MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute affiliated to RGPV, Bhopal)

Department of Information Technology

Scheme of Evaluation

B. Tech. I Semester *(Information Technology)*

(for batch admitted in academic session 2022-23)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching	Mode of Exam.	Duration of Exam.
				Theory Slot				Practical Slot										
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation			L	T	P				
				End Sem. Exam	$^{\$}$Proficiency in subject /course	Mid Sem. Exam.	Quiz/ Assignment		Lab Work & Sessional	Skill Based Mini Project								
1.	2160121	DC	Introduction to Information Technology	50	10	20	20	-	-	-	100	4	-	-	4	Blended	MCQ	1.5 Hrs
2.	2160122	DC	Computer Programming	50	10	20	20	60	20	20	200	2	1	2	4	Blended	AO	2 Hrs
3.	2160123	DC	Digital Logic Design	50	10	20	20	-	-	-	100	2	1	-	3	Blended	PP	2 Hrs
4.	2160124	DC	Discrete Structures	50	10	20	20	-	-	-	100	2	1	-	3	Offline	PP	2 Hrs
5.	2100022	ESC	Basic Electrical & Electronics Engineering	50	10	20	20	60	20	20	200	2	1	2	4	Blended	MCQ	1.5 Hrs
6.	2160125	DLC	IT workshop	-	-	-	-	60	20	20	100	-	-	2	1	Offline	SO	-
Total				**250**	**50**	**100**	**100**	**180**	**60**	**60**	**800**	**12**	**04**	**06**	**19**	-	-	-
7.	3000001	Natural Sciences & Skills	Engineering Physics	50	10	20	20	30	10	10	150	1	-	2	GRADE	Blended	MCQ	1.5 Hrs
Induction programme of three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations.																		

$^{\$}$Proficiency in course/subject – includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in that particular course/subject

Natural Sciences & Skills: Engineering Physics / Engineering Chemistry / Environmental Engineering / Language

Credits of Natural Sciences & Skills will be added in the VI Semester

MCQ: Multiple Choice Question **AO:** Assignment + Oral **PP:** Pen Paper **SO:** Submission + Oral

Mode of Teaching				Mode of Examination				Total Credits
Theory			Lab	Theory			Lab	
Offline	Online	Blended	Offline	PP	AO	MCQ	SO	
03	-	13	03	06	03	07	03	19
15.79%	-	68.42%	15.79%	31.58%	15.79%	36.84%	15.79%	Credits %

DEAN (ACADEMICS)
M.I.T.S
GWALIOR

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Department of Information Technology

Scheme of Evaluation

B. Tech. II Semester *(Information Technology)*

(for batch admitted in academic session 2022-23)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching	Mode of Exam.	Duration of Exam.
				Theory Slot				Practical Slot										
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation			L	T	P				
				End Sem. Exam	^{S}Proficiency in subject /course	Mid Sem. Exam.	Quiz/ Assignment		Lab Work & Sessional	Skill Based Mini Project								
1.	2160221	DC	Data Structures	50	10	20	20	60	20	20	200	3	-	2	4	Blended	PP	2 Hrs
2.	2160222	DC	Python Programming	50	10	20	20	60	20	20	200	2	1	2	4	Blended	AO	2 Hrs
3.	2160223	DC	Database Management System	50	10	20	20	60	20	20	200	2	1	2	4	Blended	PP	2 Hrs
4.	2160224	DC	Computer System Organization	50	10	20	20	-	-	-	100	2	1	-	3	Blended	PP	2 Hrs
5.	2100011	BSC	Engineering Mathematics-I	50	10	20	20	-	-	-	100	3	1	-	4	Offline	PP	2 Hrs
Total				**250**	**50**	**100**	**100**	**180**	**60**	**60**	**800**	**12**	**04**	**06**	**19**	-	-	-
6.	3000002	Natural Sciences & Skills	Engineering Chemistry	50	10	20	20	30	10	10	150	1	-	2	GRADE	Blended	MCQ	1.5 Hrs
Induction programme of three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations. Summer Internship Project – I (Institute Level)																		

^{S}Proficiency in course/subject – includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in that particular course/subject

Natural Sciences & Skills: Engineering Physics / Engineering Chemistry / Environmental Engineering / Language

Credits of Natural Sciences & Skills will be added in the VI Semester

MCQ: Multiple Choice Question **AO:** Assignment + Oral **PP:** Pen Paper **SO:** Submission + Oral

Mode of Teaching				Mode of Examination				Total Credits
Theory			Lab	Theory			Lab	
Offline	Online	Blended	Offline	PP	AO	MCQ	SO	
04	-	12	03	13	03	-	03	19
21.05%	-	63.16%	15.79%	68.42%	15.79%		15.79%	Credits %

02.3.2023

DEAN (ACADEMICS)
M.I.T.S
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Department of Information Technology

Scheme of Evaluation

B. Tech. III Semester *(Information Technology)* *(for batch admitted in academic session 2022-23)*

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching	Mode of Exam.	Duration of Exam.
				Theory Slot				Practical Slot										
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation			L	T	P				
				End Sem. Exam	$Proficiency in subject /course	Mid Sem. Exam.	Quiz/ Assignment		Lab Work & Sessional	Skill Based Mini Project								
1.	2100025	BSC	Engineering Mathematics-II	50	10	20	20	-	-	-	100	2	1	-	3	Offline	PP	2 Hrs
2.	2160321	DC	Computer Networks	50	10	20	20	-	-	-	100	2	1	-	3	Blended	PP	2 Hrs
3.	2160322	DC	Design & Analysis of Algorithms	50	10	20	20	60	20	20	200	2	1	2	4	Blended	PP	2 Hrs
4.	2160323	DC	Computer Graphics & Multimedia	50	10	20	20	60	20	20	200	2	1	2	4	Blended	PP	2 Hrs
5.	2160324	DC	Operating System	50	10	20	20	-	-	-	100	2	1	-	3	Blended	PP	2 Hrs
6.	2160325	DLC	Java Programming Lab	-	-	-	-	60	20	20	100	-	1	2	2	Offline	SO	-
7.	2160326	DLC	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	-	-	-	-	-	40	-	40	-	-	2	1	Online and Mentoring	SO	-
8.	200XXX	CLC	**Novel Engaging Course (Informal Learning)**	-	-	-	-	50	-	-	50	-	-	2	1	Interactive	SO	-
9.	2160327	DLC	Summer Internship Project–I (Institute Level) (Evaluation)	-	-	-	-	60	-	-	60	-	-	4	2	Offline	SO	-
Total				**250**	**50**	**100**	**100**	**290**	**100**	**60**	**950**	**10**	**06**	**14**	**23**	-	-	-
10.	3000003	Natural Sciences & Skills	Environmental Engineering	50	10	20	20	-	-	-	100	2	-	-	GRADE	Blended	MCQ	1.5 Hrs
11.	1000001	MAC	Indian Constitution and Traditional Knowledge	50	10	20	20	-	-	-	100	2	-	-	GRADE	Blended	MCQ	1.5 Hrs

$Proficiency in course/subject – includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in that particular course/subject

Natural Sciences & Skills: Engineering Physics / Engineering Chemistry / Environmental Engineering / Language

Credits of Natural Sciences & Skills will be added in the VI Semester

MCQ: Multiple Choice Question **AO:** Assignment + Oral **PP:** Pen Paper **SO:** Submission + Oral

Mode of Teaching					Mode of Examination					Total Credits
Theory			Lab	NEC	Theory			Lab	NEC	
Offline	Online	Blended	Offline	Interactive	PP	AO	MCQ	SO	SO	
03	-	12	07	01	15	-	-	07	01	23
13.04%	-	52.18%	30.43%	4.35%	65.22%	-	-	30.43%	4.35%	Credits %

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DEPARTMENT OF INFORMATION TECHNOLOGY

INTRODUCTION TO INFORMATION AND TECHNOLOGY
2160121

L	T	P	Total Credits
4	-	-	4

COURSE OBJECTIVES

- To provide the most fundamental knowledge to the students so that they can understand what the IT is.
- To present the basics and difference of Data, Information and knowledge.
- To investigate applications of Information Technology in social media analysis, mobile and IoT analysis, time series analysis, artificial neural networks and other machine learning models.

Unit I

Attributes of Information Technology, Data vs Information vs Knowledge, Type of Data: Structure, Non Structure, Semi Structure, Images, Video, Temporal, Real Time, Data Types: Categorical/Nominal/Ordinal, Data Types Conversion, Knowledge Discovery Through Data, ICT and Digital Divide, Societal Impacts of Information Technology: Introduction, Privacy, Security and Integrity of Information, Disaster Recovery, Intellectual Property Rights, IT Projects in India.

Unit II

Cyber Space and Cyber Crime: Defining Cyberspace and Overview of Computer and Web-Technology, Architecture of Cyberspace, Communication and Web Technology, Internet, World Wide Web, Information Retrieval From the World Wide Web, Advent of Internet, Internet Infrastructure for Data Transfer and Governance, Internet Society, Regulation of Cyberspace, Concept of Cyber Security, Issues and Challenges of Cyber Security.

