.
- 3.4 Software Metrics: Product Metrics (LOC, Token Count, Function Count)
- 3.5 Data Structure Metrics, Information Flow Metrics and Design Metrics
- 3.6 Software Project Scheduling: Introduction and its techniques (WBS, Gantt chart, Pert, CPM)

PART-B

UNIT 4: Software Design

- 4.1 Design goals and principles
- 4.2 Design concepts: abstraction, Refinement, modularity, Software architecture
- 4.3 Control hierarchy, Structural partitioning, and modular design: functional independence
- 4.4 Cohesion and coupling
- 4.5 Design Models: design documentation, design methods
- 4.6 Architectural Design of Software
- 4.7 Data Design: Data Modeling, data structures and databases.

UNIT 5: Software Testing

- 5.1 Error, Bug, Fault, Defect & Failure, test case, test suite
- 5.2 Testing Process and Principles
- 5.3 Black Box Testing: Equivalence Class Partitioning, Boundary Value Analysis, Cause-Effect Graphs, Comparison Testing
- 5.4 White Box Testing: Basis Path Testing, Structural Testing, Logic based Testing, Fault Based Testing
- 5.5 Alpha testing and beta testing,
- 5.6 System testing, recovery testing, security testing,
- 5.7 Stress testing, performance testing, and Integration testing.
- 5.8 Testing Tools & Standards.

UNIT 6: Software Quality Assurance and Maintenance

- 6.1 Software Quality, Quality Assurance, Quality Standards like ISO 9001
- 6.2 SEI-Capability Maturity Model
- 6.3 Software reliability, measurements of reliability.
- 6.4 Reverse Engineering, Software Re-engineering
- 6.5 Software Configuration Management
- 6.6 Software Maintenance

Suggested Readings:

1. Rogers. Pressman, 2009, Software Engineering-A practitioner's Approach, MGH
2. Rajib Mall, 2018, Fundamentals of Software Engineering, PHI
3. Ian Sommerville, 2011, Software Engineering , Pearson Education,
4. David Gustafson, 2019, Software Engineering, TMH.

Note: Only latest editions of the books are recommended.

Weblinks:

- <https://www.tutorialspoint.com>
- <https://www.nptel.ac.in>

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:

PO-CO statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BSCIT-DS-401.1	2	3	2	3	2	1	2	2	3	1	1	3	2	2
BSCIT-DS-401.2	2	1	1	3	2	1	2	1	2	1	2	3	2	2
BSCIT-DS-401.3	2	2	1	3	2	1	1	2	2	1	2	3	2	2
BSCIT-DS-401.4	2	1	2	3	1	1	2	2	2	1	3	3	2	2
BSCIT-DS-401.5	1	2	1	2	2	1	2	2	3	1	3	3	2	2
BSCIT-DS-401.6	2	1	1	2	2	1	1	3	3	1	3	3	2	2

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH & STUDIES
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BSCIT-DS-402 : CLOUD COMPUTING

Periods/week Credits

Max. Marks: 200

L: 3 T: 0 3

Continuous Evaluation: 100

Duration of Examination: 3 Hrs

End Semester Examination: 100

Pre-Requirement: Knowledge of Data Communication & Networking

Course Type: Domain

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

BSCIT-DS-402.1 Define cloud computing and memorize the different cloud services and deployment models.

BSCIT-DS-402.2 Describe importance of virtualization along with their respective technology.

BSCIT-DS-402.3 Use and examine different cloud computing services.

BSCIT-DS-402.4 Analyze and compare various different cloud computing platforms such as AWS, Microsoft Azure.

BSCIT-DS-402.5 Design different cloud computing business applications with appropriate security mechanism.

Part A

UNIT 1: Introduction to Cloud Computing

- 1.1 Definition of Cloud Computing
- 1.2 Origin and Influences
- 1.3 Basic Concepts of Clouds: Virtualization and Abstraction
- 1.4 Cloud Characteristics
- 1.5 Challenges and Risks
- 1.6 Applications of Cloud Computing

UNIT 2: Cloud Computing Architecture

- 2.1 Cloud Models: Deployment models, Service Models
- 2.2 Cloud reference model (Architecture, Infrastructure, Platform, and Software)
- 2.3 Cloud types (Public, Private, Hybrid & Community clouds) with examples
- 2.4 Exploring cloud computing status; Connecting to cloud
- 2.5 Cloud Computing Technologies: Elasticity, Load Balancing
- 2.6 Open Challenges

UNIT 3: Cloud Delivery Models

- 3.1 IaaS (IaaS workloads, Pods, Aggregation & Silos);
- 3.2 PaaS (Application development, Using PaaS application framework)
- 3.3 SaaS (Characteristics, Open SaaS & SOA)
- 3.4 IDaaS
- 3.5 Comparing Cloud Delivery Models
- 3.6 Combining Cloud Delivery Models

Part B

UNIT 4: Cloud Security and Trust Management

- 4.1 An Introduction to the Idea of Data Security
- 4.2 Cloud Security Threats
- 4.3 The Current State of Data Security in the Cloud CryptDb
- 4.4 Onion Encryption layers and Homomorphic Encryption
- 4.5 Trust, Reputation and Security Management

UNIT 5: Cloud Platforms in Industry

- 5.1 Amazon Web Services
- 5.2 Google App Engine
- 5.3 Microsoft Azure
- 5.4 Manjra Soft Aneka
- 5.5 Hadoop

Unit 6: Cloud Applications

- 6.1 Scientific Applications
- 6.2 Business Applications
- 6.3 Consumer Applications
- 6.4 Third Party Cloud Services
- 6.5 Case Study related to cloud environment

Suggested Readings:

1. B Rajkumar, V Christian and S. Thamarai Selvi, 2013, Mastering Cloud Computing, TMH Education
2. B Sosinky, 2010, Cloud Computing Bible, Wiley
3. K Jamsa, 2012, Cloud Computing: SaaS, Paas, Iaas, Virtualization, Business Models & More, Jones & Bartlett Learning,
4. K Saurabh, 2012, Cloud Computing, Wiley
5. Erl, 2013, Cloud Computing-Concepts, Technology & Architecture, Pearson Publication

Note: Only latest editions of the books are recommended.

Web links:

https://www.tutorialspoint.com/cloud_computing/cloud_computing_evolution.htm
http://www.motc.gov.qa/sites/default/files/cloud_computing_ebook.pdf
http://eddiejackson.net/web_documents/The_Definitive_Guide_to_Cloud_Computing.pdf
<http://ptgmedia.pearsoncmg.com/images/9780133387520/samplepages/0133387526.pdf>
<http://www.buyya.com/MasteringClouds/ToC-Preface-TMH.pdf>

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:

PO-CO statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BSCIT-DS-402.1	2		1	1			2						3	3
BSCIT-DS-402.2	1	3	1		1		1						2	2
BSCIT-DS-402.3	1	2	2	2		2	1						2	3
BSCIT-DS-402.4	1	2	2	2	3	2	1						3	2
BSCIT-DS-402.5	2	3	2	2		2	2	1					2	2

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES
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BSCIT-DS-403: Relational Database Management System

Periods/week Credits

L: 3 T: 3

Duration of Examination: 3 Hrs

Max. Marks: 200

Continuous Evaluation: 100

End Semester Examination: 100

Pre-Requisite: Database Management System

Course Type: Core

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

BSCIT-DS-403.1. Describe the concepts of relational databases and its comparison with database management system.

BSCIT-DS-403.2. Understand the concept of extended entity relationship and normalization.

BSCIT-DS-403.3. Apply various column level constraints and integrity constraints.

BSCIT-DS-403.4. Design relational databases and apply skills to optimize database performance in practice.

BSCIT-DS-403.5. Analyze the architecture of PL/SQL and concept of Cursors, Functions, Triggers with their programs.

BSCIT-DS-403.6. Summarize the concept of Concurrency Control, Locking Techniques and Deadlocks Handling.

PART-A

Unit 1: Database Management: An Evolutionary Phenomenon

1.1 Introduction to Relational Database Management System

1.2 Database Models

1.3 The 12 rules for an RDBMS (Codd's Rules)

1.4 Database Design

1.5 Data Modeling

1.5.1 Entity

1.5.2 Entity Relationship Diagram

1.5.3 Degree of Relationships

1.5.4 Functional Dependencies and Normal Forms

Unit 2: Oracle Server and Oracle Databases

2.1 Architecture of RDBMS

2.2 Features of RDBMS

2.3 Introduction to Oracle 11i

2.4 Features of Oracle 11i

2.5 Oracle 11i as an Object-Oriented Database Management System (OODBMS)

2.5 Oracle Database Structure

2.5.1 Logical Structure of a Database

2.5.2 Physical Structure of a Database

2.6 Oracle Memory Structures

2.7 Oracle Processes

Unit 3: SQL Fundamentals

- 3.1 Basic Query Statements
 - 3.1.1 Simple Select statement using where clause and ORDER BY clause; Handling NULL values; Arithmetic Expressions; Arithmetic, Logical and Comparison Operators; Distinct Keyword
- 3.2 Advance Query statements
 - 3.2.1 SET operators: UNION, UNION ALL, INTERSECT, MINUS
 - 3.2.2 Displaying Data Flow from multiple tables: Equi Joins, Non-Equi Joins; Outer Joins; Self Join; Sub queries;
- 3.3 Creating and Managing Tables: Data Definition Language(DDL) - Creating tables; Different Constraints and their implementation; Creating Table from another Table; Alter Table ; Rename table; Drop table; Truncate table;
- 3.4 Manipulating Data: Data Manipulation Language (DML) - Insert; Update; Delete; Transaction Control Language; Commit and Rollback
- 3.5 Other Database Objects: Views and Indexes; Sequences: Creating, Dropping and Altering Database Objects.

PART-B

Unit 4: Advanced Concepts in PL/SQL

- 4.1 Introduction to PL/SQL
- 4.2 PL/SQL Block Structure and Architecture
- 4.3 Data types Variables and Constants
- 4.4 Writing PL/SQL Code; SQL in PL/SQL; %TYPE; %ROWTYPE
- 4.5 Operators, Functions, Control Statements, Loops
- 4.6 Cursor Management in PL/SQL – Implicit Cursor, Explicit Cursor
- 4.7 Exception Handling – Predefined Exceptions, User Defined Exceptions, Using RAISE_APPLICATION_ERROR
- 4.8 Database Triggers - Parts of a Trigger, Statement Trigger and Row Triggers, Instead of Triggers, Dropping Triggers

Unit 5: Sub Programs and Packages

- 5.1 Procedures
- 5.2 Functions
- 5.3 Argument Modes - Actual vs. Format Parameters
- 5.4 Packages - Creating Packages, Advantages of Packages
- 5.5 Dropping - Procedures, Functions and Packages
- 5.6 Using Stored Procedure/Function in SQL statement

Unit 6: Distributed Database and Concurrency Control

- 6.1 Distributed Database management system; Data Distribution; Data Replication, Data Allocation
- 6.2 DDBMS Architectures
- 6.3 Fragmentation in DDBMS
- 6.4 Introduction to Concurrency
- 6.5 Locks
- 6.6 Two Phase Locking Protocol
- 6.7 Timestamp Based Protocol
- 6.8 Handling of Deadlock, Phantom Deadlock

Suggested Readings:

1. Groff James and Weinberg Paul, 2011, SQL- The Complete Reference, Tata McGraw Hill.
2. Henry F Korth, Abraham Silberschatz, 2013, Database System Concepts, Sixth Edition, McGraw Hill.
3. Parteek Bhatia, Gurvinder Singh, 2016, Simplified approach to DBMS, Kalyani Publishers.
4. Ivan Bayross, 2010, SQL, PL/SQL, BPB Publications.

Note: Only latest editions of the books are recommended.

