GRAPHIC ERA (DEEMED TO BE UNIVERSITY), DEHRADUN

SEMESTER I

Name of Program: - **Master of Computer Applications**

1. Subject Code: **TMC 101**

   Course Title: **Full Stack Development**

2. Contact Hours: **L:** 3 **T**: 0 **P**: 0

3. Examination Duration (Hrs): **Theory** 3 **Practical** 0

4. Relative Weight: **CIE** 25 **MSE** 25 **SEE** 50

5. Credits: 3

6. Semester: I

7. Category of Course: Core

8. **Course Outcome**:**	**CO-1.** Describe the usage of XHTML tags, and CSS for developing presentable web pages.[L-1] **CO-2.** Develop dynamic web pages by applying event-handling mechanisms using JavaScript.[L-5] **CO-3.** Develop web pages using cookies, sessions, and databases in PHP.[L-5] **CO-4.** Describe the concepts of MERN stack used in Full Stack Development and the features and components of ReactJS[L-1]

*** Describe the specific knowledge, skills or competencies the students are expected to acquire or demonstrate.*

10. Details of the Course:

Sr. No	Units	Contact Hours

1	**Unit 1: Basics of XHTML**
	• Standard Structure of XHTML document
	• Difference between HTML and XHTML
	• Basic Text Markup Elements –
	  ○ paragraph <p> , heading tags H1..H6
	  ○ break, italic, bold, superscript, subscript, emphasis, <hr>
	• Character entities
	• Hyperlinks
	• Images
	• Lists , , <dl>
	• tables <table>
	• division and span
	• Form Elements
		8

	○ Label, Text boxes - password, button, submit, reset, Placeholder, Textarea, Radio button, Checkboxes, Button, Dropdown <select>	
2	**Unit 2 – CSS** • Introduction to CSS • CSS Properties – text, font, list, color • Selectors ○ Simple/Element Selector, Id Selector ○ Class Selector, Generic Selector ○ Universal Selector, Pseudo-class Selector Types and Levels of Style: Inline, Internal, External • CSS Box Model • Background images • Examples using HTML and CSS	8
3	**Unit 3: Introduction to JavaScript, Event Handling, DOM, and Dynamic Documents with JavaScript** **Introduction to JavaScript -** • Overview of JavaScript • JavaScript Syntax • Variables and Data Types • Screen Output and Keyboard Input ○ alert() ○ confirm() ○ prompt() ○ document.write() • Controls and Loops • String Methods • Arrays • Functions • Pattern Matching **Event Handling, DOM, and Dynamic Documents with JavaScript -** • Document Object Model (DOM) • DOM tree structure of HTML • Accessing elements in JavaScript • Event and Event Handling ○ Handling events from body elements ○ Handling events from button elements ○ Handling events from text boxes • Validations on Forms simple example • Changing colors and fonts	10
4	**Unit 4: PHP Basics and Advance Features** **PHP Basics –** • Introduction and basic syntax of PHP, • Control Statements with examples • Output Statements • String Functions, Arrays, Functions **PHP Advance Features –** • Form Handling • Cookies and Sessions Management ○ Creating cookies and session variables in PHP programs, Creating a simple database and database operations	10

5	**Unit 5: Introduction to MERN**
	
	Introduction to MERN -
	• Overview of Full Stack Web Development
	• Overview of MERN
	• Overview of MERN Components
	  o ReactJS
	  o Node.js
	  o Express
	  o MongoDB
	• Tools and Libraries, React library
	
	Introduction to ReactJS -
	• React features, benefits, and applications, Advantages and disadvantages of ReactJS
	• ReactJS Vs other Front-End Technologies, ReactJS development environment setup
	• Creating and executing a new ReactJS project, Folder Structure of ReactJS applications
		12

11. Suggested Books:

SL. No.	Name of Authors/Books/Publishers	Edition	Year of Publication/Reprint
	Text Books		
1.	Robert W. Sebesta, "Programming the world wide web", Pearson education. ,	6th	2018
2.	Vasan Subramanian, "Pro MERN Stack, Full Stack Web App Development with Mongo, Express, React and Node", Apress.	2nd	2020
	Reference Books		
1.	Kogent Learning Solutions Inc., "HTML 5: Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP & jQuery: Black Book", Dreamtech Press.		
2.	Eddy Wilson, "MERN Quick start guide: Build Web applications with MongoDB, Express.js, React and Node", Packt publishing.		2018