Unit III

Introduction to Social Networks: Types of Social Media, Social Media Platforms, Social Media Monitoring, Hashtag, Viral Content, Social Media Marketing, Social Media Privacy, Challenges, Opportunities and Pitfalls in Online Social Network, Security issues Related to Social Media, Flagging and Reporting of Inappropriate Content, Laws Regarding Posting of Inappropriate Content, Best Practices for the use of Social Media.

Unit IV

E-Commerce and Digital Payments: Definition of E- Commerce, Main Components of E-Commerce, Elements of E-Commerce Security, E-Commerce Threats, E-Commerce Security Best Practices, Introduction to Digital Payments, Components of Digital Payment and Stake Holders, Modes of Digital Payments- Banking Cards, Unified Payment Interface (UPI), E-Wallets, Unstructured Supplementary Service Data (USSD), Aadhar Enabled Payments, Digital Payments Related Common Frauds and Preventive Measures.

Unit V

Artificial Intelligence: Introduction, History of AI, AI Problem, Approaches, Goals, Purpose, Scope, Terminology, and Application Areas, Industrialization and its Impact, Cyber-Physical System, Evolution of Industry, Data Availability, Relation Between Artificial Intelligence, Machine Learning, Deep Learning and other Related Fields.

RECOMMENDED BOOKS

- Artificial Intelligence A Modern Approach by Stuart J. Russell and Peter Norvig, Prentice Hall.
- Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011).
- Electronic Commerce by Elias M. Awad, Prentice Hall of India Pvt Ltd.
- Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers
- E. Alpaydin, Introduction to Machine Learning (3rd ed.), PHI, 2015. ISBN 978-8120350786.

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. define basic concepts of Information Technology.

CO2. understand the role of IT professional

CO3. examining the cyber space and cyber crime

CO4. link the roles and opportunities of individual towards the online social media

CO5. reflect the applications of AI and ML for solving the problems over the real world problems.

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DEPARTMENT OF INFORMATION TECHNOLOGY

COMPUTER PROGRAMMING
2160122/2230122/2240122/2270122/2280122

L	T	P	Total Credits
2	1	2	4

COURSE OBJECTIVES

- To develop the understanding of algorithms, programming approaches and program documentation techniques.
- To study the concepts of procedural and object oriented programming.
- To design and implement basic programming solutions using programming constructs.

Unit I

Introduction to Programming, Types of Computer Programming Languages, Program Execution and Translation Process, Problem Solving using Algorithms and Flowcharts. Introduction to C++ Programming: Data Types, Constants, Keywords, Variables, Input/Output, Operators & Expressions, Precedence of Operators.

Unit II

Control Statements and Decision Making: goto statement, if statement, if-else statement, nesting of if statements, switch statement, while loop, do...while loop, for loop, nesting of for loops, break and continue statement. Function Basics, Function Prototypes, Passing Parameter by Value and by Reference, Default Arguments, Recursion. Arrays: One Dimensional Arrays, Multidimensional Arrays, Passing Arrays to Functions.

Unit III

Strings, Pointers, Structures and File Handling: Operations on Strings, Basics of Pointers & Addresses, Reference Variable, Pointer to Pointer, Pointer to Array, Array of Pointers, Pointer to Strings. Dynamic Memory Allocation using New and Delete Operators. Structures & Union, Pointer to Structure, Self-Referential Structures. File Concepts, Study of Various Files and Streams, Operations on Files.

Unit IV

Object Oriented Paradigm, Features of OOPS, Comparison of Procedural Oriented Programming with Object Oriented Programming, Abstract Data Types, Specification of Class, Visibility Modes, Defining Member Functions, Scope Resolution Operator, Constructors, its types, and Destructors, Creating of Objects, Static Data Member, Static

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DEPARTMENT OF INFORMATION TECHNOLOGY

DIGITAL LOGIC DESIGN
2160123/2230123/2240123/2270123/2280123

L	T	P	Total Credits
2	1	-	3

COURSE OBJECTIVES

- To understand the fundamental operating components of Digital Computers.
- To learn various number systems, boolean algebra employed in digital computers.
- To understand the concepts of counters, latches and flip-flops.

Unit I

Introduction to Digital Electronics, Needs and Significance, Different Number System: Binary Numbers, Octal and Hexadecimal Numbers, Conversions, Complement's, Signed Binary Numbers, Binary Arithmetic's, Binary Codes: BCD, ASCII Codes.

Unit II

Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Boolean Relations, Digital Logic Gates, De Morgan's Theorem, Karnaugh Maps and simplifications.

Unit III

Combinational Circuits, Half Adder, Full Adder, Binary Adder-Subtractor, Binary Multiplier, Comparator, Decoders, Encoders, Multiplexers.

Unit IV

Sequential Circuits, Latches, Flip-Flops: RS Latches, Level Clocking, D Latches, Edge-triggered D Flip-flop, Edge-triggered JK Flip-flop, JK Master-slave Flip-flop; Registers, Shift Registers, Counters, Ripple Counters, Synchronous Counters.

Unit V

Introduction to Memory, Memory Decoding, Programmable Devices: Programmable Logic Array (PLA), Programmable Array Logic (PAL), Sequential Programmable Logic Device (SPLD), Complex Programmable Logic Device (CPLD), Field-Programmable Gate Array (FPGA), Digital Logic Design: RTL and DTL Circuits, TTL.

RECOMMENDED BOOKS

- Digital Design, Morris Mano M. and Michael D. Ciletti, IV Edition, Pearson Education.
- Digital Electronics: Principles, Devices and Applications, Anil K. Maini, Wiley.

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. explain the basic components and functional units to define computer architecture

CO2. explain different number systems and basic operations employed at machine level.

CO3. develop the understanding of combinational circuits.

CO4. analyse the basic concept of sequential circuits.

CO5. compare and differentiate various memories used in Computers.

CO6. reduce the boolean functions to mitigate hardware complexity issues.

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DEPARTMENT OF INFORMATION TECHNOLOGY

DISCRETE STRUCTURES

2160124

L	T	P	Total Credits
2	1	-	3

COURSE OBJECTIVES

- To perceive the knowledge of basic algebra
- To describe function and its relation
- To familiarize propositional logic
- To know about the graph theory and its application in computer engineering
- To familiarize the discrete numeric function and generating function

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Unit-I

Finite and Infinite Sets, Mathematical Induction, Principles of Inclusion and Exclusion, Multisets, Functions and Relations, Binary Relations, Equivalence Relations and Partitions, Partial Ordering Relations and Lattices, Chains, Pigeonhole Principle.

Unit-II

Prepositional Logic, Syntax, Semantics of ATF (Atomic Formula), WFF (Well Formed Formula's),Validity and Satisfiability of WFF by Quine's Method, Normal and Closure Form of Prepositional Calculus.

Unit-III

Introduction and Basic Terminology of Graphs, Planner Graphs, Multi-Graphs and Weighted Graph, Shortest Path in Weighted Graph, Introduction to Eularian Paths and Circuits, Hamiltonian Paths and Circuits, Introduction to Trees, Rooted Trees, Path Length in Rooted Trees, Spanning Trees and Cut Trees.

Unit-IV

Introduction to Discrete Numeric Functions and Generating Functions, Introduction to Recurrence Relations and Recursive Algorithms, Linear Recurrence Relations With Constant Coefficients, Homogeneous Solutions, Particular Solutions and Total Solutions.

Unit-V

Introduction to Group, Subgroups, Generations and Evaluation of Power, Cosets and Lagrange's Theorem, Group Codes, Isomorphism and Automorphism, Homomorphism and Normal Sub Groups, Ring, Integral Domain and Field.

RECOMMENDED BOOKS

- J. Tremblay and Manohar: Discrete Mathematical Structures with Application to Computer science. Narsingh Deo: Graph Theory.
- Kenneth Rosen: Discrete mathematics and its applications (6th edition).2006. McGraw-Hill
- C. Liu, D. Mohapatra: Elements of Discrete Mathematics. 2008. Tata McGraw-Hill.
- T. Koshy: Discrete mathematics with applications.2003. Academic Press.
- J. Hein: Discrete structures, logic and computability.2009. Jones & Bartlett Publishers.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. explain the basic concept of set theory, prepositional logic, graph theory, discrete numeric function and algebraic structure.

CO2. illustrate the knowledge of course content and distinguish between them in terms of their applications.

CO3. identify the concepts of graph and tree for solving problems in the computer science.

CO4. apply the concepts of studied topics with suitable technique faced in engineering problems

CO5. analyze the set theory, prepositional logic, graph theory, discrete numeric function and algebraic structure to examine the real world problem.

CO6. build analytical skill and interpret applications of engineering beneficial in real time troubleshooting.

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DEPARTMENT OF INFORMATION TECHNOLOGY

BASIC ELECTRICAL & ELECTRONICS ENGINEERING

2100022

L	T	P	Total Credits
2	1	2	4

COURSE OBJECTIVES

- To impart the basic knowledge of the DC and AC circuits and their applications.
- To familiarize the students with the basic knowledge of magnetic circuits, transformer and its terminology.
- To make familiarize the students about the working of rotating electrical machine, various electronic circuits and its importance.

Unit I

D.C. Circuits Analysis: Voltage and Current Sources: Dependent and independent source, Source conversion, Kirchhoff's Law, Mesh and Nodal analysis. Network theorems: Superposition theorem, Thevenin's theorem & Norton's theorem and their applications.