Software required/ Weblinks:

- ORACLE 11i
- <https://www.w3schools.com/sql/>
- <https://www.tutorialspoint.com/plsql/index.htm>

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:

PO-CO statement	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P12	PSO1	PSO2
BSCIT-DS-403.1	3			3			2		2			3	3	3
BSCIT-DS-403.2		3			3				3		2		2	3
BSCIT-DS-403.3	2			3	3		2						2	3
BSCIT-DS-403.4	3			3			3				2		2	3
BSCIT-DS-403.5			3					3						3

BSCIT-DS- 403.6			3		2					3				
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MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH & STUDIES

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

BSCIT-DS-404 : Soft Skills and Aptitude Development-II

Periods/week	Credits	Max. Marks	: 100
L:3 T:0	0	Internal	: 50
Duration of Exam: 2hrs		External	50

Course Outcomes:

- BSCIT-DS-404.1. Students will be able to analyze various forms of data.
- BSCIT-DS-404.2. Students will be able to solve complex problems based on arithmetic reasoning.
- BSCIT-DS-404.3. Students will be able to apply short tricks on complex problems of number system.
- BSCIT-DS-404.4. Students will be able to enhance and expand word knowledge by fostering word consciousness.
- BSCIT-DS-404.5. Students will be able to construct simple and complex sentences accurately.
- BSCIT-DS-404.6. Students will be able to develop reading skills & build verbal reasoning skills.

PART – A

Unit 1: Number System II

- 1.1 Factors and Multiples
- 1.2 Unit Digits & Cyclicity
- 1.3 Remainders
- 1.4 Factorials
- 1.5 Logarithm

Unit 2: Arithmetic III

- 2.1 Interest
 - 2.1.1 Simple Interest
 - 2.1.2 Compound Interest
 - 2.1.3 Relation between SI & CI
- 2.2 Time, Speed & Distance
 - 2.2.1 Basics Formulas & Proportionality
 - 2.2.2 Average & Relative Speed
 - 2.2.3 Trains and Boats & Streams
 - 2.2.4 Circular Motion and Clocks
- 2.3 Data Interpretation
 - 2.3.1 Table and Bar graph
 - 2.3.2 Line and Pie Charts
 - 2.3.1 Mixed Charts and Caselets

Unit 3: Verbal Reasoning III

- 3.1 Calendar
- 3.2 Cubes and Dices
- 3.3 Data Sufficiency

PART – B

Unit 4: Advanced Vocabulary

- 4.1 Synonym & Antonym
- 4.2 One Word Substitution
- 4.3 Ordering of Words
- 4.4 Idioms and Phrases
- 4.5 Vocabulary, COW, Punctuation

Unit 5: Sentence Construction & Syntax

- 5.1 Sentence Improvement
- 5.2 Spotting Errors
- 5.3 Ordering of Sentences
- 5.4 Change of Voice/ Direct & Indirect speech
- 5.5 Completing Statements/Sentences

Unit 6: Reading Comprehension & Reasoning

- 6.1 Strategic Reading, Eliminating Poor Reading Habits
- 6.2 Techniques to increase speed reading, comprehension and recall
- 6.3 Solving Sample RC Passages
- 6.4 Closet Test
- 6.5 Para Jumbles

Text Books/Reference Books:

1. Quantitative Aptitude for Competitive Examinations: R S Aggarwal, S Chand & Company Pvt. Ltd, Edition 2017
2. A Modern Approach to Verbal& Non Verbal Reasoning: R S Aggarwal, S Chand & Company Pvt. Ltd, Edition 2018
3. An Advanced Approach to Data interpretation: R S Aggarwal, S Chand & Company Pvt. Ltd, latest Edition
4. Verbal Ability and Reasoning for Competitive Examinations: P.A. Anand, Wiley

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH & STUDIES

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

BSCIT-DS-451: CLOUD COMPUTING LAB

Periods/week Credits
P:2 T: 0 1
Duration of Examination: 3 Hrs

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

Co-Requisite: Cloud Computing

Course Type: Domain Specific

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

BSCIT-DS-451:1. Define Git and Docker cloud computing tools. BSCIT-DS-451:2. Understand cloud oriented AmazonEC2 services.

BSCIT-DS-451:3. Extend the Microsoft azure services for mobile and desktop. BSCIT-DS-451:4. Determine the services of Hadoop and understand its features.

BSCIT-DS-451:5. Apply the open-source cloud using google app engine.

BSCIT-DS-451:6. Implement Cloud Virtualization using vmware, aws and azure.

List of Experiments:

1. Create account on github.com and install gitbash on machine.
2. Install docker from docker-hub on the machine.
3. Create and configure virtual machines using VMware.
4. Create a virtual machine in Microsoft windows using AWS.
5. Connect EC2 Linux Instance Using PuTTY and run basic linux commands on it.
6. Create and configure Elastic Load Balancer and perform live migration.
7. Create docker-image for simple program.
8. Manage virtual machines with Red Hat Network.
9. Create the containers and manage blobs in cloud environment using Microsoft Azure.
10. Create a spreadsheet using google drive.
11. Install Google App Engine. Create hello world app and other simple web applications using python/java.
12. Create and deploy an application using google app engine.
13. Create encryption and decryption script using Microsoft Azure Key Vault
14. Create backup script with Azure VMs.
15. Create recovery scripts using Azure VMs.
16. Deploy Open Stack Single Node with Open Stack Compute (Nova), Open Stack Identity (Keystone) and Open Stack Dashboard (Horizon).
17. Find procedure to attach virtual block to the virtual machine and check whether it holds the data even after the release of the virtual machine.
18. Show the virtual machine migration based on the certain condition from one node to the other.
19. Find procedure to set up the one node Hadoop cluster.
20. Mount the one node Hadoop cluster using FUSE.
21. Write a program to use the API's of Hadoop to interact with it.
22. Write a word count program to demonstrate the use of Map and Reduce task.

Case Studies:

1. As Amazon.com grows larger, the sizes of their Oracle databases continue to grow, and so does the sheer number of databases they maintain. This has caused growing pains related to backing up legacy Oracle databases to tape and led to the consideration of alternate strategies including the use of Cloud services of Amazon Web Services (AWS), a subsidiary of Amazon.com, so maintain reliable backups and being fast and efficient when retrieving data. DBAs have to evaluate whether Amazon S3 backups would be viable for their database backups.
2. In Microsoft Azure, a server takes lot of time to upload a file, so create some function or macro to reduce the file uploading time on Azure.
3. Devevelop a Hadoop-based cloud computing application that pro-cesses sequences of microscope images of live cell.
4. Organize a case in Aneka / Eucalyptus for simulation entities in run-time using a its toolkit support and manage virtual cloud.

Suggested Readings:

1. K Jamsa, 2012, Cloud Computing Saas, Paas, Iaas, Virtualization, Business Models & More, Jones & Bartlett Learning
2. B Rajkumar, V Christian, S. ThamaraiSelvi, 2013, Mastering Cloud Computing, TMH Education
3. B Sosinky, 2011, Cloud Computing Bible, Wiley Publication

Note: Only latest editions of the books are recommended.

Web links:

<https://aws.amazon.com/what-is-cloud-computing/>
http://www.manjrasoft.com/aneka_architecture.html/ <http://uir.ulster.ac.uk/20675/3/ijacivol3no1.pdf/>
https://en.wikipedia.org/wiki/Point_of_delivery_%28networking%29/
<https://www.techopedia.com/definition/25939/silo/> <https://github.com/>
<https://hub.docker.com>

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-451.1	1	1	3	3	1	1	1	1			2	1	1	2
BSCIT-DS-451.2	1	1	3	3	1	1	1	1			2	1	1	2
BSCIT-DS-451.3	1	1	3	3	1	1	1	1				1	1	2
BSCIT-DS-451.4	1	1	3	3	1	1	1	1				1	1	2
BSCIT-DS-451.5	1	1	3	3	3	1	1	3			3	1	1	3
BSCIT-DS-451.6	1	1	3	3	3	1	1	2			3	1	1	2

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BSCIT-DS-453 : RELATIONAL DATABASE MANAGEMENT SYSTEM LAB

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

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

Pre-Requisite: DBMS Lab

Course Type: Core

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

- BSCIT-DS-453.1 To implement various basic SQL (Structured Query Language) queries
- BSCIT-DS-453.2 To apply different referential and integrity constraints on tables
- BSCIT-DS-453.3 To create database triggers, cursors and exceptions
- BSCIT-DS-453.4 To develop an application using oracle as backend with any frontend

List of Experiments:

Every student is required to maintain Practical File and write the following steps in each practical:

- i. Problem statement
- ii. Formula(s) used
- iii. To use DDL for database objects – Table
- iv. To use DML for database objects – Table
- v. To use DCL for database objects – Table
- vi. Input & Output.

1. Create the following tables

Customer

<u>Column name</u>	<u>Data type</u>	<u>Size</u>	<u>Constraint</u>
SID	Varchar2	4	Primary Key
First Name	Char	20	
Last_name	Char	20	

Orders

<u>Column name</u>	<u>Data type</u>	<u>Size</u>	<u>Constraint</u>
Order_ID	Varchar2	4	Primary Key
Order_date	Char	20	
Customer_SID	Varchar2	20	Foreign Key
Amount	Number		Check > 20000

2. Insert five records for each table

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

4. Insert five records for both tables
5. List the details of the customers along with the amount.
6. List the customers whose names end with "s".
7. List the orders where amount is between 21000 and 30000
8. List the orders where amount is increased by 500 and replace with name "new amount".
9. Display the order_id and total amount of orders
10. Calculate the total amount of orders that has more than 15000.
11. Display all the string functions used in SQL.
12. Create the following tables

Student

<u>Column name</u>	<u>Data type</u>	<u>Size</u>	<u>Constraint</u>
RollNo	Varchar2	20	Primary Key
Name	Char	20	
Class	Varchar2	20	
Marks	Number	6,2	

Student1

<u>Column name</u>	<u>Data type</u>	<u>Size</u>	<u>Constraint</u>
R_No	Varchar2	20	Primary Key
Name	Char	20	
Class	Varchar2	20	
Marks	Number	6,2	

13. Display all the contents of student and student1 using union clause.
14. Find out the intersection of student and student1 tables.
15. Display the names of student and student1 tables using left, right, inner and full join.
16. Write a PL/SQL block to calculate total salary of employee having employee number 100.
17. Write a PL/SQL code to find the greatest of three numbers.
18. Write a PL/SQL code to print the numbers from 1 to n.
19. Write a PL/SQL code to reverse a string using for loop.
20. Write a PL/SQL code to find the sum of n numbers.
21. Consider a PL/SQL code to display the empno, ename, job of employees of department number 10.
22. Consider a PL/SQL code to display the employee number & name of top five highest paid employees.
23. Consider a PL/SQL procedure that accepts 2 numbers & return addition, subtraction, multiplication & division of two numbers using stored procedure AND local procedure.
24. Consider a PL/SQL code that accepts 2 numbers & return addition, subtraction, multiplication & division of two numbers using stored functions and local function.
25. Write a PL/SQL block to show the use of NO_DATA_FOUND exception.
26. Write a PL/SQL block to show the use of TOO_MANY_ROWS exception.
27. Write a PL/SQL block to show the use of ZERO_DIVIDE exception.
28. To create a trigger on the emp table, which store the empno & operation in the table auditor for each operation i.e. Insert, Update & Delete.
29. To create a trigger so that no operation can be performed on emp table.
30. Make a Mini project using Developer 2000.

Suggested Readings:

1. Groff James and Weinberg Paul, 2011, SQL- The Complete Reference, Tata McGraw Hill.
2. Henry F Korth, Abraham Silberschatz, S. Sudharshan, 2011, Database System Concepts, Sixth Edition, McGraw Hill.
3. Parteek Bhatia, Gurvinder Singh, 2016, Simplified approach to DBMS, Kalyani Publishers.
4. Ivan Bayross, SQL, 2010, PL/SQL, BPB Publications.

Note: Only latest editions of the books are recommended.