12.	**Mode of Evaluation**	Test / Quiz / Assignment / Mid Term Exam / End Term Exam / Lab Exam

GRAPHIC ERA (DEEMED TO BE UNIVERSITY), DEHRADUN

SEMESTER I

Name of Department: - **Master of Computer Applications**

1. Subject Code: **TMC 102**

   Course Title: **Computer Networks**

2. Contact Hours: **L:** 3 **T**: 0 **P** 0

3. Examination Duration (Hrs): **Theory** 3 **Practical** 0

4. Relative Weight: **CIE** 25 **MSE** 25 **SEE** 50

5. Credits: 3

6. Semester: I

7. Category of Course : Core

8. **Course Outcome**:**	**CO-1.** Explain the principles, mechanisms, and functionalities of network applications, transport layer protocols, network layer design, and link layer services in computer networks.(L2) **CO-2.** Illustrate the principles and architectures of network applications, including protocols such as HTTP, FTP, SMTP, POP3, IMAP, and DNS.(L2) **CO-3.** Demonstrate use of different computer network components, including hardware, media, and topologies.(L3) **CO-4.** Compare error-detection and correction techniques, multiple access protocols, and Ethernet technologies in the context of link layer services and local area networks.(L4) **CO-5.** Evaluate routing algorithms (such as link-state and distance vector) in terms of their efficiency, scalability, and adaptability to various network environments. (L5)

*** Describe the specific knowledge, skills, or competencies the students are expected to acquire or demonstrate.*

9. Details of the Course:

Sr. No	Units	Contact Hours
1	**Introduction:** Data Communication Basics, History of Computer Networking and the Internet. Internet, Protocol, Services. Computer Network: Hardware, Media and topology. **Protocol layering**: The OSI Reference Model and the TCP/IP protocol stack. Internet Access Networks. Circuit and Packet Switching, Delays: Processing, Queuing, Transmission and Propagation delays.	**8**
2	**Application Layer:** Principles and Architectures of Network Applications. Application Layer Protocols- The Web and http: Persistent and Non-persistent connections, http message format, cookies, proxy server, conditional GET, File Transfer Protocol. Email: SMTP, mail message formats, mail access protocols: POP3, IMAP, MIME. **DNS:** Services, how it works, Root, Top-Level and Authoritative DNS servers, Resource Records, DNS messages. A simple Introduction to p2p files distribution: Bit Torrent	**10**
3	**Transport Layer**: Introduction and Services, Transport layer in internet, Difference between Connection Oriented and Connectionless services. UDP: Segment structure, checksum in UDP. **TCP**: the principles behind connection-oriented data transfer, stop-and-wait, Go Back N, Selective Repeat. Connection Establishment, TCP header, Round Trip Time, designing a reliable data transfer protocol.	**8**
4	**Network Layer**: Network Layer Design Issues, Packet Forwarding and Routing, Difference between Virtual Circuits and Datagram networks, The Internet Protocol (IP), Datagram format, IP fragmentation, IPv4 addressing, subnets, CIDR, classful addressing, DHCP, Network Address Translation (NAT). IPv6 Header, Moving from IPv4 to IPv6: tunneling, dual stack and header translation. **Routing Algorithms**: Link state (LS), Distance Vector (DV). Routing in the Internet: RIP, OSPF & BGP.	**10**
5	**Link Layer and Local Area Network**: **Introduction and Services**: Service provided by the LL, Implemented. Error-Detection and Correction Techniques: Parity checks, Check-summing methods, Cyclic Redundancy Check (CRC). Multiple Access protocols: Channel partitioning, Random access. **Ethernet**: Frame structure, CSMA/CD, Ethernet technologies. **Signals-** analog and digital signals, periodic and a periodic signal, Digital Data Conversion: unipolar, polar, bipolar. **Analog data conversion**: - PAM, PCM, sampling. Modulation techniques: - ASK, FSK, PSK, AM, FM, PM.	**12**