Unit II

Single-phase AC Circuits: Generation of sinusoidal AC voltage, definitions: Average value, R.M.S. value, Form factor and Peak factor of AC quantity, Concept of Phasor, analysis of R-L, R-C, R-L-C Series and Parallel circuit, Power and importance of Power factor.

Unit III

Magnetic Circuits: Basic definitions, AC excitation in magnetic circuits, self-inductance and mutual inductance, Induced voltage, laws of electromagnetic Induction, direction of induced E.M.F. Flux,MMF and their relation, analysis of magnetic circuits.

Unit IV

Single-phase Transformer &Rotating Electrical Machines: Single phase transformer, Basic concepts, construction and working principal, Ideal Transformer and its phasor diagram at No Load, Voltage, current and impedance transformation, Equivalent circuits and its Phasor diagram, voltage regulation, losses and efficiency, testing of transformers, Construction & working principle of DC and AC machine.

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Unit V

Digital Electronics, Devices & Circuits: Number systems used in digital electronics, decimal, binary, octal, hexadecimal, their complements, operation and conversion, Demorgan's theorem, Logic gates- symbolic representation and their truth table, Introduction to semiconductors, Diodes, V-I characteristic, Bipolar junction transistors and their working, Introduction to CB, CE & CC transistor configurations.

RECOMMENDED BOOKS

- Basic Electrical and Electronics Engineering, D.P. Kothari & I.J. Nagrath-Tata McGraw Hill
- Basic Electrical and Electronics Engineering, V N Mittle & Arvind Mittal -Tata McGraw Hill
- Basic Electrical and Electronics Engineering, S. K Bhattacharya -Pearson
- Electrical Machinery- A.E. Fitzgerald, C. Kingsley and Umans - TMH
- Principles of Electrical Engineering- Vincdent Del Toro- Prentice Hall.
- Basic Electrical Engineering -A,E. Fitzgerald, Higginbotham and Grabel -TMH
- Integrated Electronics- Millmann & Halkias
- Electronics Devices & circuits- Sanjeev Gupta, Dhanpat Rai Publication.
- Basic Electrical and Electronics Engineering, D.C Kulshreshtha-Tata McGraw Hill

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COURSE OUTCOMES

After completion of the course students would be able to:

CO 1. solve DC & AC circuits by applying fundamental laws & theorems

CO 2. compare the behavior of electrical and magnetic circuits for given input

CO 3. explain the working principle, construction, applications of rotating electrical machines

CO 4. explain the working principle, constructional details, losses & applications of single phase transformer.

CO 5. select the logic gates for various applications in digital electronic circuits.

CO 6. explain characteristics of diode and transistor.

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DEPARTMENT OF INFORMATION TECHNOLOGY

IT WORKSHOP
2160125

L	T	P	Total Credits
-	-	2	1

COURSE OBJECTIVES

- To make use of computers for various purposes like surfing the net, sending/ receiving emails, preparation of various documents and presentations, preparing small databases, maintenance of accounts.
- To acquire the knowledge of computer system, mother board and its processing unit.
- To be aware of different memories, windows installation, hardware and software troubleshooting.

Unit-I

Computer Hardware: Introduction to Hardware Peripherals like RAM, ROM, Keyboard, Hard disk drive, Mouse , Processors, Generation of processor , Working of SMPS , Study of various ports, Assembly and Disassembly of Computer, Study of Networking Cable and it's types, Installation and Partition of Hard Disk, Troubleshooting & Fault finding.

Unit-II

Operating System and software installations: Introduction to Operating System, Types of Operating System (Windows and Linux), Evolution of Operating System, Introduction of Software, Types of Software, Installation steps for Operating System (Windows, Linux etc), Creating Virtual Machine using VMware/ VirtualBox.

Unit-III

Word & Excel Orientation: Overview of Microsoft office word / Excel, New Features of Microsoft Office, Working with Documents in Microsoft Word /Excel, Saving the File, Formatting the Text, Alignment of Text, Applying Fonts, Spell Checking, Inserting Header and Footer , Charts and Graphics in Microsoft Word/Excel, Working with Tables, functions and Macros in Microsoft Word/Excel, Validating Data in Microsoft Excel, Using formulae in Excel, Creating project/certificates/Newsletter using Word.**PowerPoint Presentation:** Introduction to Microsoft PowerPoint, Use of Standard Formatting toolbar, Working with Charts and Tables, Editing slides, Changing templates, Slide Layouts, Inserting clipart &

Pictures into slide, Slide Transitions, Animation, Inserting sound and movies into slides, Create & Deliver dynamic presentation.

Unit-IV

Computer Application: Microsoft Disk Operating System (MS-DOS): Internal Commands, External Commands, Batch File etc. Overview of Linux, Common Linux Features, **Essential Linux commands**, Advantage of Linux, Creating E-mail Account, E-mail Writing , Blog Writing, Net Surfing and Chatting ,Customize Web Browser with the LAN proxy setting, Bookmarks, Search Toolbars and Pup up Blockers, Install Antivirus Software, Configure personal firewall and Window update, Customize browser to block pop ups, Cyber Hygiene.

Unit-V

Internet: Introducing the Networking concept using LAN & WAN, Introduction, Evolution and Uses of Internet, Concepts of Web Browser, Web Page and Web Site, Study of various Internet based services like Email, Social Network, Chat, Introduction to Cyber Security and Cyber Laws.

Server: Introduction to Server, Difference between server and normal desktop, Evolution of servers, Study of various servers. Web designing using HTML/CSS.

RECOMMENDED BOOKS

- Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
- The Complete Computer upgrade and repair book, 3rd edition Cheryl A Schmidt, WILEY Dreamtech.
- Introduction to Information Technology, ITL Education Solutions Limited, Pearson Education.
- PC Hardware and A+ Handbook - Kate J. Chase PHI (Microsoft)

COURSE OUTCOMES

After completion of the course student would be able to:

CO1. understand the basic concept and structure of computer hardware and networking.

CO2. demonstrate installation of windows and connections through ports at basic level.

CO3. identify the existing configuration of the computers and peripherals.

CO4. apply the knowledge about computer peripherals to identify/rectify problems onboard.

CO5. explain the concept of Memory, Motherboard, Bus and SMPS.

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CO6. manage data backup and restore operations on computer and update application software.

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DEPARTMENT OF INFORMATION TECHNOLOGY

COMPUTER PROGRAMMING
2160122/2230122/2240122/2270122/2280122

LIST OF PROGRAMS

1. Write a program to add two numbers and display its sum.
2. Write a Program to calculate and display the volume of a cylinder for height and radius parameters to be input from the user.
3. Write a program to realize the following expressions:
   a. V = u + at
   b. S = ut+1/2a
   c. T=2*a+√b+9c
4. Write a program to take input of name, rollno and marks obtained by a student in 5 subjects of 100 marks each and display the name, rollno with percentage score secured.
5. Write a program to swap values of two variables with and without using the third variable.
6. Write a program to illustrate the use of unary prefix and postfix increment and decrement operators.
7. Write a program to find the largest of three numbers using ternary operators.
8. Write a program to find the roots of quadratic equation.
9. Write a Program to Check Whether a Number is Prime or not.
10. Write a program to compute the grade of students using if else ladder as per MITS norms.
11. Write a program to check whether the entered year is leap year or not (a year is leap if it is divisible by 4 and divisible by 100 or 400.)
12. Write a program to print the sum of digits of a number using for loop.
13. Write a program to display the following pattern using for loops.

(i)
```
* * * * *
* * * *
* * *
* *
*
```

(ii)
```
1
2 2
3 3 3
4 4 4 4
5 5 5 5 5
```

(iii)
```
        1
      1 2
    1 2 3
  1 2 3 4
1 2 3 4 5
```

(iv)
```
A
A B
A B C
A B C D
A B C D E
```

(v)
```
        *
      * * *
    * * * * *
  * * * * * * *
* * * * * * * * *
```

(vi)
```
* * * * * * * * *
  * * * * * * *
    * * * * *
      * * *
        *
```

(vii)
```
        1
      1 2 1
    1 2 3 2 1
  1 2 3 4 3 2 1
1 2 3 4 5 4 3 2 1
```

(viii)
```
A B C D E F
A B C D E
A B C D
A B C
A B
A
```

14. Write a program to calculate factorial of a number using recursion.

15. Write a program to add two matrices of the same order.

16. Write a program to add two complex numbers, use structure data-type to represent complex numbers.

17. Write a program to create 10 objects of a student class containing the student's name, ID, Semester and CGPA as data members, and getDetails(), setDetails() as member functions. The class should also contain static variables which keep track of the student with maximum CGPA in each semester. The class should also contain a constructor to initialize the data members.

COURSE OUTCOMES

After completing this, the students will be able to:

CO1. apply basic programming concepts .

CO2. develop algorithms and flowchart for a given problem.

CO3. illustrate the concepts of procedural programming.

CO4. implement the concepts of object oriented programming.

CO5. design suitable programming solutions using procedural/object oriented programming paradigms.

CO6. develop computer programs to solve real world problems.