Software required/ Weblinks:

- ORACLE 11i
- <https://www.w3schools.com/sql/>
- <https://www.tutorialspoint.com/plsql/index.htm>

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-453.1	2	2	3				2		3	2				3
BSCIT-DS-453.2	3	2	3				3						3	3
BSCIT-DS-453.3	3	3	3				2		3	2			3	3
BSCIT-DS-453.4	3	2	2				2			3				3

Evaluation Criteria: The following evaluation parameters shall be considered for internal assessment by both research coordinators and faculty coordinator or research mentors:-

Criteria	Evaluation parameters	Weightage (Marks)	
Online and offline Attendance	<ul style="list-style-type: none"> Percentage of classes attended by the students 	3+2	5
Group participation and response of the students to a given task	<ul style="list-style-type: none"> Judge individual student in the group Meeting timelines as per lesson plan 	5 10	15
Literature Survey	<ul style="list-style-type: none"> Usage of Scientific Literature Databases. e.g., Scopus/ Web of Science/ etc. Number of relevant papers referred for the given topic Summarizing the referred paper Plagiarism/Authenticity Reference listing 	2 4 4 3 2	15
Structuring and presentation	<ul style="list-style-type: none"> Paper structuring and presentation Group presentation with individual contribution Target journal, Impact factor/ Topic centered Journal Students response towards comments by research/faculty mentors 	7 2 1 5	15

References:

1. <http://www.sciencedirect.com/>
2. <https://www.ncbi.nlm.nih.gov/pubmed>
3. <https://www.elsevier.com/books-and-journals>
4. <https://www.plos.org/>
5. <https://www.deepdyve.com/>
6. <http://ieeexplore.ieee.org/Xplore/home.jsp>
7. <https://www.researchgate.net/>
8. <https://www.science.gov/>
9. <https://scholar.google.co.in/>
10. <http://www.popsci.com/>

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH & STUDIES

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BSCIT-DS-454: VOCATIONAL TRAINING

Periods/week Credits

4 Weeks 2

Duration of Examination: 2 Hrs

Max. Marks : 100

Continuous Evaluation : 100

End Semester Examination: ---

Internship experience provides the student with an opportunity to enhance the knowledge in their respective subject areas. This training provides insight to understand the actual behavior of the industry able to develop a greater understanding about the career option. Each of the students is required to develop a mini project during his/ her one-month internship. Evaluation will be done by the respective mentors. Internal assessment will be done on the basis of following criteria:

1. Presentation - 30 marks
2. Viva - 50 marks
3. Thesis/Project report - 20 marks.

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH & STUDIES

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BSCIT-DS-405 : INFORMATION SYSTEM SECURITY

Periods/week Credits

L: 3 T:0 P:0 3

Duration of Examination: 3 Hrs

Max. Marks : 200

Continuous Evaluation 100

End Semester Examination : 100

Pre-Requisite: Basics of System security

Course Type: Program Core

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

BSCIT-DS-405.1 Analyze and catalogue information assets and threats to their security.

BSCIT-DS-405.2 Plan an information security strategy and incorporate this in the infrastructure design and configuration.

BSCIT-DS-405.3 Analyze information security policies and procedures and explore the development of security policies, which involves security policy cycle, risk identification, policy design and compliance monitoring and evaluation.

BSCIT-DS-405.4 Plan risk management strategies and evaluate various access control methodologies including authentication, authorization, and biometric access controls.

BSCIT-DS-405.5 Investigate techniques and security solutions used to securing the network infrastructure.

BSCIT-DS-405.6 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 the Management of Information Security, Law and Ethics

1.1 History of Information Security

1.2 Security Model of Information system

1.3 Approaches to Information Security and Implementation access

1.4 Security Systems Development Life Cycle

1.5 The need for security: Threats and Attacks

1.6 Secure Software Development

1.7 Law and Ethics in Information Security

1.8 Relevant U.S. Laws

1.9 International Laws and legal Bodies

1.10 Ethics and Information Security

UNIT 2: Risk Management: Identifying and Assessing Risk & Controlling Risk

2.1 An Overview of Risk Management

2.2 Risk Identification

2.3 Risk Assessment

2.4 Risk Control Strategy

2.5 Selecting a Risk Control Strategy

2.6 Quantitative versus Qualitative Risk Control

UNIT 3: Planning for Security and Contingencies

3.1 Security Planning and Governance

3.2 Information Security Policy

3.3 Standards and Practices

3.4 Continuity Strategies

3.5 Access Control of security systems

3.6 Firewalls

3.7 Protecting Remote Connections

PART - B

UNIT 4: Security Technology: Intrusion Detection and Prevention Systems and Other security Tools

- 4.1 Intrusion Detection and Prevention Systems
- 4.2 Security tools: Honeypots, Honeynets
- 4.3 Padded cell systems
- 4.4 Scanning and Analysing Tools
- 4.5 Biometric Access Control

UNIT 5: Cryptography

- 5.1 Foundation of cryptography
- 5.2 Cipher Methods
- 5.3 Cryptographic Algorithms
- 5.4 Cryptographic Tools
- 5.5 Protocols for Secure Communications
- 5.6 Attacks on Cryptosystems

UNIT 6: Physical Security and Implementing Information Security

- 6.1 Physical Access Control
- 6.2 Interception of Data in security systems
- 6.3 Mobile and Portable Systems Security
- 6.4 Implementing Information Security
- 6.5 Information Security Project Management
- 6.6 Developing the Project Plan for security systems
- 6.7 Project Planning Considerations for security systems
- 6.8 Scope Considerations for security systems
- 6.9 The Need for Project Management
- 6.10 The Bull's-Eye Model
- 6.11 Information Security Maintenance, Security Management Maintenance Models
- 6.12 Digital Forensics

Suggested Readings:

1. Principals of Information Security : Michael E. Whitman - Ph. D. , CISM, CISSP - Kennesaw State University, Herbert J. Mattord - MBA, CISM, CISSP - Kennesaw State University.
2. Security + Guide to Network Security Fundamentals : Mark Ciampa , Course Technology
3. Information Systems Security: Security Management, Metrics, Frameworks and Best Practices : Nina G., Wiley.

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. 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

End term examination

COURSE ARTICULATION MATRIX:

PO-CO Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BSCIT-DS-405.1		2	3		2	1	1					1		3
BSCIT-DS-405.2		2	3	2	2	2	2	1	2	1	3	1	3	3
BSCIT-DS-405.3		2	2				1						2	3
BSCIT-DS-405.4		2	2	2			1						3	2
BSCIT-DS-405.5	2						2						2	2
BSCIT-DS-405.6	1						2						2	2

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH & STUDIES

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BSCIT-DS-406: DATA MINING

Periods/week Credits

L: 3 T: 0 P:0 3

Duration of Examination: 3 Hrs

Max. Marks : 200

Continuous Evaluation : 100

End Semester Examination : 100

Pre-requisite : Knowledge of Data Base Management System

Course Type: Program Core

Course Objectives: At the end of the course, the student will be able to:

BSCIT-DS-406.1. Define the fundamental concepts of Data Warehouse.

BSCIT-DS-406.2. Describe the difference between data base management system, data mining and data warehouse.

BSCIT-DS-406.3. Demonstrate the architecture of a Data Mining

BSCIT-DS-406.4 Apply data mining techniques on different kinds of data.

BSCIT-DS-406.5. Compare various data mining techniques and their applications.

PART-A

Unit 1: Introduction to Data Warehousing

- 1.1 Evolution of data warehousing
- 1.2 Difference between data warehousing and data warehouse
- 1.3 Data Warehousing characteristics
- 1.4 Benefits of data warehousing
- 1.5 Data warehouse architecture
- 1.6 Comparison of OLTP and OLAP
- 1.7 Problems of data warehousing

Unit 2: Data Model

- 2.1 Data Mart
- 2.2 Data Cube
- 2.3 Multidimensional Data Model
- 2.4 Characteristics of OLAP System
- 2.5 OLAP operations on MDDM
- 2.5 Schemas for data model: Star, Snowflake and Fact constellation

Unit 3: Introduction to Data Mining

- 3.1 Basic concepts of data mining
- 3.2 Data mining steps, data mining functionalities
- 3.3 Architecture of data mining
- 3.4 Knowledge Discovery in Data mining versus data mining
- 3.5 Applications of data mining
- 3.6 Classification of Data Mining Systems
- 3.7 Data Mining primitives
- 3.8 Data preprocessing

PART-B

Unit 4: Data Mining Techniques: Association Rules

- 4.1 Support and confidence
- 4.2 Frequent Item set Mining methods
- 4.3 Multi-Level Association Rules
- 4.4 Multi-Dimensional Association Rules : Apriori algorithm
- 4.5 Correlation analysis

Unit 5: Data Mining Techniques: Classification

- 5.1 Difference between Classification and Prediction
- 5.2 Decision Tree Induction
- 5.3 Bayesian Classification
- 5.4 kNN (k Nearest Neighbors) algorithm
- 5.5 Regression Analysis
- 5.6 Prediction techniques

Unit 6: Data Mining Techniques: Clustering

- 6.1 Cluster Analysis
- 6.2 Categorization of Clustering Methods
- 6.3 Partitioning Methods: k-Means, k-Medoids
- 6.4 Hierarchical Methods
- 6.5 Data Mining Applications

Suggested Readings:

1. Data Mining- Concepts & Techniques: Jawei Han & Micheline Kamber, Morgan Kaufmann.
2. Mastering Data Mining: Berry Michael, Linoff Gordon, John Wiley & Sons
3. Data Mining: Pudi Vikram, Oxford University Press
4. Data Warehousing: Thareja Reema, Oxford University Press

Note: Only latest editions of the books are recommended.

Softwares required:

Weka
Tanagra

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:

PO-CO Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BSCIT-DS-406.1	1	1	1	1	1								1	1
BSCIT-DS-406.2	1	1	1	1	1								1	1
BSCIT-DS-406.3	1	1	1	1	1								1	1
BSCIT-DS-406.4	2	1	1	1	1								1	1
BSCIT-DS-406.5	2	2	2	2	2		2						2	2

FIFTH
SEMESTER

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH & STUDIES
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BSCIT-DS-501 : BIG DATA ANALYTICS

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: Knowledge of Database Management System, Data Warehousing, Java or Python
Course Type: Domain

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

BSCIT-DS-501.1. Understand the key concepts of Big data management and its associated applications. .

BSCIT-DS-501.2. Explore the need of Big Data to make better business decisions.

BSCIT-DS-501.3. Manage big data using NoSQL databases.

BSCIT-DS-501.4. Apply Map-Reduce programming using Hadoop and related tools.

BSCIT-DS-501.5. Implement the parallel processing framework using Apache Spark.

PART-A

Unit 1: Introduction Data Mining

- 1.1 Data Mining Functionalities
- 1.2 Steps in Data Mining Process
- 1.3 Architecture of A Typical Data Mining Systems
- 1.4 Classification of Data Mining Systems
- 1.5 Overview of Data Mining Techniques

Unit 2: Overview of Big Data

- 2.1 Basics of Big data
- 2.2 Reasons for using Big data
- 2.3 Characteristics of Big Data
- 2.4 Big Data Architecture: Storing, Selecting and Processing of Big Data
- 2.5 Applications of Big Data
- 2.6 Cloud and Big Data

Unit 3: Managing Data with NoSQL

- 3.1 Introduction of NoSQL Database concepts- ACID Vs. BASE, Advantages, Application
- 3.2 Schema of NoSQL database
- 3.3 CAP Theorem: Consistency, Availability and Partition Tolerance
- 3.4 Sharding and Share Nothing Architecture- Feature Based, Key Based and Lookup Table Based
- 3.5 Distributed and Decentralised NoSQL databases
- 3.6 High Availability and Fault Tolerance in NoSQL databases
- 3.7 Comparison of few NoSQL Databases (Cassandra, Mongo, Cloudera, CouchDB, HBase)

PART-B

Unit 4: Introduction to Hadoop Ecosystem

- 4.1 Problems with traditional large-scale systems
- 4.2 Hadoop v/s RDBMS
- 4.3 Hadoop Distributed File System Design and Architecture

- 4.4 Building Blocks of Hadoop: NameNode, DataNode, Secondary NameNode, JobTracker and Task Tracker
- 4.5 Map Reduce Framework
- 4.6 Map Reduce Input and Output Formats
- 4.7 Introduction to write a MapReduce Program

Unit 5: Querying Big Data with Hive

- 5.1 Hive Architecture
- 5.2 Comparison with Traditional Database
- 5.3 Hive-Data types
- 5.4 Hive built-in operators and built-in functions
- 5.5 Hive-Views and Indexes
- 5.6 Hive QL

Unit 6: Basics of Apache Spark

- 6.1 Features of Apache Spark
- 6.2 Hadoop v/s Apache Spark
- 6.3 Resilient Distributed Dataset (RDD): Introduction of Resilient Distributed Dataset
- 6.4 Spark RDD operations: RDD Transformation
- 6.5 Parallel Processing in Spark

Suggested Readings:

1. Tom Plunkett, Brian Macdonald, 2013, Oracle Big Data Handbook, Bruce Nelson, Fujitsu
2. Madhu Jagadeesh, Soumendra Mohanty, Harsha Srivatsa, 2013, Big Data Imperatives: Enterprise Big Data Warehouse, BI Implementations and Analytics: Apress
3. Frank J. Ohlhorst, Big Data Analytics, 2012, Turning Big Data into Big Money, Wiley Publishers
4. Cristian Molaro, Surekha Parekh, Terry Purcell, DB2 11, 2013, The Database for Big Data & Analytics, MC Press
5. Mike Frampton, 2015, Mastering Apache Spark
6. Edward Capriolo, Dean Wampler, Jason Rutyherglen, 2012, O Reilly, Programming Hive

Note: Only latest editions of the books are recommended.