10. Suggested Books:

SL. No.	Name of Authors/Books/Publishers	Edition	Year of Publication /Reprint
	Text Books		
1.	James F. Kurose and Keith W. Ross, Computer Networking: A Top-Down Approach,Prentice Hall.	7th	2017

2.	Andrew S. Tanenbaum and David J. Wetherall, Computer Networks, Pearson	5th	2014
3.	Computer Networks: A Top-Down Approach by Behrouz A. Forouzan and Firouz Mosharraf. New York, NY: McGraw-Hill.	6th	2012

12.	**Mode of Evaluation**	Test / Quiz / Assignment / Mid Term Exam / End Term Exam / Lab Exam

GRAPHIC ERA (DEEMED TO BE UNIVERSITY), DEHRADUN

SEMESTER I

Name of Program: - **Master of Computer Applications**

1. Subject Code: **TMC 103** Course Title: **Programming and Problem-Solving**
2. Contact Hours: **L:** 3 **T**: 0 **P**: 0
3. Examination Duration (Hrs): **Theory** 3 **Practical** 0
4. Relative Weight: **CIE** 25 **MSE** 25 **SEE** 50
5. Credits: 3
6. Semester: 3
7. Category of Course: **DC**

8. **Course Outcome:**	After completion of the course the students will be able to**:** **CO-1.** Describe the fundamental concepts of computational thinking and problem-solving strategies. [L-1] **CO-2.** Demonstrate the use of arrays, strings, structures, and unions in the 'C' programming language. [L-3] **CO-3.** Demonstrate the use of re-useable code using functions in 'C'. [L-3] **CO-4.** Describe and implement file handling mechanism in 'C' programs. [L-3]

*** Describe the specific knowledge, skills or competencies the students are expected to acquire or demonstrate.*

9. Details of the Course:

Sr. No	Units	
1	**Unit 1 – Computational Thinking, Problem Solving, and Programming Concepts** **Computational Thinking -** • What is computational thinking? • Computational thinking approaches • Information and Data – Converting Information to Data • Data Types and Encoding **Problem-Solving and Programming Concepts –** • Problem-Solving techniques, Algorithms, Flowcharts, Pseudocode • Classification and Characteristics of programming language • Programming paradigms: Procedure-oriented programming, Object-oriented programming languages	
2	**Unit 2: Introduction to C Programming, Variables and constants, Operators and**	

	Expressions, Input/Output functions in C **Introduction to 'C' Programming -** • Characteristics of 'C', Structure of C Program, The life cycle of the C Program • First C Program • Commands to run a C Program, Comments Style in 'C', Programming errors - Syntax error and semantic errors, Logical and runtime errors **Variables and Constants -** • C Character Set, Identifiers and keywords, Variables and constants, Escape sequence • Data Types **Operators and Expressions in C -** • Assignment Operators, Arithmetic Operators, Relational Operators, Logical Operators • Increment and Decrement Operators, Conditional Operators, Typecast Operators, Sizeof Operator, Associativity and precedence of operators, Evaluation of Expressions **Input/Output (I/O) Functions -** • Types of I/O Functions o Unformatted I/O Functions: getchar(), putchar(), gets(), puts(), getch(), putch() o Formatted I/O functions: Format specifiers, scanf(), printf()	
3	**Unit 3: Conditional and Control Statements, Functions** **Conditional and Control Statements -** • Conditional Branching Statements o If statement, If then else statement, Nested if, Switch Statement • Loops o For loop, While loop, Do While loop • Jump Statement o break, continue, goto, return **Functions -** • Library functions • Function declaration and definition, Function prototype and call, Return Statement • Function with and without arguments, Function with and without return value • Function call by value and call by reference, Advantages of functions • Function call stack and activation records, Recursive functions, Recursive Vs Iterations • Examples of recursive functions, Static and Dynamic Linking	
4	**Unit 4: Pointers, Arrays, and Strings** **Pointers -** • Pointers and their characteristics, Pointer declaration and assignment • Dereferencing pointer variables, Pointer arithmetic, Pointers and functions • Dynamic memory allocation – malloc(), calloc() realloc(), free() functions • Memory leak and segmentation fault • Debugging and Testing **Arrays -** • Single-dimensional array o Array declaration, Accessing elements of an array, Initialization, Array operations (insert, delete, sort, and search) • Two-dimensional arrays o Declaration of a 2D array, Initialization, Operations on Matrices (addition, product, transpose)	