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DEPARTMENT OF INFORMATION TECHNOLOGY

COMPUTER PROGRAMMING
2160122/2230122/2240122/2270122/2280122
LIST OF SKILL BASED MINI PROJECT

1. Ram and Shyam are playing a game. Ram initially has the number **A** and Shyam has the number **B**. There are a total of **N** turns in the game, and Ram and Shyam alternatively take turns. In each turn the player whose turn it is, multiplies his or her number by 2. Ram has the first turn. Suppose after all the **N** turns, Ram's number has become **C** and Shyam's number has become **D**. Write a program to calculate the integer division of the maximum number among **C** and **D** by the minimum number among **C** and **D**.
2. There's an array A consisting of N non-zero integers $A_{1..N}$. A subarray of A is called alternating if we take any two adjacent elements in it , then one of them should be even and the other should be odd. For each x from 1 to N, write a program to compute the length of the longest alternating subarray that starts at x - that is, a subarray $A_{x..y}$ for the maximum possible $y \geq x$. The length of such a subarray is y-x+1.
3. Given an array $A_1, A_2, \ldots, A_N$, count the number of subarrays of array A which are non-decreasing. A subarray A[i,j], where $1 \leq i \leq j \leq N$ is a sequence of integers $A_i, A_{i+1}, \ldots, A_j$. A subarray A[i,j] is non-decreasing if $A_i \leq A_{i+1} \leq A_{i+2} \leq \ldots \leq A_j$. Write a program to count the total number of such subarrays.
4. Two strings A and B are given , each consisting of lower case alphabets.

   Write a program to find whether it is possible to choose some non empty strings s1 and s2 where s1 is a substring of A, s2 is a substring of B such that s1 + s2 is a palindromic string. Here '+' denotes the concatenation between the strings. And if there are such strings S1 and S2 then print S1+S2.
5. There are N students standing in a row and numbered 1 through N from left to right. You are given a string S with length N, where for each valid i, the i-th character of S is 'x' if the i-th student is a girl or 'y' if this student is a boy. Students standing next to each other in the row are friends .The students are asked to form pairs for a project. Each pair must consist of a boy and a girl. Two students can only form a pair if they are friends. Each student can only be part of at most one pair. Write a program to find the maximum number of pairs that can be formed.
6. Following conditions are given based on three subjects marks
   a. Physics marks must be greater than 50
   b. Chemistry marks must be greater than 80

c. English marks must be greater than 70

Students are awarded grade 10 if all three conditions are met. Grade 9 is given if conditions a and b are met. Grade 8 is given if conditions b and c are met. Grade 7 is given if a and c are met. Grade is 6 if only one condition is met . Grade is 5 if none of the three conditions are met. Write a program to display the grade of students , based on the values of physics, chemistry and English, given by the user. Use object oriented programming to implement the system.

7. Library Systems is aimed to computerize the library management operations, e.g. Registering a Student, Issuing a book, Handling Books Return, etc. Design an OOPS system to implement the same.

8. The Question Bank computerized the MCQ based exams. It takes input from a file having questions and their answers and presents them randomly before the exam takers. Use OOPS concepts to implement the question bank system.

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DEPARTMENT OF INFORMATION TECHNOLOGY

IT WORKSHOP
(2160125)
LIST OF PROGRAMS

1. Design Resume on Word.
2. Prepare powerpoint presentation on one latest technology.
3. Write a request and apology email.
4. Run MS-DOS commands/Linux commands.
5. Study of Computer Hardware (RAM, ROM, Keyboard, Hard disk drive, Mouse, processors, hard disk etc).
6. Installation and partition of hard disk.
7. Installations of OS (Windows/Linux etc).
8. Disassemble and assemble the PC.
9. Study of PC troubleshooting.
10. Creating Virtual Machine using VMWARE.
11. Design Webpage using HTML & CSS.

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DEPARTMENT OF INFORMATION TECHNOLOGY

DATA STRUCTURES

2160221/2230222/2240222/2270221/2280221

L	T	P	Total Credits
3	-	2	4

COURSE OBJECTIVES

- To be familiar with the use of data structures as the foundational base for computer solutions to problems.
- To understand various techniques of searching and sorting.
- To understand basic concepts about stacks, queues, lists, trees and graphs.

Unit-I

Introduction to Data Structures: Algorithms & their characteristics, asymptotic notations. arrays and its representations, index to address translation. **Link list:** Introduction, implementation of linked list, operations, circular link list, doubly linked list, polynomial manipulation using linked list.

Unit-II

Stacks: Concepts and implementation of stacks, operations on stack, conversion of infix to postfix notation, evaluation of postfix expression, recursion.

Queues: Concepts and implementation, operations on queues, dequeue, priority queues, circular queues and application.

Unit-III

Trees: Types, terminology, binary tree -representations, traversal, conversion of general tree to binary tree, binary search tree, threaded binary tree and height balanced tree.

Unit-IV

Graphs: Background, graph theory terminologies, representation of graphs- sequential & linked representation, path matrix, graph traversals- BFS, DFS, spanning trees, applications of graph.

Unit-V

Searching & Sorting: Linear search, binary search, bubble sort, selection sort, insertion sort, quick sort, merge sort, radix sort and heap sort, comparison between sorting techniques, hashing and collision resolution techniques.

RECOMMENDED BOOKS

- Data Structures, Algorithms and Applications in C++, Sartaj Sahni, 2nd Edition.
- An Introduction to Data Structures with Applications, Jean-Paul Tremblay, Mcgraw hill.
- Data Structures & Algorithms, Aho, Hopcroft & Ullman, original edition, Pearson Publication.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. outline the basics of Algorithms and their performance criteria.

CO2. explain the working of linear/Non Linear data structures.

CO3. identify the appropriate data structure to solve specific problems.

CO4. analyze the performance of various Data Structures & their applications.

CO5. evaluate the time/space complexities of various data structures & their applications.

CO6. design the optimal algorithmic solutions for various problems.

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DEPARTMENT OF INFORMATION TECHNOLOGY

PYTHON PROGRAMMING
2160222/2230223/2240223/2270222/2280222

L	T	P	Total Credits
2	1	2	4

COURSE OBJECTIVES

- To develop the understanding of algorithms, programming approaches and program documentation techniques in Python.
- To study the concepts of procedural and object oriented programming techniques in Python.
- To design and implement basic programming solutions using Python programming constructs.

Unit I

Introduction to Python: Formal and natural languages, Downloading and installing Python. Problem-solving methods and algorithm development. The first program, Variables, expressions, keywords, Operators, Expressions and statements, Interactive mode and script mode, Order of operations. Datatypes: Numeric, string, list tuple, dictionary, set.

Unit II

Function, ways of passing arguments to functions, user defined and inbuilt functions, lambda function. Control Statements: Conditional and unconditional branching, while loop, for loop, loop control statements, range function. Numeric, String, list, tuple, dictionary and set manipulation operations using loops and inbuilt manipulation functions. Packages and modules in python.

Unit III

Exception and File Handling: Errors vs exceptions, Exceptions handling with try block, handling multiple exceptions, writing your own exceptions, file handling modes, reading, writing and appending a file, Handling file exceptions.

Unit IV

Object oriented programming: Characteristics and features of OOPS, Classes and objects, constructors and destructors, defining member variables and functions, visibility modes, static members.

Unit V

Polymorphism: Introduction, Type of Polymorphism: Compile Time Polymorphism & Run Time Polymorphism, polymorphism in python. Inheritance: Introduction,

Visibility Modes, Types of Inheritance: Single Level, Multilevel, Multiple, Hybrid, Multipath. Association, Aggregation and composition. Array manipulation and visualization using numpy and matplotlib libraries.

RECOMMENDED BOOKS

- Python Crash Course: A Hands-On, Project-Based Introduction to Programming, By Eric Matthes.
- Learn Python the Hard Way: third Edition T.R. Padmanabhan, Programming with Python, Springer, first Ed., 2016.
- Kenneth Lambert, Fundamentals of Python: First Programs, Cengage Learning, first Ed., 2012.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. define basics syntax and features of python programming language

CO2. solve computational problem using python language.

CO3. take part in online coding platforms.

CO4. inspect the python program for errors.

CO5. design a program using the features of object oriented concept.

CO6. construct the python code for real world problem using the libraries.

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DEPARTMENT OF INFORMATION TECHNOLOGY

DATABASE MANAGEMENT SYSTEM
2160223/2230224/2240224/2270223/2280223

L	T	P	Total Credits
2	1	2	4

COURSE OBJECTIVES

- To understand the different issues involved in the design and implementation of a database system.
- To study the physical and logical database designs, database modelling, relational, hierarchical and network models.
- To understand and use data manipulation language to query, update and manage a database.

Unit-I

DBMS: Database Approach v/s Traditional File Approach, Advantages of Database System, Database Users and Administrator, Database System Environment, Application Architectures, Schemas, Instances, Data Independence, Data Models: Hierarchical Data Model, Network Data Model & Relational Data Model, Comparison between Models.

Entities and Relationship Model: Entity types, Entity sets, Attributes and Keys, Relationship Types and Sets, Constraints, Design issue, E-R Diagram, Weak Entity Sets.

Unit-II

Relational Model: Structure of Relational Databases: Relation, Attribute, Domain, Tuples, Degree, Cardinality, Views, Database Relations, Properties of Relations, Attributes, Keys, Attributes of Relation, Domain Constraints, Integrity Constraints.