Software required/Weblinks:

<http://hadooptutorials.co.in/> <https://www.ibm.com/analytics/hadoop/mapreduce>
<https://www.datacamp.com/community/tutorials/apache-spark-tutorial-machine-learning>
<http://hadooptutorial.info/category/hive/>

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). A student is required 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:

PO-CO Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BSCIT-501.1.	1	1	1	1	1		1						1	1
BSCIT-501.2.	1	1	1	1	1		1						2	2
BSCIT-501.3.	2	2	3	3	3		3						3	3
BSCIT-501.4.	3	3	3	3	3		3						3	3
BSCIT-501.5.	3	3	3	3	3		3						3	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH & STUDIES

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

BSCIT-DS-502: CYBER SECURITY

Periods/week Credits

L: 3 T: 0 3

Duration of Examination: 3 Hrs

Max. Marks :200

Continuous Evaluation: 100

End Term Examination: 100

Pre-Requisite: Information System Security

Course Type: Domain Specific

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

BSCIT-DS-502.1 Analyse common security concepts and principles, threats, and counter-measures.

BSCIT-DS-502.2 Implement secure network management, Authentication, Authorisation and Accounting concepts and configuration, and IEEE 802.1X standard authentication.

BSCIT-DS-502.3 Explore Virtual Private Network (VPN) concepts, implement remote access VPN technologies, and secure routing protocols.

BSCIT-DS-502.4 Evaluate common layer 2 attacks, mitigation procedures, and Virtual LAN security.

BSCIT-DS-502.5 Implement Network Address Translation (NAT) and Intrusion Prevention System (IPS) considerations.

BSCIT-DS-502.6 Develop workplace soft-skills that include working in groups, writing formal reports and delivering oral presentations.

PART- A

UNIT 1: Introduction

- 1.1 Common Security Threats
- 1.2 Intruders
- 1.3 Viruses
- 1.4 Common network Security Concept
- 1.5 Digital Signature
- 1.6 Authentication

UNIT 2: Fundamental of System Security

- 2.1 Secure Routing
- 2.2 Switching Infrastructure
- 2.3 Secure Network Devices
- 2.4 Deploy Basic Authentication
- 2.5 Authorization
- 2.6 Accounting Services

UNIT 3: Fundamental of IP Security

- 3.1 Overview of IP Security
- 3.2 IP Security Architecture
- 3.3 Authentication Header
- 3.4 Encapsulating Security Payload
- 3.5 Key Management

PART-B

UNIT 4: Fundamental of VPN Technology and Cryptography

- 4.1 Configure site-to-site VPNs
- 4.2 SSL VPNs
- 4.3 Securing Layer 2 Technologies
- 4.4 Secure Electronic Transactions
- 4.5 Encryption
- 4.6 Decryption
- 4.7 Cryptanalysis

UNIT 5: Securing Routing Protocols and Control Panel

- 5.1 Routing Information Protocol
- 5.2 EIGRP Fundamentals
- 5.3 OSPF Protocol Fundamentals
- 5.4 Router Control Panel
- 5.5 Neighbor Authentication

UNIT 6: Firewall Fundamental and Configuration

- 6.1 Firewall Design Principles
- 6.2 Firewall Configuration Management
- 6.3 Net masks
- 6.4 Packet Filters
- 6.5 Stateful Firewalls
- 6.6 Linux and Windows Firewall

Suggested Readings:

1. CCNA Security 210-260 Official Cert Guide, Publisher: Pearson Education (US) Imprint: Cisco Press, Language English, ISBN10 1587205661, ISBN13 9781587205668,2017,3rd edition
2. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives: Nina Godbole, Sunit Belpure, Publication Wiley,4th edition ,2017
3. Anti-Hacker Tool Kit: Mike Shema, McGraw Hill,2013,3rd edition
4. Cryptography and Network Security Principles and Practices: W. Stallings, Prentice-Hall ,2015,2nd edition

Recommended reading:

1. NZ Cyber Security Strategy <http://www.dpmc.govt.nz/sites/all/files/publications/nz-cyber-security-strategy-december-2015.pdf>.
2. Susan Lincke, 2015, Security Planning, An Applied Approach, Springer. ISBN 978-3-319-16026-9 ISBN 978-3-319-16027-6 (eBook), DOI 10.1007/978-3-319-16027-6.
3. William Stallings, 2016, Cryptography and Network Security: Principles and Practice, ISBN: 0134484525, 9780134484525.
4. Atul Kahate, 2011, Cryptography and Network Security, ISBN: 9332900922, 9789332900929

Other Web links:

- New Zealand Cyber Security www.ncsc.govt.nz
- FTC – Computer Security <http://www.consumer.ftc.gov/topics/computer-security>
- Fight Spam on the Internet! <http://spam.abuse.net/>
- How to recognize phishing e-mail messages, links, or phone calls
<http://www.microsoft.com/security/online-privacy/phishing-symptoms.aspx>
- Anti-Phishing Working Group <http://www.antiphishing.org/>
- SANS' Information Security Reading Room http://www.sans.org/reading_room/
- Zero day initiative <http://www.zerodayinitiative.com/>

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	PS01	PS02
BSCIT-DS-502.1		1		2				1					1	1
BSCIT-DS-502.2			1			1	2	1		1			2	1
BSCIT-DS-502.3	1	1		1	1	1	2			1			2	1
BSCIT-DS-502.4	1	1	1		2		1	2		1	1	1	2	1
BSCIT-DS-502.5	1		3	1	3	1	2	2		1	1		3	2
BSCIT-DS-502.6			3	1	3	1	2	1		2	1	1	2	2

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH & STUDIES

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BSCIT-DS-503 : Soft Skills and Aptitude Development-III

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

Course Outcomes

- BSCIT-DS-503.1. Students will be able to recognize problem based on Modern Mathematics and Algebra
- BSCIT-DS-503.2. Students will be able to solve basic to moderate level problems based on Mensuration and Geometry.
- BSCIT-DS-503.3. Students will be able to calculate solution to logical reasoning.
- BSCIT-DS-503.4. Students will get proficient with resume building and will be able to draft effective cover letters.
- BSCIT-DS-503.5. Students will be able to participate effectively and confidently in a Group Discussion
- BSCIT-DS-503.6. Students will be able to manage interviews effectively.

PART – A

Unit 1: Modern Mathematics and Algebra

1.1 Permutation and Combination

- 1.1.1 Principal of counting and Basic formulas
- 1.1.2 Arrangements, Selection and Selection + Arrangement.
- 1.1.3 Linear/Circular arrangements, Digits and Alphabetic Problems and Applications.

1.2 Probability

- 1.2.1 Events and Sample Space, Basic Formulas.
- 1.2.2 Problems on Coins, Cards and Dices.
- 1.2.3 Conditional Probability, Bayes' Theorem and their Applications.

1.3 Algebra

- 1.3.1 Linear & Quadratic equations
- 1.3.2 Mathematical inequalities
- 1.3.4 Maximum & Minimum Values
- 1.3.3 Integral Solutions

Unit 2: Geometry and Mensuration

2.1 Geometry

- 2.1.1 Basic geometry & Theorems, Lines & Angles
- 2.1.2 Polygons, Triangle and Quadrilaterals
- 2.1.3 Circles

2.2 Mensuration I- Areas

- 2.2.1 Different types of Triangles and their area and perimeter.
- 2.2.2 Different types of Quadrilateral and their area and perimeter.
- 2.2.3 Circumference and Area of Circle, Area of Sector and length of Sector.
- 2.2.4 Mixed Figures and their Applications.

2.3 Mensuration II- Surface Areas and Volumes

- 2.3.1 Problems on Cubes & Cuboids, Cone, Cylinder and Sphere.
- 2.3.2 Prism and Pyramid.
- 2.3.3 Mixed Figures and their Applications.

Unit 3: Logical Reasoning

- 3.1 Linear Arrangement
- 3.2 Circular Arrangement
- 3.3 Puzzles

Part - B**Unit 4: Professional Writing**

- 4.1. Profiling on Social Sites: LinkedIn, Facebook, Instagram
- 4.2. Cover Letter/Emails
- 4.3. Resume Writing

Unit 5: Group Discussions

- 5.1. Do's and Dont's of a Group Discussion
- 5.2. Roles played in a Group Discussion
- 5.3. Tips for Cracking a Group Discussion

Unit 6: Managing Interviews

- 6.1. Developing the employability mindset
- 6.2. Preparing for Self -Introduction
- 6.3. Researching the employer
- 6.4. Portfolio Management
- 6.5. Answering Questions in an Interview

Text Books/Reference Books:

- 1. Teach Your Self Quantitative Aptitude: Arun Sharma, 1st Edition, McGraw Hills Education, 2017
- 2. A Modern Approach to Logical Reasoning: R S Aggarwal, S Chand & Company Pvt Ltd, Edition 2017
- 3. The Damn Good resume Guide ByYana Parker & Beth Brown
- 4. Interview Answers By Ceri Roderick & Stephan Lucks

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH & STUDIES

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BSCIT-DS-552 : BIG DATA ANALYTICS LAB

Periods/week Credits

P: 4 2

Duration of Examination: 3Hrs

Max. Marks 100

Continuous Evaluation: 50

End Semester Examination : 50

Course Outcomes:

At the end of the course the student will be able to:

BSCIT-DS-552.1. To acquire fundamental enabling techniques and scalable algorithms such as NO

BSCIT-DS-552.2. To analyze and integrate machine learning libraries, mathematical and statistical tools with modern technologies like map reduce.

BSCIT-DS-552.3. To solve problems associated with big data characteristics such as high dimensionality, dynamically growing data and in particular scalability issue.

BSCIT-DS-552.4. To implement machine learning techniques and computing environment that are suitable for the real time applications such as recommender system.

The students will compare NoSQL Databases (Cassandra, Mongo, Cloudera, CouchDB, HBase)

List of Practical

1. Installation of VMWare to setup the Hadoop environment and its ecosystems.
2. Perform setting up and Installing Hadoop in its three operating modes. i. Standalone. ii. Pseudo distributed.
3. iii. Fully distributed.
4. Prototype Designing
5. Simulation based implementation
6. Use web based tools to monitor your Hadoop setup.
7. Implementing the basic commands of LINUX Operating System – File/Directory creation, deletion, update operations.
8. Implement the following file management tasks in Hadoop:
9. Adding files and directories
10. Retrieving files
11. Deleting files
12. Creating and destroying files
13. Write a Word Count Map Reduce program to understand Map Reduce Paradigm.
14. Optimization of Codes
15. Write a Map Reduce Program to analyse time-temperature statistics and generate report with max/min temperature.
16. Implement Matrix Multiplication with Hadoop Map Reduce
17. Download MongoDB and analyse its client and server working.
18. Create a database in MongoDB and apply CRUD operations.
19. Download Hive.
20. Use Hive to create, alter, and drop databases, tables, views, functions, and indexes .
21. Download Apache Spark, python libraries, open source libraries and implement python programs in spark.
22. How MongoDB associated with other coding languages
23. Android and iOS integrated with Big Data.
24. Implement word count problem using pyspark.