	Strings - • Declaration and initialization of strings, Input and Output of strings, Formatting strings • String handling functions	
5	**Unit 5: Structures and Unions, File Handling** **Structures and Unions –** **Structures -** • Need of structures, Declaring and defining a structure, Initialization of structure variables • Accessing structure members, assignment of structure variables, Size of a structure • Array of structures, Structure with arrays, Nested structure, Structures and functions • Structures and Pointers, Self-referential structure **Unions -** • Declaring and defining a union, Initialization and access of union variables, Size of a union • Nested unions, Difference between Structure and Union **File Handling -** • Types of files • File modes, Opening, closing, and end of a file • Character I/O functions - fputc() , fgetc(), Integer I/O functions - putw(), getw(), String I/O functions - fputs(), fgets(), Formatted I/O functions - fprintf(), fscanf(), Block Read/Write functions - fwrite(), fread(), Random access to a file - fseek(), ftell(), rewind() • Error handling in files	

10. Suggested Books:

S.No	Name of Authors/Books/Publishers	Edition	Year of Publication / Reprint
	Textbooks		
1.	David D. Riley and Kenny A. Hunt, "Computational thinking for the Modern Problem Solver", Chapman & Hall/CRC	3rd	2014
2.	Yashavant Kanetkar, ©"Let Us C", BPB Publication	14th	2016
	Reference Books		
1.	Charles H. Roth Jr., Fundamentals of Logic Design, Wadsworth Publishing	5th	2005
2.	John P Hayes, Computer Architecture and Organization, McGraw Hill	3rd	2017

12.	**Mode of Evaluation**	Test / Quiz / Assignment / Mid Term Exam / End Term Exam

GRAPHIC ERA (DEEMED TO BE UNIVERSITY), DEHRADUN

SEMESTER I

Name of Program: - **Master of Computer Applications**

1. Subject Code: **TMC 104** Course Title: Advanced Operating Systems
2. Contact Hours: **L:** **3** **T**: **0** **P**: **0**
3. Examination Duration (Hrs): **Theory** **3** **Practical** **0**
4. Relative Weight: **CIE** **25** **25** **SEE** **50**
5. Credits: **3**
6. Semester: **I**
7. Category of Course: **Core**

8. Course Outcomes:

	After completion of the course the students will be able to**:** **CO-1**. List the functions and purposes of modern operating systems. [L-1] **CO-2**. Describe the file and storage management concepts. [L-2] **CO-3.** Differentiate between the protection and security features of an operating system and its implementation mechanisms. [L-4] **CO-4**. To interpret the concept of virtualization and describe its advantages, and need. [L-5] **CO-5.** To analyze and compare the design, features, and functionality of Linux, and Windows operating systems through a case study. [L-5]

*** Describe the specific knowledge, skills or competencies the students are expected to acquire or demonstrate.*

10. Details of the Course:

SL. NO.	Contents	Contact Hours
1	**Unit 1:** **File and Storage Management** • Overview of OS Objectives and Functions, Files and File systems, File organization and Access, File Directory and Sharing, Secondary storage management **Protection and Security** Goals of Protection, Principles of Protection, Domain of Protection, Access Control	**10**

	Unit 2: **Real-Time Operating System (RTOS)** • Background, Characteristics of Real-Time Operating Systems, Types of RTOS • RTOS kernel and function, Task Management, Real-Time Scheduling, Application Example	10
2	**Unit 3:** **Distributed Systems** • Advantages of Distributed Systems, Distributed Operating Systems, Types of Distributed Operating Systems, Robustness and Design Issues of Distributed OS **Parallel Systems** • Definition, Parallel vs Distributed Systems, Example, Types of Parallel Systems: Overview	**10**
3	**Unit 4:** **Virtualization** • Definition, Advantages, and Needs, Types, Building Block Diagram, Example **Cloud Operating Systems** Goals and working, Examples of Cloud Operating Systems	**10**
4	**Unit 5:** **Case Studies** A comparative analysis of Linux and Windows 7 operating systems based on, • Architecture, Process Management, Memory Management, Security features	**10**
	Total	**50**