Relational Algebra: Concepts and Operations: Select, Project, Division, Intersection, Union, Division, Rename, Join etc.

Unit-III

SQL: Purpose of SQL, Data Definition Language (DDL) Statements, Data Manipulation Language (DML) Statements Update Statements & Views in SQL, Data Control Language (DCL), Triggers.

Unit-IV

Relational Database Design: Purpose of Normalization, Data Redundancy and Update Anomalies, Functional Dependency, Process of Normalization, Various Normal Forms:

1NF, 2NF, 3NF, BCNF, Decomposition, Desirable Properties of Decomposition: Dependency Preservation, Lossless Join, Problems with Null Valued & Dangling Tuple, Multivalued Dependencies.

Unit-V

Transaction Management: Transaction Concept, Transaction State, Concurrent Executions, Serializability: Conflict and View Serializability, Concurrency Control: Lock-Based Protocol, Recovery: Log-Based Recovery.

RECOMMENDED BOOKS

- Database System Concepts, Abraham Silberschatz Henry F. Korth S. Sudarshan, McGraw-Hill 6th Edition.
- Database Management System, Raghu Ramakrishnan Johannes Gehrke, McGraw Hill 3rd Edition.
- Fundamentals of Database System, Elmasri & Navathe, Addison-Wesley Publishing, 5th Edition.
- An Introduction to Database Systems, Date C. J, Addison-Wesley Publishing, 8th Edition.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. demonstrate the concepts of different types of database system.

CO2. apply relational algebra concepts to design database system.

CO3. make use of queries to design and access database system.

CO4. analyze the evaluation of transaction processing and concurrency control.

CO5. determine the normal form of the relation.

CO6. design a ER diagram/database system for a real world application.

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DEPARTMENT OF INFORMATION TECHNOLOGY

COMPUTER SYSTEM ORGANIZATION

2160224

L	T	P	Total Credits
2	1	-	3

COURSE OBJECTIVE

- To provide the fundamental knowledge of a computer system and its processing units.
- To provide the details of input & output operations, memory management and performance measurement of the computer system.
- To understand how computer represents and manipulate data.

Unit -I

Introduction: Von Newman Model, Various Subsystems: Input Unit, Output Unit, Memory Unit, CPU, Accumulator, Memory Registers, Program Counter, System Bus, Register Transfer and Micro Operations: Register Transfer Language, Register Transfer, Bus and Memory Transfers, Register Transfer Micro-Operations, Arithmetic Micro-Operations, Logic Micro-Operations, Shift Micro-Operations.

Unit- II

Computer Arithmetic: Addition and Subtraction with Signed-Magnitude, Multiplication Algorithms, Division Algorithms, Floating-Point Arithmetic Operations.

Central Processing Unit (CPU): General Purpose Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC), Hardwired and Micro Programmed Control.

Unit -III

Microprocessors: Introduction of 8085 Microprocessor: Architecture, Instruction Set, Addressing Modes, Interrupts and Basic Assembly Language Programming.

Unit –IV

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA), Input-Output Processor (IOP), Data Transfer-Serial/ Parallel, Simplex/ Half Duplex/ Full Duplex.

Unit-V

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory- Organization and Mappings, Memory Management Hardware, Introduction to Pipelining & Multiprocessors.

RECOMMENDED BOOKS

- Computer System Architecture, Morris Mano, PHI.
- Microprocessor Architecture, Programming and Applications with the 8085, Gaonkar, Penram International Publishing (India) Pvt.Ltd.
- Computer Organization, Carl Hamacher, THM.
- Computer Architecture and Organization, J P Hayes, Mc-Graw Hills, New Delhi.

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. recall the basic building blocks of computer Architecture.

CO2. compare different memories.

CO3. apply the concept of memory mapping, multiprocessor and pipelining in solving real world problems.

CO4. analyze various modes of Input-Output data transfer.

CO5. evaluate the arithmetic related to the number system.

CO6. develop the skill of writing low level programming.

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DEPARTMENT OF INFORMATION TECHNOLOGY

DATA STRUCTURES
2160221/2230222/2240222/2270221/2280221
LIST OF EXPERIMENTS

1. Write a program for implementing the following sorting methods to arrange a list of integers in ascending order:
   a. Selection sort
   b. Quick sort
   c. Merge sort
2. Write a program to implement Stack using array.
3. Write a program to count the number of nodes in the binary search tree.
4. Write a program to implement stack using linked list.
5. Write a program to implement AVL Tree.
6. Write a program to implement Breadth First Search and Depth First Search.
7. Write a program to implement graph using array.
8. Write a program to implement Spanning Tree.
9. Write a program to implement Heap Sort.
10. Write a program to implement binary search algorithm.

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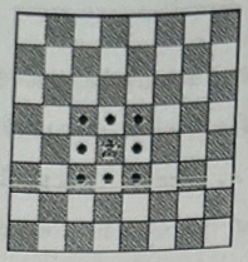
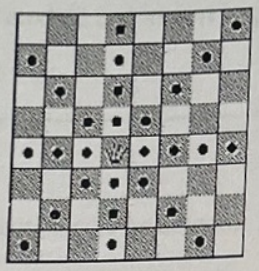
DEPARTMENT OF INFORMATION TECHNOLOGY

DATA STRUCTURES
2160221/2230222/2240222/2270221/2280221
LIST OF SKILL BASED MINI PROJECT

1. Write a program to implement King Travails on the standard 8x8 chess board. (The king moves one square in any direction, horizontally, vertically, or diagonally.)



2. Write a program to implement Queen Travails on the standard 8x8 chess board. (The queen may move in any straight line, horizontal, vertical, or diagonal.)



3. Implement the Phone directory application using doubly-linked lists.
4. Design and solve any puzzles with only one solution, such as mazes. (DFS can be adapted to find all solutions to a maze by only including nodes on the current path in the visited set.)
5. Write a program to evaluate any arithmetic expressions using STACK.
6. Write a program tc implement priority queue for airport check in process.

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DEPARTMENT OF INFORMATION TECHNOLOGY

PYTHON PROGRAMMING LAB
2160222/2230223/2240223/2270222/2280222

LIST OF PROGRAMS

1. Write a program to demonstrate different number data types in python.
2. Write a program to perform different arithmetic operations on numbers in python.
3. Write a program to create, concatenate and print a string and accessing substring from a given string.
4. Write a python program to create, append and remove lists in python.
5. Write a program to demonstrate working with tuples in python.
6. Write a program to demonstrate working with dictionaries in python.
7. Write a python program to find the factorial of a number using recursion.
8. WAP to swap two integers without using a third variable. The swapping must be done in a different method in a different class.
9. WAP to find the greater of two given numbers in two different classes using friend function.
10. Write a python program to define a module and import a specific function in that module to another program.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. write, test, and debug simple Python programs.

CO2. solve computational problem using python language.

CO3. familiar with basics syntax and features of python programming language.

CO4. use Python lists, tuples, dictionaries for representing compound data.

CO5. design a program utilizing the features of object oriented concept.

CO6. utilize some of the libraries available for solving problems.

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DEPARTMENT OF INFORMATION TECHNOLOGY

PYTHON PROGRAMMING LAB
2160222/2230223/2240223/2270222/2280222

LIST OF SKILL BASED MINI PROJECT

1. Implement a calculator using Tkinter library.
2. Design and implementation of Animal Kingdom Classification.
3. Design and implementation of a real-time, User friendly Currency Converter.
4. Design and implementation of a File Manager which supports various types of files.
5. Design a program for Number Guessing using random number generator library. Make a play game with the defined library.
6. Design any game of your choice like tic-tac-toe etc.
7. Implement a contact book (command line project) capable of storing user data like name, address, phone number, email etc. Use any database for storing the information so that updation and deletion can also be carried out.
8. Implement binary search algorithm by creating a list from random numbers between any predefined ranges.
9. Design a program for spam filtering.
10. Design a dice rolling simulator generating random number from 1 to 6 every time dice is rolled.
11. Implement countdown clock and timer.

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DEPARTMENT OF INFORMATION TECHNOLOGY

DATABASE MANAGEMENT SYSTEM
2160223/ 2230224/ 2240224/ 2270223/ 2280223

LIST OF PROGRAMS

While creating tables, databases the name should have a prefix of your roll number.

Ex. If your roll number is 55 then every table name must start with 55 TABLE_NAME. 1. Write program name 2. Write description of command used for executing the query. 3. Write commands in bold letters. 4. Take the screenshot of the output.

1. Implementation of DDL commands of SQL with suitable examples.
   a. Create table
   b. Alter table
   c. Drop Table
2. Implementation of DML commands of SQL with examples.
   a. Insert
   b. Update
   c. Delete
3. Implementation of different type of function with suitable example
   a. Number function
   b. Aggregate function
   c. Character function
   d. Conversion function
   e. Data function
4. Implementation of different type of operators in SQL.
   a. Arithmetic operators
   b. Logical operators
   c. Set operator
   f. Comparison Operator
   g. Special operator
5. Implementation of type of joins.
   a. Inner Join
   b. Outer Join
   c. Natural Join etc.
6. Study and implementation of
   a. Group by & having clause
   b. order By clause
   c. Indexing
7. Study of Implementation of
   a. Sub queries
   b. Views
8. Study & implementation of different type of constraints.
9. Study & implementation of database backup & recovery command. Study & implementation of Rollback, commit, savepoint.
10. Creating Database /Table Space
    a. Managing Users: Create User, Delete User
    b. Managing roles: Grant, Revoke.