Suggested Readings:

1. Tom Plunkett, Brian Macdonald, Bruce Nelson, Fujitsu, 2013, Oracle Big Data Handbook, Oracle Press
2. Madhu Jagadeesh, Soumendra Mohanty, Harsha Srivatsa, 2013, Big Data Imperatives: Enterprise Big Data Warehouse, BI Implementations and Analytics, Apress
3. Frank J. Ohlhorst, 2012, Big Data Analytics: Turning Big Data into Big Money, Wiley Publishers
4. Cristian Molaro, Surekha Parekh, Terry Purcell, 2013, DB2 11: The Database for Big Data & Analytics, MC Press
5. Mike Frampton, 2015, Mastering Apache Spark, PACKT Publishers
6. Edward Capriolo, Dean Wampler, Jason Rutyherglen, 2012, Programming Hive, O Reilly

Note: Only latest editions of the books are recommended

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-552.1	2	2	3	3	3		3						3	3
BSCIT-DS-552.2	3	3	3	3	3		3						3	3
BSCIT-DS-552.3	3	3	3	3	3		3						3	3
BSCIT-DS-552.4	2	3		3	3		2						3	3

Evaluation Criteria: The following evaluation parameters shall be considered for internal assessment by both research coordinators and faculty coordinator or research mentors:-

Criteria	Evaluation parameters	Weightage (Marks)	
Online and offline Attendance	<ul style="list-style-type: none"> Percentage of classes attended by the students 	3+2	5
Group participation	<ul style="list-style-type: none"> Judge individual student's participation in the experiments Proper experimental planning Collecting evidences substantiating to the experiments Time bound completion of experiments 	5	15
		2	
		3	
		5	
Execution of experiments	<ul style="list-style-type: none"> Finding available resources Usage of Scientific Literature Databases. e.g., Scopus/ Web of Science/ etc. for theoretical guidance Understanding the technique/technology used Analysis and interpretation of results Percentage of reproducibility 	2	12
		2	
		3	
		2	
		3	
Report and Presentation	<ul style="list-style-type: none"> Presentation of slides Experimental findings and content (Graph, Tables, Diagrams, Real time videos etc.) Report 	6	18
		6	
		6	

References:

1. www.originlab.com
2. <http://www.cambridgesoft.com/software>
3. <http://www.synergy.com/>
4. www.mathworks.com/products/matlab.html

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH & STUDIES

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BSCIT-DS-504: MOBILE APPLICATIONS DEVELOPMENT

Periods/week Credits

L: 3 T:0 P:0 3

Duration of Examination: 3 Hrs

Max. Marks : 200

Continuous Evaluation : 100

End Semester Examination : 100

Pre- Requisite: Basics of Programming

Course Type: Program Core

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

BSCIT-DS-504.1 Install and configure Android application development environment.

BSCIT-DS-504.2 Develop and implement Android applications User Interface (UI) by using Android controls.

BSCIT-DS-504.3 Develop Android applications that include the following features: splash page, dial phone number, send email, create event in Google calendar, browsing website, and play video.

BSCIT-DS-504.4 Develop Android applications that include the following features: image gallery, Rich Site Summary (RSS), Google map, GPS, and Social Networks.

BSCIT-DS-504.5 Develop Android applications that can access data from remote data sources through HTTP web service.

BSCIT-DS-504.6 Develop Android applications that are able to read and write data from local data sources such as XML and SQLite.

BSCIT-DS-504.7 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:

- 1.1 Introduction to Android
- 1.2 Android Framework
- 1.3 Review and compare Java and C#
- 1.4 Android Development tool
- 1.5 Installing Java, and ADT bundle

UNIT 2: Android Architecture Overview and its Application

- 2.1 The Android Software Stack
- 2.2 Android Libraries
- 2.3 Creating an Activity
- 2.4 Running the Application in the AVD

UNIT 3: Android Software Development Platform

- 3.1 Understanding Java SE and the Dalvik Virtual Machine
- 3.2 The Directory Structure of an Android Project
- 3.3 Leveraging Android XML
- 3.4 Launching Your Application: The AndroidManifest.XML File
- 3.5 Creating Your First Android Application

PART-B

UNIT 4: Android Framework Overview

- 4.1 Android Application Components
- 4.2 Defining the UI
- 4.3 Develop Android UI
- 4.4 Work with layouts
- 4.5 Android Manifest XML

UNIT 5: An Overview of Content Providers, Database and Android Threads

- 5.1 Implement SQLite database
- 5.2 Work with content providers
- 5.3 Work with Tabs and custom adapters
- 5.4 Threads
- 5.5 Implementing a Thread Handler
- 5.9 Transaction oriented TCP

UNIT 6: Location-Based Services

- 6.1 Work with locations and maps
- 6.2 Working with Web Services
- 6.3 Configuring the Android Emulator for Location-Based Services
- 6.4 Geocoding and Map-Based Activities
- 6.5 Deploy an app
- 6.6 Test and debug an Android app

Suggested Readings:

1. Dawn Griffiths, David Griffiths, "Head First: Android Development", O'Reilly 2015, ISBN: 9781449362188
2. Greg Milette, Adam Stroud, "PROFESSIONAL Android™ Sensor Programming", John Wiley and Sons, Inc 2012, ISBN/978111265055, 9781280678943, 978111227459
3. Paul Deitel, Harvey Deitel, Alexander Wald, "Android 6 for Programmers, App Driven approach", 2015, Prentice Hall, ISBN: 9780134289366

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:

PO-CO Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BSCIT-DS-504.1			2		1		1	1			1	1	1	
BSCIT-DS-504.2		2	1		1			1	1		1	1	1	
BSCIT-DS-504.3		1			2		1	2	1		1	1		
BSCIT-DS-504.4		3	2		1		1	2	1		1	1	1	
BSCIT-DS-504.5		1	2						2					
BSCIT-DS-504.6		1				1	1	2	2		2	1		
BSCIT-DS-504.7	2	1				1	1	2	2		2	1		

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

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BSCIT-DS-505: INTRODUCTION TO COMPUTER GRAPHICS

Periods/week Credits

L: 3 T: 3

Duration of Examination: 3 Hrs

Pre-Requisite: Basic Programming Skills

Max. Marks: 200

Continuous Evaluation: 100

End Semester Examination: 100

Course Type: Core

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

BSCIT-DS-505.1: Familiarize with graphics system.

BSCIT-DS-505.2: Apply transformations on 2D and 3D objects.

BSCIT-DS-505.3: Categorize the different viewing and clipping techniques for graphics objects.

BSCIT-DS-505.4: Comprehend and analyze the fundamentals of animation on real life graphics Applications.

BSCIT-DS-505.5: Implement various scan conversion algorithms on real life problems.

PART-A

UNIT 1: Overview of Computer Graphics

- 1.1 Introduction to Computer Graphics
- 1.2 Interactive and Passive Graphics
- 1.3 Application of Computer Graphics
- 1.4 Console User Interface (CUI)
- 1.5 Graphical User Interface (GUI)
- 1.6 Input – Output Devices
- 1.7 Display Device: Cathode Ray Tube
- 1.8 Flat Panel Devices
- 1.9 Color Monitors
- 1.10 Graphics standards

UNIT 2: Scan Conversion and Interactive Graphics

- 2.1 Scan Conversion
- 2.2 Scan converting a point
- 2.3 Scan converting a line
- 2.4 Digital Differential Analyser
- 2.5 Bresenham's Algorithm for line drawing
- 2.6 Pointing and Positioning
- 2.7 Gravity Field
- 2.8 Rubber band method
- 2.9 Inking and Painting
- 2.10 Dragging and Sketching
- 2.11 Boundary fill algorithm
- 2.12 Flood fill algorithm.

UNIT 3: Two Dimensional Graphics Transformation

- 3.1 Introduction
- 3.2 Matrix Representation
- 3.3 Homogeneous Coordinate
- 3.4 Composite Transformation
- 3.5 Basic Numerical Examples

PART-B

UNIT 4: Three Dimensional Transformation & Projection

- 4.1 Three-Dimensional graphics concepts
- 4.2 Matrix Representation of 3-D transformation
- 4.3 Translation
- 4.4 Scaling
- 4.5 Rotation
- 4.6 Introduction to Projections

UNIT 5: Viewing and Clipping

- 5.1 Window
- 5.2 Viewport
- 5.3 World Coordinate System
- 5.4 Device Coordinate System
- 5.5 Normalized Device Coordinate System
- 5.6 Window to view port mapping
- 5.7 Introduction to Clipping: point; line; polygon.
- 5.8 Line Clipping algorithm: Cohen Sutherland

UNIT 6: Introduction to Animation

- 6.1 General Procedure
- 6.2 Zooming and Panning
- 6.3 Frame by Frame Animation Techniques
- 6.4 Real time Animation Technique
- 6.5 Animation Software

Suggested Readings:

1. D Hearn & P M Baker, 2002, Computer Graphics, Prentice Hall
2. J D Foley & A Van Dam, 1983, Fundamentals of interactive Computer Graphics, Addison Wesley
3. Schaum Series, 2015, Computer Graphics, Tata McGraw Hill
4. Pradeep K. Bhatia, 2009, Computer Graphics, I.K. International

Note: Only latest editions of the books are recommended.

Software required/ Web Links:

Turbo C

https://www.tutorialspoint.com/computer_graphics/

https://www.courses.psu.edu/art/art201_jxm22/tutorials.html

<https://www.mindmeister.com/1111459473/computer-graphics-tutorial>

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%
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Assessment Tools:

Assignment/Tutorials

Sessional tests

Surprise questions during lectures/Class Performance

Term end examination

COURSE ARTICULATION MATRIX:

PO-CO Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BSCIT-DS-505.1		2				1	2	1	1	1	1		2	2
BSCIT-DS-505.2	2		1			1	2	1	1	1	2		1	1
BSCIT-DS-505.3	2		1			1	2	1	1	1	2		1	3
BSCIT-DS-505.4	2		1			1	2	1	1	1	2		1	3
BSCIT-DS-505.5	2	2		2	2	1	2	2	2	1	2		2	2

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

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BSCIT-DS-554: MOBILE APPLICATIONS DEVELOPMENT LAB

Periods/week Credits

L: 0 T: 0 P: 4 2

Duration of Examination: 3Hrs

Max. Marks : 100

Continuous Evaluation: 50

End Semester Examination: 50

Co- Requisite: Mobile Applications Development

Course Type: Domain Specific

Course outcomes: At the end of the course the student will be able to:

BSCIT-DS-554.1 Build and deploy his/ her Android application.

BSCIT-DS-554.2 Understand the operation of the application, application lifecycle, intents, and activities.

BSCIT-DS-554.3 Better understanding of the UI - components, layouts, event handling.

BSCIT-DS-554.4 Develop UI rich apps using all the major UI components.

BSCIT-DS-554.5 Gain an in-depth understanding of broadcast receivers, services, Android's APIs for data Storage, retrieval, user preferences, files, and databases.

BSCIT-DS-554.6 Send and Receive SMS messages programmatically

BSCIT-DS-554.7 Develop basic applications that act as a working example of all the topics covered in the class

List of Experiments:-

Activity 1: Introduction to Android Platform.

Concept: Overview of android platform architecture.

Practical: a) Build & Simulate the first "HelloWorld" Application.

Activity 2: User Interface (UI) Development in Android.

Concept: Overview of different Layouts:

- Linear Layouts, Grid Layouts

Concept: Introduction about Text Controls:

- TextView, EditText

Practical: a) Add TextView to the LinearLayout.

b) Add TextView to the GridLayout.

Activity 3: Introduction to the range of UI Components.

Concept: Other UI components are:

- Buttons Controls, Input Controls

Practical:

a) Design layout to show working of button and input controls.

Activity 4: Make Interactive UI using Event Handling.

Concept: Identify resources with IDs and programmatically change the Ids, on Click Attribute.