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. construct database schema for a given problem domain.

CO2. apply integrity constraints on a database schema using a state-of-the-art RDBMS.

CO3. apply SQL queries using DDL and DML to design and access database systems.

CO4. make use of operators and functions used in query.

CO5. distinguish Tables and Views for database systems.

CO6. develop a small project for a real world scenario.

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DEPARTMENT OF INFORMATION TECHNOLOGY

DATABASE MANAGEMENT SYSTEM
2160223/ 2230224/ 2240224/ 2270223/ 2280223

LIST OF SKILL BASED MINI PROJECT

- Design, develop, and implement the specified queries for the following problems using Oracle, MySQL, MS SQL Server, or any other DBMS under LINUX/Windows environment.
- Design ER-Diagram, Create Schema and insert at least 5 records for each table. Add appropriate database constraints

Mini Skill Project 1

Consider the following schema for a Library Database:
BOOK (Book_id, Title, Publisher_Name, Pub_Year)
BOOK_AUTHORS (Book_id, Author_Name)
PUBLISHER (Name, Address, Phone)
BOOK_COPIES (Book_id, Programme_id, No-of_Copies)
BOOK_LENDING (Book_id, Programme_id, Card_No, Date_Out, Due_Date)
LIBRARY_PROGRAMME (Programme_id, Programme_Name, Address)

Write SQL queries to

1. Retrieve details of all books in the library – id, title, name of publisher, authors, number of copies in each Programme, etc.
2. Get the particulars of borrowers who have borrowed more than 3 books, but from Jan 2017 to Jun 2017.
3. Delete a book in BOOK table. Update the contents of other tables to reflect this data manipulation operation.
4. Partition the BOOK table based on year of publication. Demonstrate its working with a simple query.
5. Create a view of all books and its number of copies that are currently available in the Library.

Mini Skill Project 2

Consider the following schema for Order Database:
SALESMAN (Salesman_id, Name, City, Commission)
CUSTOMER (Customer_id, Cust_Name, City, Grade, Salesman_id)
ORDERS (Ord_No, Purchase_Amt, Ord_Date, Customer_id, Salesman_id)
Write SQL queries to

1. Count the customers with grades above Bangalore's average.
2. Find the name and numbers of all salesman who had more than one customer.
3. List all the salesman and indicate those who have and do not have customers in their cities (Use UNION operation.)
4. Create a view that finds the salesman who has the customer with the highest order of a day.
5. Demonstrate the DELETE operation by removing salesman with id 1000. All his orders must also be deleted.

Mini Skill Project 3

Consider the schema for Movie Database:
ACTOR (Act_id, Act_Name, Act_Gender)
DIRECTOR (Dir_id, Dir_Name, Dir_Phone)
MOVIES (Mov_id, Mov_Title, Mov_Year, Mov_Lang, Dir_id)
MOVIE_CAST (Act_id, Mov_id, Role)
RATING (Mov_id, Rev_Stars)

Write SQL queries to

1. List the titles of all movies directed by 'Hitchcock'.
2. Find the movie names where one or more actors acted in two or more movies.
3. List all actors who acted in a movie before 2000 and in a movie after 2015 (use JOIN operation).
4. Find the title of movies and number of stars for each movie that has at least one rating and find the highest number of stars that movie received. Sort the result by movie title.
5. Update rating of all movies directed by 'Steven Spielberg' to 5.

Mini Skill Project 4

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

Write SQL queries to

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

Mini Skill Project 5

Consider the schema for Company Database:
EMPLOYEE (SSN, Name, Address, Sex, Salary, SuperSSN, DNo)
DEPARTMENT (DNo, DName, MgrSSN, MgrStartDate)
DLOCATION (DNo,DLoc)
PROJECT (PNo, PName, PLocation, DNo)
WORKS_ON (SSN, PNo, Hours)

Write SQL queries to

1. Make a list of all project numbers for projects that involve an employee whose last name is 'Scott', either as a worker or as a manager of the department that controls the project.
2. Show the resulting salaries if every employee working on the 'IoT' project is given a 10 percent raise.
3. Find the sum of the salaries of all employees of the 'Accounts' department, as well as the maximum salary, the minimum salary, and the average salary in this department.

4. Retrieve the name of each employee who works on all the projects controlled by department number 5 (use NOT EXISTS operator).
5. For each department that has more than five employees, retrieve the department number and the number of its employees who are making more than Rs. 6,00,000.

Mini Skill Project 6

A university registrar's office maintains data about the following entities:
(a)courses, including number, title, credits, syllabus, and prerequisites;
(b) course offerings, including course number, year, semester, section number, instructor(s), timings, and classroom;
(c) students, including student-id, name, and program; and
(d) instructors, including identification number, name, department, and title. Further, the enrollment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modeled.
Construct an E-R diagram forthe registrar's office. Document all assumptions that you make about the mapping constraints.

Mini Skill Project 7

Construct an E-R diagram for a car-insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents.

Mini Skill Project 8

Construct an E-R diagram for a hospital with a set of patients and a set of medical doctors. Associate with each patient a log of the various tests and examinations conducted.

Mini Skill Project 9

Design an E-R diagram for keeping track of the exploits of your favourite sports team. You should store the matches played, the scores in each match, the players in each match and individual player statistics for each match. Summary statistics should be modeled as derived attributes.

Mini Skill Project 10

Consider a database used to record the marks that students get in different exams of different course offerings.
a. Construct an E-R diagram that models exams as entities, and uses a ternary relationship, for the above database.
b. Construct an alternative E-R diagram that uses only a binary relationship between students and course-offerings. Make sure that only one relationship exists between a particular student and course-offering pair, yet you can represent the marks that a student gets in different exams of a course offering.

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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DEPARTMENT OF INFORMATION TECHNOLOGY

COMPUTER NETWORKS
2160321

L	T	P	Total Credits
2	1	-	3

COURSE OBJECTIVES

- Familiarize the student with the basic taxonomy and terminology of the computer networking.
- Provide detail knowledge about various layers, protocols and devices that facilitate networking.
- Enable Students to deal with various networking problems such as flow control, error control and congestion control.

Unit-I

Introduction: Computer Network, Types- LAN, MAN & WAN, Data Transmission Modes- Serial & Parallel, Simplex, Half Duplex & Full Duplex, Synchronous & Asynchronous Transmission, Transmission Medium- Guided & Unguided, Cables- Twisted Pair, Coaxial Cable & Optical Fiber, Networking Devices-Repeaters, Hub, Switch, Bridge, Router, Gateway and Modem, Performance Criteria- Bandwidth, Throughput, Propagation Time & Transmission Time, Network Standardization- OSI Reference Model & TCP/IP Reference Mode, X.25.

Unit-II

Physical Layer: Network Topologies- Bus, Ring, Star & Mesh, Line Coding- Unipolar, Polar and Bipolar, Switching- Circuit Switching, Message Switching & Packet Switching, Multiplexing: FDM – Frequency Division Multiplexing, WDM – Wavelength Division Multiplexing & TDM – Time Division Multiplexing.

Unit-III

Data Link Layer: Introduction, Design Issues, Services, Framing, Error Control, Flow Control, ARQ Strategies, Error Detection and Correction, Parity Bits, Cyclic Redundant Code (CRC), Hamming Codes, MAC Sub Layer- The Channel Allocation Problem, Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD, IEEE 802.3, IEEE 802.4 and IEEE 802.5.

Unit-IV

Network Layer & Transport Layer: Introduction, Design Issues, Services, Routing- Distance Vector Routing, Hierarchical Routing & Link State Routing, Shortest Path Algorithm- Dijkstra's Algorithm & Floyd–Warshall's Algorithm, Flooding, Congestion Control- Open Loop & Closed Loop Congestion Control, Leaky Bucket & Token Bucket Algorithm. Connection Oriented & Connectionless Service, IP Addressing.

Unit-V

Presentation, Session& Application Layer: Introduction, Design Issues, Presentation Layer- Translation, Encryption- Substitutions and Transposition Ciphers, Compression- Lossy and Lossless. Session Layer – Dialog Control, Synchronization. Application Layer- Remote Login, File Transfer & Electronic Mail.

RECOMMENDED BOOKS

- Data Communication and Networking, Behrouz A. Forouzan, McGraw Hill.
- Computer Networks, Andrew S. Tanenbaum, Pearson Education India.
- Computer Networks and Internets, Douglas E. Comer, Pearson India.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. explain the fundamental concepts of computer network.

CO2. illustrate the basic taxonomy & terminologies of computer network.

CO3. identify various parameter for affecting the performance of computer network.

CO4. analyze the concepts of communication using various layer of OSI model.

CO5. evaluate the performance of computer network in congestion and Internet.

CO6. design the network environment and applications for implementation of computer networking concept.