Practical:

a) Add click behavior to a button

b) Change text of text View on button click.

Activity 5: Introduction to various Views.

Concept:

- How to make activities scrollable?
- How to create a List View in Android?

Practical:

- a) Use a scroll view for text with minor changes in HTML formatting.
- b) Create a list View and also implement its on Click attribute.

Activity 6: Activities and Intents

Concept:

Creating apps with multiple activities. Starting activities with both explicit and implicit intents. Sending data between activities. Understanding activity lifecycle.

Practical:

- a) Create a new activity and layout
- b) Start the new activity from an existing activity with an explicit intent
- c) Pass user-entered information from one activity to the other
- d) Pass information back to the main activity.

Activity 7: Overview of Menus

Concept:

- Options menu, Adding menu items.
- Handling on Click from menus.

Practical:

- a) Set up an options menu.
- b) Add items to the option menu.
- c) Add up navigation to the app bar.
- d) Implement on Click for menus.

Activity 8: Implement Broadcast Receiver.

Concept: What is a Broadcast Receiver?

Practical:

- a) Create an app with a Broadcast Receiver.

Activity 9: Introduce Notifications

Concept: What is a Notification?

Practical:

- a) Trigger a Notification.
- b) Add Actions to your Notification.

Activity 10: Database Connectivity Using SOLLite.

Concept:

- Overview of SQLite
- Querying (dev) Searching (user) databases
- Best practices for using databases in Android

Practical:

- a) Create an app that stores data in an SQL database.

Activity 11: Publishing your App

Concept: Understanding the ways of monetizing your App.

Practical:

- a) Publish your App to Google Play.

Recommended Small Projects:

- a. Create an accident alert app.
- b. Create a diet planner app
- c. Create an application for budget management of your family.
- d. Create an application to stimulate calculator
- e. Create an application to simulate Notepad
- f. Create an application for Women Protection System

Note: Faculty can suggest more practical assignment and projects as per the need.

Suggested Readings:

1. Professional Android 2 Application Development by Reto Meier
2. Learning Android by Marko Gargenta
3. Sams Teach Yourself Android Application Development in 24 Hours by Lauren Darcey

Note: Only latest editions of the books are recommended.

Software required:

Android Studio
Android SDK

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	PO 10	PO 11	PO 12	PSO1	PSO2
BSCIT-DS-554.1	1	2	2	2	3	1	2				2		3	3
BSCIT-DS-554.2	2	2	2	2	3								1	2
BSCIT-DS-554.3	3	3	2	3			2							2
BSCIT-DS-554.4	2	3	3	2										2
BSCIT-DS-554.5	2	2	2	2				2			2			2
BSCIT-DS-554.6	2	1	1	1										
BSCIT-DS-554.7	3	3	3	3	3		3						2	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

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BSCIT-DS-555: COMPUTER GRAPHICS LAB

Periods/week Credits

P: 2 T:0 1

Duration of Examination: 3 Hrs

Max. Marks 100

Continuous Evaluation : 50

End Semester Examination : 50

Co-Requisite: Elements of computer graphics

Course Type: Core

BSCIT-DS-555.1: Apply clipping and filling techniques for modifying an object.

BSCIT-DS-555.2: Experiment the techniques of scan conversion, object drawing and 2D and 3D transformations.

BSCIT-DS-555.3: Apply different graphics functions in a computer programs for designing graphics applications.

BSCIT-DS-555.4: Practically implement modeling, rendering, viewing of objects in 2D.

BSCIT-DS-555.5: Develop basic applications that act as a working example of all the topics covered in the Course.

List of Experiments:

a) Every student is required to maintain Practical File and write the following steps in each practical:

b) Problem statement

c) Function used

d) Algorithm

e) Flow Chart

f) Source codes in student's handwriting

g) Program listing (print-out)

h) Input & Output.

1. Write a Program to draw a Smiley.

2. Write a Program to draw a face.

3. Write a Program to draw a grid of 32 lines with color black & white in alternate fashion.

4. Write a Program to draw a line using Bresenham's Line drawing algorithm.

5. Write a Program to implement DDA Line drawing algorithm.

6. Write a Program to draw a House.

7. Write a Program to draw a Star with a circle inside it.

8. Write a Program to draw a digital Watch.

9. Write a Program to draw a ball which moves randomly on the screen.

10. Write a Program to implement midpoint circle drawing algorithm.

11. How will you show the movement of the snake?

12. Write a Program to plot pixel randomly with random colors.

13. Write a Program to draw a Moving Fan.

14. Design your Solar System.

15. Suppose you are a Group of 4 people and want to open a software company. How will you prepare its logo? Create your own idea to represent it.

16. Through some quotation & a beautiful banner tell us some of the good things about yourself.

17. Share your experience (your likes & dislikes) with some creative idea.

18. Build a scene of night sky full of stars and moon.

19. Write a program to draw chess board.

20. Write a program to draw a hut.

21. Write a program to show the effect of animation.

22. Write a program to display the student record sheet and draw the bar chart of it.

Subject Name	Student Passed	Student Failed
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English	80	20
Maths	52	48
Hindi	92	08

23. Make a mini project based on above mentioned list of practical. Suggested mini projects are:

- a) Create a paint brush screen with working of following tools:
 1. Color bucket
 2. Pencil tool
 3. Jumping ball
 4. Text color
 5. Text style

- b) Design Tic Tac Toe game with following parameters.
 1. Blue color Background
 2. White color table
 3. Score board
 4. Two players

Suggested Readings:

1. D Hearn & P M Baker,2002, Computer Graphics, Prentice Hall
2. J D Foley & A Van Dam,1982 Fundamentals of interactive Computer Graphics, Addison Wesley
3. Schaum Series,2015, Computer Graphics, Tata McGraw Hill
4. Pradeep K. Bhatia, 2013, Computer Graphics, I.K. International

Note: Only latest editions of the books are recommended.

Software required/Web Links:

Turbo C++ for Windows
<https://www.programmingsimplified.com/c/graphics.h>
<https://www.geeksforgeeks.org/draw-rectangle-c-graphics/>
www.techcrashcourse.com/2015/08/c-graphics-programming-tutorial.html

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-555.1	3				1	1	2						1	1
BSCIT-DS-555.2		2	2		2	2	2				2		3	2
BSCIT-DS-555.3	2	2		1		1	1	1	1		2		3	3
BSCIT-DS-555.4	2	2				1	1	1	1		1	1	3	2
BSCIT-DS-555.5	1	1				1	1	1	1		1	2	2	2

SIXTH
SEMESTER

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH & STUDIES

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BSCIT-DS-601: BASICS OF MIS AND ERP

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: Principles of Management

Course Type: Domain Specific

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

BSCIT-DS-601.1. Learn various information system and their successful implementation in an organization

BSCIT-DS-601.2. Identify the major challenges in building and using management information system.

BSCIT-DS-601.3. Assess the relationship between management information system and business processes.

BSCIT-DS-601.4. Evaluate the role of Information systems supporting various levels of business strategy

UNIT 1: Information Systems

- 1.1 Introduction
- 1.2 Objectives
- 1.3 Concept of Information System
- 1.4 Components of Information System
- 1.5 Trends in Information System
- 1.6 Types of Information System
- 1.7 Framework of Information System in an Organization
- 1.8 Sub Systems of an Information System
- 1.9 Causes for failures of Information System

UNIT 2: Management Information System (MIS)

- 2.1 Nature and scope of MIS
- 2.2 Characteristics of MIS
- 2.3 Functions of MIS
- 2.4 Structure of MIS
- 2.5 Physical Components of MIS
- 2.6 Development Process of MIS
- 2.7 Decision Support System (DSS)
- 2.8 Information requirement and levels of management

UNIT 3: Management Information System and Organization Structure

- 3.1 Managing in the Internet Era
- 3.2 MIS in Organization
- 3.2 Strategic Level Planning
- 3.3 Operational Level Planning
- 3.4 Use of information for competitive advantage
- 3.5 Economic and Behavior Theories
- 3.6 MIS Pitfalls and factors affecting the same

UNIT 4: Introduction to Enterprise Resource Planning (ERP)

- 4.1 Introduction and Objective of ERP
- 4.2 Need for ERP

- 4.3 Basic Concepts of ERP
- 4.4 ERP Models and Modules
- 4.5 Growth of ERP
- 4.6 Benefits of ERP
- 4.7 Proper and Improper ERP Implementation

UNIT 5: ERP Modules and Vendors

- 5.1 Finance
- 5.2 Production Planning
- 5.3 Control and Maintenance
- 5.4 Sales and Distribution
- 5.5 Human Resource Management (HRM)
- 5.6 Inventory Control System
- 5.7 Quality Management

UNIT 6: Strategies of ERP

- 6.1 Strategy of Organization and ERP
- 6.2 Role of ERP in achieving Organizational Objectives
- 6.3 Developing an effective ERP system
- 6.4 ERP and challenges of E-Commerce
- 6.5 ERP Related Technologies (OLAP, Data Mining)

Suggested Readings:

1. Leon Alexis, 2019, Enterprise Resource Planning , Tata McGraw-Hill, 1999
2. 2011, Management Information System: James A. O'Brien PaperBack
3. 2013, Management Information Systems: A Global Digital Enterprise Perspective : W.S. Jawadekar, Paperback

Note: Only latest editions of the books are recommended.

Web links:

- <https://www.slideshare.net/sumit235/mis-and-erp>
- ddugkysop.in/mod/book/view.php?id=433&chapterid=871
- https://mthink.com/legacy/www.cfoproject.com/content/pdf/CFO1_wp_shank.pdf
- <https://pdfs.semanticscholar.org/fb0c/ac0d03b50116d48a43ece5f7c26d6f27b0bc.pdf>

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:

PO-CO Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
BSCIT-DS-601.1.	1		2		2		1		2	1		2	2	3
BSCIT-DS-601.2.		2		1		1	2	1	1	3	2	1	1	1
BSCIT-DS-601.3.			3		1		2		2	3	3	2	1	1
BSCIT-DS-601.4.	2		2	2			3	2		2	3		2	3

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES
(Deemed to be University under section 3 of the UGC Act 1956)

BSCIT-DS-602: .NET PROGRAMMING USING C#

Periods/week Credits

L: 3 T: 0 P:0 3

Duration of Examination: 3 Hrs

Max. Marks : 200

Continuous Evaluation : 100

End Semester Examination : 100

Pre-Requisite: Object Oriented Programming

Course Type: Core

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

BSCIT-DS-602.1. Describe the concepts of windows application programming.

BSCIT-DS-602.2. Understand the internal working of .Net Framework.

BSCIT-DS-602.3. Demonstrate the usage of different tools and controls used in C# programming.

BSCIT-DS-602.4. Analyze the various types of database connectivity with visual studio .net.

BSCIT-DS-602.5. Assess various ASP.NET components and justify their usage in various programming situations.

BSCIT-DS-602.6. Design a full-fledged Web Application using ASP.NET complete with database connectivity.

PART -A

UNIT 1: Introduction

1.1 Introduction to Visual Studio

1.2 Visual Studio IDE, Development Environment Setup

1.3 .NET Overview, CLR, Assemblies (monolithic vs. component-based applications)

1.4 Execution Model, Client-Side vs. Server-Side Programming.

1.5 Debugging using Visual Studio.

1.6 Creating Different types of Projects in Visual Studio(Web, Desktop, Library)

UNIT 2: C# Basics

2.1 Variables, Constants

2.2 Strings, Data Types

2.3 Arrays Different Types of Arrays and Operations on Arrays

2.4 Decision statements

2.5 Loop statements

2.6 Exception Handling using try – catch –finally

2.7 Name Space

2.8 Class and Objects, Creating and using Objects

UNIT 3: Inheritance

3. 1 Inheriting a class

3. 2 Sealed class

3. 3 Overloading an operator

3. 4 Overloading a method

3. 5 Overloading an Indexer

3. 6 Creating an Interface

3. 7 Implementing an Inheritance

3. 8 Inheriting an Interface

PART-B

Unit 4: Desktop Applications and Event Handling

4.1 Windows Forms

4.2 Msg Box ,Dialog Box

4.3 Handling Mouse and Keyboard Events

4.4 Basic Control Programming for following controls

4.5 Button , Label , Text box, Rich Textbox

4.6 Radio Button , Checkbox, List Box

4.7 Checked List Box.

4.8 Tree View

4.9 Picture Box, Tab Control

UNIT 5: Control Programming

5.1 Architecture of ADO.NET

5.2 Data Providers in ADO.NET

5.3 Connection and Command Class

5.4 Data Reader

5.5 Data Adapter

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH & STUDIES

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BSCIT-DS-652: .NET PROGRAMMING USING C# LAB

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

Pre -Requisite: Object Oriented Programming Lab

Course Type: Domain Specific

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

BSCIT-DS-652.1. Implementation of Programming's elementary concepts.