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DEPARTMENT OF INFORMATION TECHNOLOGY

DESIGN & ANALYSIS OF ALGORITHMS
2160322/2230322/2240322/2270323/2280323

L	T	P	Total Credits
2	1	2	4

COURSE OBJECTIVES

- To introduce the topic of algorithms as a precise mathematical concept.
- To study the techniques like recursion, divide and conquer, dynamic programming, greedy approach, backtracking and branch and bound.
- To practice their skills on many well-known algorithms and data structures designed to solve real-life problems.

Unit-I

Introduction to Computational Model: Algorithms and its Importance, Recurrences and Asymptotic Notations, Mathematical Analysis of Non-Recursive and Recursive Algorithm, Review of Sorting & Searching Algorithms, **Basic Tree and Graph Concepts:** B-Trees and Traversal Techniques, Topological sort.

Unit-II

Divide and Conquer Method: Introduction and its Examples such as Finding the Maximum and Minimum, Binary Search, Merge Sort, Quick Sort and Strassen's Matrix Multiplication and Additional Real World Problems on Divide and Conquer.

Unit-III

Greedy Method: Introduction, Characteristics, Examples of Greedy Methods such as Single-Source Shortest Paths, **Minimum Cost Spanning Trees :** Prims's and Kruskal's Algorithm, Knapsack Problem, Dijkstra's Single Source Shortest Path Algorithm, Optimal Storage on Tapes.

Unit-IV

Dynamic Programming: Introduction, The Principle of Optimality, Examples of Dynamic Programming Methods such as – 0/1 Knapsack, Traveling Salesman Problem, Floyd's All Pairs Shortest Path, Longest Common Subsequence and Reliability Design, Matrix Chain Multiplication.

Unit-V

Backtracking: Concept and its Examples like 4-Queen's Problem, Knapsack problem Hamiltonian Circuit Problem, Graph Coloring Problem etc. **Branch & Bound:** Introduction and its Examples like - Traveling Salesperson Problem etc. **NP-Completeness:** Introduction, Class P and NP, Polynomial Reduction, NP-Hard and NP-Complete Problems.

RECOMMENDED BOOKS

- Fundamentals of Computer Algorithms, Horowitz & Sahani, Universities press.
- Introduction to Algorithms, Coremen Thomas, Leiserson CE, Rivest RL, PHI.
- Design & Analysis of Computer Algorithms, Ullmann, Pearson.
- Algorithm Design, Michael T Goodrich, Robarto Tamassia, Wiley India.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. demonstrate a familiarity with major algorithms and data structures.
CO2. idenify important algorithmic design paradigms and methods of analysis.
CO3. analyze the performance of algorithms.
CO4. compare various algorithm design techniques.
CO5. select the design technique to solve any real world problem.
CO6. design efficient algorithm using various design techniques.

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DEPARTMENT OF INFORMATION TECHNOLOGY

COMPUTER GRAPHICS & MULTIMEDIA
2160323/2230323/2240323/2270324/2280324

L	T	P	Total Credits
2	1	2	4

COURSE OBJECTIVES

- To become familiar with computer graphics techniques and display devices.
- To enhance the proficiency in image representations, 2D and 3D graphics transformations.
- To develop awareness with various illumination, color models and multimedia system.

Unit-I

Introduction to Computer Graphics: Interactive Computer Graphics, Application of Computer Graphics, Random and Raster Scan Displays, Storage Tube Graphics Display, Calligraphic Refresh Graphics Display, Flat Panel Display, Refreshing, Flickering, Interlacing, Resolution, Bit Depth, Aspect Ratio etc.

Unit-II

Scan Conversion Technique: Image representation, Line drawing: DDA, Bresenham's Algorithm. Circle Drawing: Mid-Point, DDA, Bresenham's Circle Generation Algorithm, Ellipse Generation Algorithm, Curves: Parametric Function, Bezier Method, B-Spline Method.

Unit-III

2D & 3D Transformations: Translation, Rotation, Scaling, Reflection, Shearing, Inverse Transformation, Composite Transformation, World Coordinate System, Viewing Transformation, Representation of 3D object on Screen, Parallel and Perspective Projections.

Unit-IV

Clipping: Point clipping, Line Clipping, Simple Visibility Line Clipping Algorithm, Polygon Clipping, Hidden Surface Elimination: Z- Buffer algorithm and Painter's Algorithm, Area Filling, **Basic Illumination Models:** Diffuse Reflection, Specular Reflection, Phong Shading, Gouraud Shading, Color Models: RGB, YIQ, CMY, HSV.

Unit-V

Multimedia System: An Introduction, Multimedia hardware and software, Multimedia System Architecture, Multimedia Applications and evolving technologies, Multimedia Authoring. Data & File Format standards, Sampling, Compression standards, Compression through spatial and temporal redundancy.

RECOMMENDED BOOKS

- Donald Hearn and M.P. Becker : Computer Graphics, PHI Publication
- FoleyVandam, Feiner, Hughes : Computer Graphics principle and Practice
- Rogers : Principles of Computers Graphics, TMH
- Sinha and Udai : Computer Graphics, TMH
- Prabhat K. Andleigh, Kiran Thakrar : Multimedia Systems Design, Prentice Hall PTR

COURSE OUTCOMES

After completion of the course students will be able to:

CO1. explore various display devices and applications of computer graphics.

CO2. illustrate various scan conversion techniques like line, circle, curve and shape drawing algorithms.

CO3. apply 2-dimensional, 3-dimensional transformations and projections on images.

CO4. classify methods of image clipping and various algorithms for line and polygon clipping.

CO5. apply appropriate filling algorithms, hidden surface elimination algorithm on images.

CO6. summarize various color models, shading methods and multimedia system.

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DEPARTMENT OF INFORMATION TECHNOLOGY

OPERATING SYSTEM
2160324/2230324/2240324

L	T	P	Total Credits
2	1	-	3

COURSE OBJECTIVES

- To provide basic knowledge of computer operating system structures and functioning.
- To compare several different approaches to memory management, file management and process management.
- To understand various problems related to concurrent operations and their solutions.

Unit I

Basics of Operating System: Generations, Types, Structure, Services, System Calls, System Boot, System Programs, Protection and Security.

Unit II

Process Management: Process Concepts, Process States, Process Control Block, Scheduling-Criteria, Scheduling Algorithms and their Evaluation, Threads, Threading Issues.

Unit III

Process Synchronization: Background, Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors.

Deadlock: System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery from Deadlock.

Unit IV

Memory Management: Main Memory, Swapping, Contiguous Memory Allocation, Paging, Structure of Page Table, Segmentation, Virtual Memory, Demand Paging, Page Replacement Algorithms, Allocation of Frames, Thrashing.

Unit V

Storage Management: Mass-Storage Structure, Overview, Disk Structure, Disk Attachment, Disk Scheduling.

File System Interface: The Concept of a File, Access Methods, Directory Structure, File System Structure, Allocation Methods, Free-Space Management.

RECOMMENDED BOOKS

- Operating System Concepts, Silberschatz, Ninth Edition, Willey Publication.
- Operating Systems, internals and Design Principles, Stallings, Seventh Edition, Pearson Publication.
- Modern Operating Systems, Tanenbaum, Fourth Edition. Pearson Publication.

COURSE OUTCOMES

After the successful completion of this course, the student will be able to:

CO1. tell the basic concept of operating systems.
CO2. explain the working procedure of the operating system.
CO3. analyze the various operating system problems and issues.
CO4. develop the solutions for various operating system problems and issues.
CO5. measure the performance of various scheduling and allocation techniques.
CO6. test the working of various scheduling and allocation techniques.

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DEPARTMENT OF INFORMATION TECHNOLOGY

JAVA PROGRAMMING LAB
2160325

L	T	P	Total Credits
-	1	2	2

COURSE OBJECTIVES

- To understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- To acquire the ability to write a computer program to solve specified problems.
- To be able to use Java SDK environment to create, debug and run simple Java programs.

Unit-I

Introduction to Java programming: Overview and Characteristics of Java, The Java Virtual Machine, Installing Java, Java Program Development, Java Source File Structure, Compilation, Executions. Packages, Package access, Variables and data types, Conditional and looping constructs, Arrays.

Unit-II

Object-oriented programming with Java Classes and Objects: Fields and Methods, Constructors, Overloading methods, Nested classes, Overriding methods, Polymorphism, Making methods and classes final, Wrapper classes.

Unit-III

Extending Classes and Inheritance: Types of Inheritance in Java, Abstract classes and methods, Interfaces, use of 'super', Polymorphism in inheritance. Garbage collection in JAVA.

Exception handling: Try- Catch, Throw, Throws, Finally constructs, The Exception class.

Unit-IV

String Package and Multithreading: Operation on String, Mutable & Immutable String, Tokenizing a String, Creating Strings using String Buffer class.

Understanding Threads: Needs of Multi-Threaded Programming, Thread Life-Cycle, Thread Priorities and Synchronizing Threads.

Unit-V

The I/O Package: Input Stream and Output Stream classes, Reader and Writer classes, Basics of AWT, Swing and Applets: Layout Managers, Event Handling, Classes for various controls, such as label, choice, list, checkbox, etc., Dialogs and frames using menus.

Basic concepts of networking: Working with URLs, Concepts of URLs and Sockets. Basics of database connectivity with JDBC.