BSCIT-DS-652.2. Design & develop the Graphical User Interface (GUI) for the windows application /WPF using VB .NET and ADO.NET

BSCIT-DS-652.3. Implement object oriented concepts: information hiding, abstraction, programming to interfaces and enforcement of design intent using language features such as visibility qualifiers, constructors, constants, abstract classes and interfaces using VB.NET

BSCIT-DS-652.4. Incorporate the ADO.NET features in VB.NET such as DataSet, DataTable and Table Adapter in the application development

BSCIT-DS-652.5. Develop workplace soft-skills including working in groups, writing formal reports, carrying out individual research and/or delivering oral presentations

List of Experiments

1. Write program to demonstrate the working of VB.NET Windows Application.
2. Write program to show the use of various data types available in VB.NET.
3. Write programs to understand the use of Control statements.
4. Write programs to understand the use of library functions.
5. Write a program to demonstrate the use of various arithmetic, unary, logical, bit-wise, assignment and conditional operators.
6. Write a program to store 10 elements in an array and display the array elements in increasing order.
7. Demonstrate the use of pass by value and pass by reference by writing a program.
8. Program to create a calculator in VB .NET.
9. Write programs to implement one dimensional and two dimensional arrays.
10. Write programs to understand the working of predefined string functions like Compare(), CompareTo(), Concat(), Copy() and Join().
11. Write a program to implement class and its objects.
12. Write a program to implement constructors.
13. Create one admission enquiry form.
14. Create a windows form with registration number, name, age, class and other details.
15. Implement the concept of file handling to read XML file and display all the values in a read only Form.
16. Concept of three variables: temp, pressure and water level for a chemical industry boiler from the keyboard. Throw an event called alert, if these variables level shoot above a certain level. [Event Handling]

17. Concept to illustrate overloading an indexer.
18. Implement the concept in VB.NET consisting of a delegate called student that refers to a method called student record (), your program should get the details of student record and display. [Delegate]
19. Develop the Concept to create a class that does metric conversion from meters, centimeter to feet, inches respectively. Create a class called meters.txt and read the data from the user by prompting. Convert this data into feet and inches and save it in another file called feet.txt. [File Handling]
20. Prepare a login form, which will accept unique username, password of alphanumeric type, re-type password, date of birth, and text to remember password. And put all necessary validation. If user does not fill the complete form it should show valid error message. Also if user is new then there should be option for creating new Login and a checkbox to remember on computer. [Windows application].
21. Create a database of 10 students with registration number, age, class and other details.
22. Use ADO.NET to connect the database with the fields of windows form and populate the form field with the entries of the database.
23. Prepare a ASP.NET page to fill student details. Use any of the components available as deemed fit for the requirements. on the press of save button user should be able to save the form data in a mysqltable .
24. Develop an ASP page to display the data of students entered in the previous form in tabular format using any of the grids .use Dataset to populate the grid.
25. Make a mini project based on above mentioned list of practical. Suggested mini projects are:

Few of the projects are as follows:

- a. Financial Management System
- b. Automatic Toll Payment
- c. E-Auction
- d. Asset Tracking System
- e. Movie Ticket Reservation system

Suggested Readings:

1. Visual Basic. NET: The Complete Reference: Shapiro Jeremy, McgrawHill , 2002
2. Visual Basic. NET Programming Black Book: Steven Holzner, Paraglyph Press, 2002
3. ASP.NET and VB.NET Web Programming: Matt J. Crouch, Pearson publication, 2002(1st edition)
4. Microsoft Visual Basic.NET Deluxe Learning Edition: Michael Halvorson, Microsoft Press, 2003 (1st edition)
5. Beginning VB.NET: Richard Blair et all, Wrox Press, 2002 (2nd edition)

Note: Only latest editions of the books are recommended.

Web links:

- <https://www.tutorialspoint.com/vb.net>
- <https://www.vbtutor.net/index.php/visual-basic-net-tutorials/>
- <http://howtostartprogramming.com/vb-net/>
- <http://vb.net-informations.com/>
- <https://docs.microsoft.com/en-us/visualstudio/get-started/visual-basic/tutorial-console>

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-652.1	3	2	1	3		1	1					2	3	
BSCIT-DS-652.2	3	1	2	1	1	2	3			2			3	1
BSCIT-DS-652.3	2	1	3		2	2	3			2			3	1
BSCIT-DS-652.4		1	3	2	3	2	2	1	1	3	1	3	3	1
BSCIT-DS-652.5			1			3	2			3			3	
BSCIT-DS-652.6	1	3	3				2	1	1				3	2

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

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BSCIT-DS-655: Project

Periods/week Credits

L: 0 T: 0 4

Duration of Examination: 3 Hrs

Max. Marks : 500

Internal : 300

External 200

All the candidates of BSc IT Final year are required to submit a project report based on the work done by him/her during the project period.

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH & STUDIES

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OBSCIT-DS-603: MULTIMEDIA AND ANIMATION

Periods/week Credits

L: 3 T: 3

Duration of Examination: 3 Hrs

Max. Marks: 200

Continuous Evaluation: 100

End Semester Examination: 100

Pre-Requisite: Basics of Computer Graphics

Course Type: Domain Specific

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

OBSCIT-DS-603.1. Understand various types of multimedia and its elements.

OBSCIT-DS-603.2. Describe the features offered by various authoring programs.

OBSCIT-DS-603.3. Demonstrate the use of Google Chrome to access and use various plug-ins of multimedia.

OBSCIT-DS-603.4. Apply different types of animations, digitized sounds, video controls, and scanned images in real time applications.

OBSCIT-DS-603.5. Analyze the role played by different team members in the development of an education based multimedia project.

PART -A

Unit 1: Multimedia Overview

- 1.1 Introduction to Multimedia concepts
- 1.2 Types of Multimedia
- 1.3 Applications of Multimedia
- 1.4 Methods to deliver Multimedia
- 1.5 Introduction to Multimedia Database
- 1.6 Multimedia Input and Output Devices

Unit 2: Text Manipulation in Multimedia

- 2.1 Introduction about font and faces
- 2.2 Using Text in Multimedia
- 2.3 Applying different types of text in multimedia
- 2.4 Font Editing and Design tools
- 2.5 Hypermedia and Hypertext application

Unit 3: Images and Sound in Multimedia

- 3.1 The power of images
- 3.2 Making Still Images
- 3.3 Colouring
- 3.4 Image File Formats (GIF, JPEG, PNG etc.)
- 3.5 The power of sound
- 3.6 MIDI Vs. Digital Audio
- 3.7 Audio File Formats (AIFF, WAV, MPEG, MOV etc.)
- 3.8 Adding Sound to multimedia project

Part B

Unit 4: Animation Basics

- 4.1 The power of motion
- 4.2 Principles of Animation
- 4.3 Different techniques of Animation
- 4.4 Animation in Powerpoint
- 4.5 Making Animations that work using Flash
- 4.6 Animation file formats(.fla, .swf, .mov, .dir etc.)

Unit 5: Introduction to Video

- 5.1 Working of a Video and its Display
- 5.2 Digital Video Containers (Codecs & Video Format Converters)
- 5.3 Obtaining Video Clips
- 5.4 Shooting and editing Video
- 5.5 Non Linear Editing(NLE) in Videos

Unit 6: Making Multimedia and enhancing Multimedia Skills

- 6.1 The stages of Multimedia Project
- 6.2 Hardware and Software requirements
- 6.3 Authoring Systems
- 6.4 Team for Multimedia Development
- 6.5 Different stages of multimedia
- 6.6 The internet and multimedia

Suggested Readings:

1. Tay Vaughan, 2011, Multimedia: Making It Work , Tata McGraw Hills.
2. James E Shuman, 1998, Multimedia in Action ,Vikas Publishing House.
3. Andreas Holzinger, 2002, Multimedia Basics – Volume – 1 Technology, Firewall Media
4. Rangan Parekh, 2006, Principles of Multimedia, Tata McGraw Hills

Note: Only latest editions of the books are recommended.

Web links:

- <http://www.ftms.edu.my/images/Document/MMGD0101%20>
- <https://1.cdn.edl.io/izjEhIiCI19QuzrnjoWXM8IXLVbFB9tjpWk7NybQ6KJzwJtx.pdf>
- <https://www.sfu.ca/~tutor/techbytes/Flash/index.html>

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.

Assessment Tools :

Assignment/Tutorials
Sessional Tests
Surprise questions during lectures/Class Performance
Term End Examination

Distribution of Continuous Evaluation Table

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

COURSE ARTICULATION MATRIX:

PO-CO Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
OBSCIT-DS-603.1	1	1	2		1		1	1	1	1			2	2
OBSCIT-DS-603.2					2	1		1			1	1	2	2
OBSCIT-DS-603.3	2	2	2		2		2	2			2	2	2	2
OBSCIT-DS-603.4					2	2					1	1	1	1
OBSCIT-DS-603.5	1	2	2		1	1		1			1	1	2	2

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

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BSCIT-DS-604: SOFTWARE TESTING

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

Pre-requisite: System Analysis and Design

Course Type: Program Core

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

- OBSCIT-DS-604.1: Define the basic software testing methods and practices.
- OBSCIT-DS-604.2: Understand of software testing model static testing techniques.
- OBSCIT-DS-604.3: Implement dynamic testing techniques in various software programs.
- OBSCIT-DS-604.4: Classify different software testing strategies.
- OBSCIT-DS-604.5: Compare the various testing strategies at functional and behavior level.
- OBSCIT-DS-604.6: Assess software quality attributes and integrate software quality control with software quality assurance.

PART –A

Unit 1: Introduction to Testing

- 1.1 Software testing: introduction and definition
- 1.2 Some terms: error, mistakes, bug, fault, failure, defects
- 1.3 Testing objectives
- 1.4 Testing process
- 1.5 Testing lifecycle
- 1.6 Testing principles
- 1.7 Software testing team

Unit 2: Static Testing Techniques

- 2.1 Models for software testing
- 2.2 Test cases designing and writing of test cases: concept & introduction
- 2.3 Verification & Validation
- 2.4 Review techniques
- 2.5 Testing strategies
- 2.6 Debugging

Unit 3: Dynamic Testing Techniques

- 3.1 Introduction dynamic testing techniques
- 3.2 Need & advantages
- 3.3 Functional testing techniques: Equivalence partitioning, BVA, Cause- Effect graphing
- 3.4 Acceptance testing: Alpha testing & Beta testing
- 3.5 Web Based Testing
- 3.6 Purpose of various Testing tools.

PART –B

Unit 4: Various Testing Strategies

- 4.1 Usability testing
- 4.2 Regression testing
- 4.3 Performance testing: load testing & stress testing
- 4.4 Security testing
- 4.5 Recovery testing,
- 4.6 Compatibility testing
- 4.7 Interface Testing
- 4.8 Usability Testing

Unit 5: Agile Testing Techniques

- 5.1 Fundamentals of Agile Software Development
- 5.2 Traditional Vs Agile Approaches
- 5.3 Agile Testing Principles
- 5.4 Agile testing techniques and methods
- 5.5 Agile Testing Strategies

Unit 6: Software Quality Assurance

- 6.1 Definition of software quality
- 6.2 Various quality attributes
- 6.3 Software quality control
- 6.4 Software quality assurance Software quality control VS Software quality assurance
- 6.5 McCall's Software quality model, Boehm's Software quality model
- 6.6 The SEI process Capability Maturity Model (CMM)

Suggested Readings:

1. Software Testing Principles and practices: Naresh Chauhan, Oxford University Press.
2. Software Engineering: Deepa Bura, Bindiya Ahuja, Manav Rachna Publishing House.
3. Software Engineering: A practitioner's approach, R. S. Pressman, McGraw Hill
4. Software Engineering: K.K. Aggarwal & Yogesh Singh, New Age International.
5. Fundamentals of Software Engineering: Rajib Mall, PHI
6. Software Engineering : Ian Sommerville; Pearson Education,

Note: Only latest editions of the books are recommended.