RECOMMENDED BOOKS

- Programming with JAVA: A Primer, E. Balagurusamy, Tata McGraw Hill.
- JAVA: The Complete Reference, Herbert Schildt, McGraw Hill Education.
- JAVA-2: The Complete Reference, Patrick Naughton, Herbert Schidt.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. tell the available features in Java programming language.

CO2. illustrate Java programming concepts for solving problems.

CO3. make use of the Java programming methods for connecting the various databases.

CO4. test for bugs in a software application written in the Java programming language.

CO5. determine different ways for handling exceptions, memory management, file handling, i/o management and internet based application development.

CO6. build a project for application development using Java programming language.

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DEPARTMENT OF INFORMATION TECHNOLOGY

DESIGN & ANALYSIS OF ALGORITHMS
2160322/2230322/2240322/2270323/2280323

LIST OF PROGRAMS

1. WAP to implement the following using array as data structure and analyze its time complexity.
   a. Insertion sort b. Selection sort c. Bubble sort d. Quick sort
   e. Merge sort f. Heap sort
2. WAP to implement Linear and Binary Search and analyze its time complexity.
3. WAP to implement Strassen's Matrix Multiplication.
4. WAP to implement Binomial coefficient computation and analyze its time complexity.
5. WAP to implement minimum spanning tree using Prim's algorithm and analyze its time complexity.
6. WAP to implement Dijkstra's Algorithm and analyze its time complexity.
7. WAP to implement Bellman Ford Algorithm and analyze its time complexity.
8. WAP to implement DFS and BFS and analyze their time complexities.
9. WAP to implement Bucket Sort Algorithm for integer elements.
10. WAP to implement Topological sort algorithm and analyze their time complexities.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. relate the principles of algorithm design in solving problems.

CO2. demonstrate basic algorithms and different problem solving strategies.

CO3. build creativeness and confidence to solve non-conventional problems.

CO4. analyze running times of algorithms using asymptotic analysis.

CO5. compare various algorithm design approaches for solving real world problems.

CO6. design and implement optimization algorithms in specific applications.

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DEPARTMENT OF INFORMATION TECHNOLOGY

DESIGN & ANALYSIS OF ALGORITHMS
2160322/2230322/2240322/2270323/2280323
LIST OF SKILL BASED MINI PROJECT

List of Micro Projects:

1. Implement the greedy approach for single source shortest path.
2. Design a program for finding minimum cost tree for traversing all nodes of a graph.
3. Implement tree traversal techniques like pre-order, post-order and in-order.
4. Implement the Task Scheduling problem.
5. Implement the Longest Common Subsequence problem.
6. Find the shortest cycle in a graph.

List of Macro Projects:

1. Implement the movement of knight in chess game.
2. Implementation of a guessing game of the terminal on screen.
3. Print all the nodes reachable from a given starting node in a digraph using BFS method.
4. Check whether a given graph is connected or not using DFS method.
5. Find a subset of a given set S = {s1,s2,.....,sn} of n positive integers whose sum is equal to a given positive integer d. For example, if S= {1, 2, 5, 6, 8} and d = 9 there are two solutions {1,2,6} and {1,8}.A suitable message is to be displayed if the given problem instance doesn't have a solution.
6. Write a program to solve the job scheduling problem using the greedy algorithm.
7. Calculate the maximum weighted vertex pair in the weighted graph.

List of Mini Projects:

1. Implement a program for matrix layer rotation.
2. Implementation of vertex cover algorithm.
3. Implementation of the knapsack problem.
4. Implement N Queen's problem using Back Tracking.
5. Write a program to calculate the shortest path using travelling salesman problem.
6. Implement a phone directory application using doubly-linked lists.
7. Find the maximum clique in a graph.
8. WAP to implement the spanning tree using kruskal algorithms.

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DEPARTMENT OF INFORMATION TECHNOLOGY

COMPUTER GRAPHICS & MULTIMEDIA
2160323/2230323/2240323/2270324/2280324

LIST OF PROGRAMS

1. WAP to implement line generation using DDA algorithm.
2. WAP to implement line generation using Bresenham's line generation algorithm.
3. WAP to generate a circle using mid-point algorithm.
4. WAP to implement Bresenham's circle generation algorithm.
5. WAP to perform translation, rotation, scaling on 2D transformation.
6. WAP to perform scaling and shearing on 2D transformation.
7. WAP to implement translation of a line and triangle.
8. WAP to implement rotation of a line and triangle.
9. WAP to implement scaling transformation.
10. WAP to fill polygon using seed filling algorithm.
11. WAP to implement 3D rotation about an arbitrary axis.
12. WAP to implement Cohen Sutherland line clipping.

COURSE OUTCOMES

After completion of the course students will be able to:

CO1. understand the basic concepts of computer graphics.

CO2. demonstrate scan conversion problems using programming language.

CO3. implement the concepts of geometric transformation of 2D and 3D objects.

CO4. apply clipping and filling techniques for modifying an object.

CO5. understand the practical implementation of modelling and rendering.

CO6. demonstrate the concept of viewing of 2D objects.

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COMPUTER GRAPHICS & MULTIMEDIA
2160323/2230323/2240323/2270324/2280324

LIST OF SKILL BASED MINI PROJECT

List of Micro Projects:

1. Draw the three parallel lines with different colors.
2. Draw the three lines, first should be line horizontal, second line on 45 degree and third line vertical.
3. Draw a triangle with different colors.
4. Draw a circle with multiple colors.
5. Draw two triangles with different size.
6. Draw a rectangle with 45 degree on screen.
7. Draw an ellipse on 45 degree on screen.
8. Case study on the hardware level components available in computer graphics.
9. Case study on the software level components available in computer graphics.
10. Case study on functions available in graphics.h header file.

List of Macro Projects:

1. Design an Indian Flag on screen.
2. Design a Pyramid.
3. Design a House front face.
4. Design a Balloon.
5. Design a Smile face.
6. Design a Rain.
7. Design a Football.
8. Design a Moving a wheel project.
9. Design a Moving a Cycle project.
10. Design a Analog Clock.

List of Mini Projects:

1. Write the code to draw a hut and color it using graphics.
2. Write the code to draw concentric circle on screen using graphics.
3. Write the code to draw pie-chart using graphics.
4. Write the code to make a digital clock using graphics.
5. Write the code to draw a Rainbow using graphics.

6. Write the code for moving car animation using graphics.
7. Write the code for bouncing ball animation using graphics.
8. Write the code to draw 3D bar chart on screen using graphics.
9. Write the code to draw sine wave using graphics.
10. Write the code to draw stars in night sky using graphics.

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DEPARTMENT OF INFORMATION TECHNOLOGY

JAVA PROGRAMMING LAB
2160325

LIST OF PROGRAMS

1. Write a program to accept two numbers (int) as command line arguments and print their Sum.
2. Write a program to find the average and sum of the N numbers Using Command line argument.
3. Write a program to Demonstrate Type Casting.
4. Write a program to find the number of arguments provide at runtime.
5. Write a program to print Fibonacci series without using recursion and using recursion.
6. Write a program to check prime numbers and palindrome numbers.
7. Write a program to sort an array of elements using bubble sort algorithm.
8. Write a program to sort an array of elements using insertion sort algorithm.
9. Write a non-static function in java that prints the sum of two numbers.
10. Create an abstract class Shape which has a field PI=3.14 as final and it has an abstract method Volume. Make two subclasses Cone and Sphere from this class and they print their volume.
11. WAP to handle the Exception using try and multiple catch block.
12. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divide by zero.
13. Develop an Applet that receives an integer in one text field & compute its factorial value & returns it in another text field when the button "Compute" is clicked
14. Write a Java program that implements a multi-thread application that has three threads. First thread generates a random integer every first second and if the value is even, the second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of the cube of the number.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. tell the available features in Java programming language.

CO2. illustrate Java programming concepts for solving problems.

CO3. make use of the Java programming methods for connecting the various databases.

CO4. test for bugs in a software application written in the Java programming language.

CO5. determine different ways for handling exceptions, memory management, file handling, i/o management and internet based application development.

CO6. build a project for application development using Java programming language.

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LIST OF SKILL BASED MINI PROJECT

List of Micro Projects:

1. To build an Authentication System for user login.
2. Design a Random number generator using function.
3. Calculate the CGPA of students using java application.
4. Implementation of Word Counter using java programming language.
5. Convert the temperature in different slandered using java.
6. To manage the data of alumni using Online Alumni Database System.
7. Design a Ceaser Cipher for encryption and decryption of text.

List of Macro Projects:

1. Implementation of Online shopping bill generation system using java programming language.
2. Design a Scientific Calculator using event delegation model of java.
3. To mange Online Quiz using java application.
4. Build an application for designing CV/ Resume
5. Calculate the Electricity Bill using java programming language.
6. Design a Online Voting System using multithreading concept of java.
7. To implement the Playfair Cipher concept using java programming language.

List of Mini Projects:

1. Develop a java application for implementation of Online Shopping Cart.
2. Apply the basic concept of java applet for designing Tic-Tac-Toe Game.
3. Create a Java application for implement basic transaction in any Bank.
4. To manage the attendance of students using Java database Management System
5. To implement a Java application for conduction of Online survey System
6. Design a Java application for designing Search Engine
7. Create a Java application for development of Snake Game.