Weblinks:

<https://www.tutorialspoint.com>
<https://www.nptel.ac.in>

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 :

PO-CO Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
OBSCIT -DS-604.1	2	3	2	3	2	1	2	2	3	1	1	3	2	2
OBSCIT -DS-604.2	2	1	1	3	2	1	2	1	2	1	2	3	2	2
OBSCIT -DS-604.3	2	2	1	3	2	1	1	2	2	1	2	3	2	2
OBSCIT -DS-604.4	2	1	2	3	1	1	2	2	2	1	3	3	2	2
OBSCIT -DS-604.5	1	2	1	2	2	1	2	2	3	1	3	3	2	2
OBSCIT -DS-604.6	2	1	1	2	2	1	1	3	3	1	3	3	2	2

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

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

BSCIT-DS- 653: MULTIMEDIA AND ANIMATION LAB

Periods/week Credits

L: 4 T: 0 2

Duration of Examination: 3 Hrs

Max. Marks : 100

Continuous Evaluation : 50

End Semester Examination : 50

Course Type: Domain Specific

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

OBSCIT-DS-653.1: Understand the fundamentals of different elements of multimedia.

OBSCIT-DS-653.2: Work on Photoshop software

OBSCIT-DS-653.3: Gain expertise in Flash 2D designing

OBSCIT-DS-653.4: Learn to navigate and use some modeling tools that will help to gain a strong foundation in 3D design software Blender

PART –A

Adobe Photoshop

1. Introduction to Photoshop Basics
2. Design a poster for 2019 elections and show the difference in quality and resolution for Print and Web.
3. Pick any picture of a magazine cover page and make changes using Selection tool
4. Draw a landscape using multiple Layers
5. Paint a scenery of a park using different tools of Photoshop
6. Take image from different Image Sources show variation in resolution
7. Using effective Cropping, design a collage
8. Using Adobe® Bridge® show Automations
9. Design a scenery showing correction of image tonality
10. Make a poster by adjusting Image Colors
11. Painting the cover page of your magazine with Special Photoshop Tools
12. Design a card on the occasion of Diwali using at least 3 different filters.
12. Make your passport size picture with all editing and print multiple copies of the same on A4 size page.

Macromedia Flash

1. Introduction to the layout and tools of Flash
2. Move a car from left to right of the screen using symbols
3. Design a movie clip
4. Using timeline, design the casting of the movie directed by you
5. Depict a small story using 2 D animation

Blender

1. Introduction to Blender and its various tools
2. Create an object using blender and show its motion
3. Using Selections and Transform make a scenery
4. Design a character for your game using modeling
5. Depict the change in Materials, Lights and Rendering in 3 different frames
6. Using Blender show compositing

Suggested Readings:

1. Sinclair, 2008, Multimedia on the PC, BPB
2. David Vogelear, 2005, Macromedia Flash Professional 8 Unleashed

3. Tay Vaughan, 2011, Multimedia making it works, TMH

Note: Only latest editions of the books are recommended.

Software Required:

ADOBE PHOTOSHOP

MACROMEDIA FLASH PLAYER

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
OBSCIT-DS-604.1	2	3	2	3	2	1	2	2	3	1	1	3	2	2
OBSCIT-DS-604.2	2	1	1	3	2	1	2	1	2	1	2	3	2	2
OBSCIT-DS-604.3	2	2	1	3	2	1	1	2	2	1	2	3	2	2
OBSCIT-DS-604.4	2	1	2	3	1	1	2	2	2	1	3	3	2	2
OBSCIT-DS-604.5	1	2	1	2	2	1	2	2	3	1	3	3	2	2
OBSCIT-DS-604.6	2	1	1	2	2	1	1	3	3	1	3	3	2	2

MANAV RACHNA INTERNATIONAL INSTITUTE OF RESEARCH AND STUDIES

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

BSCIT-DS-654: SOFTWARE TESTING LAB

Periods/week Credits

P: 4 T:0 2

Duration of Examination: 3 Hrs

Max. Marks : 100

Continuous Evaluation : 50

End Semester Examination : 50

Co-requisite: Software Testing

Course Type: Program Core

Course Outcomes:

At the end of the course the student will be able to:

OBSCIT-DS-654.1: Develop systematic approach for testing of applications manually and automatically.

OBSCIT-DS-654.2: Understanding for formulation of test cases for various real applications and implement them

OBSCIT-DS-654.3: Learn various software testing tools and techniques through case studies.

OBSCIT-DS-654.4: Understand the concept of Web application testing using automated testing tool.

OBSCIT-DS-654.5: Test web applications using software testing tool Selenium.

Unit I

1.1 Develop a standard format for writing test cases using suitable example and correct them for defects.

1.2 Develop a sample test case suit for log-in page by using a website e.g. gmail log-in screen.

1.3 Develop a library of test cases for ATM.

Unit II

2.1 Write test cases for addition of two numbers and perform dynamic testing of these test cases

2.2 Write test cases (all possible test cases) for finding the greater of two numbers and also perform dynamic testing

2.3 Write test cases for finding number are even or odd for all possible inputs and develop a program to test all possible test cases.

2.4 Write boundary – value analysis test cases by assuming the boundaries of inputs for your own for the problem to find the sum of digits of a number and also execute those test cases .

2.5 Write the robust test cases and perform dynamic testing of these test cases using a code for given problem of finding the roots of a quadratic equation with given input data

$[1 \leq a \leq 100]$

$[0 \leq b \leq 100]$

$[0 \leq c \leq 100]$

2.6 Write the equivalence test cases and perform dynamic manual testing for a problem to calculate the previous date with given input

$[1 \leq \text{day} \leq 31]$

$[1 \leq \text{month} \leq 12]$

$[1900 \leq \text{year} \leq 2025]$

2.7 Write down all possible test cases to find the factorial of a number. Develop a program for the same which accepts only number as input between the ranges of 0 to 12. Test the program for all possible test cases.

2.8 Write equivalence test cases for a given problem to find the nature of a triangle. The inputs for all sides of triangle ranges between 0 to 100. Develop a program for the same which accepts only number as inputs between the ranges of 0 to 100. Test the program for all possible test cases of equivalence testing.

Unit III

3.1 Give brief description of web-based testing tool Selenium.

3.2 Perform recording and playing of test cases for log-in screen of g-mail using Selenium tool.

3.3 Write down the test cases for registration page of CORBIS IMAGES website. Perform recording and playing of these test cases using Selenium tool.

Unit IV

4.1 Prepare a website name DEMO with three web pages at least with following information:

- New User registration page.
- Log-in page for the user.

- User-information page for log-in user.
- Study and perform various text commands, On mouse click commands, URL confirmation commands using Selenium tool.

4.2 Study and Perform Run Alert, Assert Confirmation, Show Prompt commands on DEMO website in Selenium tool.

Suggested Readings:

1. Fundamentals of Software Engineering: Rajib Mall, PHI
2. Software Testing Principles and practices: Naresh Chauhan, Oxford University Press.
3. Software Engineering: K.K. Aggarwal & Yogesh Singh, New Age International.
4. Software Engineering: Sommerville, Addison Wesley.

Note: Only latest editions of the books are recommended.

Weblinks:

<https://www.tutorialspoint.com>

<https://www.nptel.ac.in>

Distribution of Continuous Evaluation Table:

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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	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
OBSCIT-DS-654.1	3				1	1	2						1	1
OBSCIT-DS-654.2		2	2		2	2	2				2		3	2
OBSCIT-DS-654.3	2	2		1		1	1	1	1		2		3	3
OBSCIT-DS-654.4	2	2				1	1	1	1		1	1	3	2
OBSCIT-DS-654.5	1	1				1	1	1	1		1	2	2	2

Appendix-A

List of courses having relevance to the Local/Regional, National and Global Development needs.

Course Code	Course Name	Regional	National	Global
BSCIT-DS-101	Programming & Problem-Solving Using C			√
BSCIT-DS-102	Operating System			√
BSCIT-DS-103	Linear Algebra & Statistical Techniques			√
BSCIT-DS-104	Business Communication			√
BSCIT-DS-151	C Programming Lab			√
BSCIT-DS-201	Data Structure & Algorithm		√	
BSCIT-DS-202	Python Programming			√
BSCIT-DS-203	Database Management System		√	
CH-202B	Environmental Studies & Waste Management			√
BSCIT-DS-251	Data Structure & Algorithm Lab		√	
BSCIT-DS-252	Python Programming Lab			√
BSCIT-DS-301	Object Oriented Programming using Java			√
BSCIT-DS-302	Computer Networks		√	
BSCIT-DS-303	Computer Architecture & Organization		√	
BSCIT-DS-304	Soft Skills and Aptitude Development-I		√	
BSCIT-RIC-I	Research Innovation Catalyst-I			√
BSCIT-DS-351	Object Oriented Programming using Java Lab			√
BSCIT-DS-305	Artificial Intelligence			√
BSCIT-DS-306	System Programming		√	
BSCIT-DS-401	Software engineering			√
BSCIT-DS-402	Cloud Computing			√
BSCIT-DS-403	Relational Database Management system			√
BSCIT-DS-404	Soft Skills and Aptitude Development-II		√	
BSCIT-DS-452	Cloud Computing Lab			√
BSCIT-DS-453	Relational Database Management System Lab			√
BSCIT-RIC-II	Research Innovation Catalyst-II			√

BSCIT-DS-454	Vocational Training		√	
BSCIT-DS-405	Information System Security			√
BSCIT-DS-406	Data Mining			√
BSCIT-DS-501	Big Data Analytics			√
BSCIT-DS-602	Cyber Security			√
BSCIT-DS-503	Soft Skills and Aptitude Development-III			√
BSCIT-DS-551	Big Data Analytics Lab			√
BSCIT-RIC-III	Research Innovation Catalyst-III			√
BSCIT-DS-504	Mobile Applications Development			√
BSCIT-DS-505	Introduction to Computer Graphics		√	
BSCIT-DS-554	Mobile Applications Development Lab			√
BSCIT-DS-555	Introduction to Computer Graphics Lab		√	
BSCIT-DS-601	Basics of MIS and ERP		√	
BSCIT-DS-602	.Net Programming using C#			√
BSCIT-DS-652	.Net Programming using C# Lab			√
BSCIT-DS-655	Project			√
BSCIT-DS-603	Multimedia & Animation		√	
BSCIT-DS-604	Software Testing			√
BSCIT-DS-653	Multimedia & Animation Lab		√	
BSCIT-DS-654	Software Testing Lab			√

Appendix B: List of courses having focus on Employability, Entrepreneurship and Skill Development

Course Code	Course Name	Employability	Entrepreneurship	Skill development
BSCIT-DS-151	C Programming Lab	√		√
BSCIT-DS-251	Data Structure & Algorithm Lab	√		√
BSCIT-DS-252	Python Programming Lab	√		√
BSCIT-DS-253	Database Management System Lab	√		√
BSCIT-DS-351	Object oriented programming in Java Lab	√		√
BSCIT-DS-452	Cloud Computing Lab	√		√
BSCIT-DS-453	Relational Database Management System Lab	√		√
BSCIT-DS-554	Mobile Applications Development Lab	√		√
BSCIT-DS-555	Introduction to Computer Graphics Lab	√		√
BSCIT-DS-652	.Net Programming using C# Lab	√		√
BSCIT-DS-653	Multimedia & Animation Lab	√		√

Appendix C: List of courses and proposed activities relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability

	Environment and Sustainability	Professional Ethics	Human Values	Gender Equality
Activity on Gender Sensitization				√
Workshop on Ethical Hacking		√		