11. Suggested Books:

SL. No.	Name of Authors/Books/Publishers	Edition	Year of Publication / Reprint
	Textbooks		
1.	Abraham Silberschatz, Peter B Galvin, Greg Gagne, "Operating System Concepts", Wiley India Pvt. Ltd .	9th	**2018**
2	William Stallings, "Operating Systems Internals and Design Principles", Pearson ,	9th	**2018**
3	Andrew S. Tanenbaum, "Distributed Operating Systems", Pearson .	9th	2018

12.	**Mode of Evaluation**	Test / Quiz / Assignment / Mid Term Exam / End Term Exam

GRAPHIC ERA (DEEMED TO BE UNIVERSITY), DEHRADUN

SEMESTER I

Name of Program - **Master of Computer Applications**

1. Subject Code: TMC 105 Course Title: **Cloud Computing**
2. Contact Hours: **L:** 3 **T**: 0 **P**: 0
3. Examination Duration (Hrs): **Theory** 3 **Practical** 0
4. Relative Weight: **CIE** 25 **MSE** 25 **SEE** 50
5. Credits: 3
6. Semester: I
7. Category of Course: **DSE**

8. **Course Outcome**:**	After completion of the course the students will be able to**:** **CO-1.** Classify various cloud computing services and models[L-2]. **CO-2.** Use different compute services in cloud with a case study[L-3]. **CO-3.** Analyze the benefits and challenges of using cloud-based data storage in comparison to traditional on-premises storage. [L-4]. **CO-4.** Evaluate the trade-offs between different database features and characteristics, such as consistency, durability, and query capabilities. [L-5]. **CO-5.** Illustrate various security mechanisms and services available for securing network traffic, such as virtual private clouds (VPCs), network security groups (NSGs), and web application firewalls (WAFs). [L-4]. **CO-6.** Explain the concept and benefits of a content delivery network (CDN) in distributing and delivering content to users. [L-2].

*** Describe the specific knowledge, skills or competencies the students are expected to acquire or demonstrate.*

9. Details of the Course:

Sl. No.	Contents	Contact Hours
1	**Unit 1:** **Fundamentals of Cloud Computing** • Introduction • Cloud Types • Deployment Models • Service Models • Virtualization • Cloud architecture **Case Study: Amazon Web Services, Microsoft Azure.**	10

2	**Unit 2:** **Compute Services of Cloud Computing** • Compute Node Architecture • Types of Compute nodes: Virtual Machines & Containers • Configuration of Compute node. **Case study: Amazon EC2, Virtual Box, Docker.**	9
3	**Unit 3:** **Storage Services in Cloud Computing** • Introduction to Cloud based Data Storage • Advantages and disadvantages of Cloud based data Storage • Types of cloud storage: File storage, • Block storage-Elastic Block Storage. • Storage for backups • **Case Study: Amazon S3, EBS, EFS, Glacier**	9
4	**Unit 4:** **Database Servies in Cloud Computing** • Need for Cloud Databases, Consideration for databases, Database architecture • Data Models, Relational Databases, key-value based databases • Time series databases • **Case study: Amazon RDS, DynamoDB**	9
5	**Unit 5:** **Networking and Security Services** • Building Cloud network • Scaling Cloud Network • Securing Network Traffic • Content Delivery Network • **Case study: Amazon VPC, Route S3**	9
	Total	**46**

10. Suggested Books:

SL. No.	Name of Authors/Books/Publishers	Edition	Year of Publication / Reprint
	Textbooks		
1.	Furht, Borivoje, and Armando Escalante, 2010, Handbook of cloud computing. Vol. 3. New York: springer.	3rd	2010
2	Kavis, Michael J., Architecting the cloud: design decisions for cloud computing service models (SaaS, PaaS, and IaaS). John Wiley Sons	8th	2014
	Reference Books		
1.	Wittig, Michael, Andreas Wittig, and Ben Whaley, 2018, Amazon web services in action. Manning	10th	2018

12.	**Mode of Evaluation**	Test / Quiz / Assignment / Mid Term Exam / End Term Exam

GRAPHIC ERA (DEEMED TO BE UNIVERSITY), DEHRADUN

SEMESTER I

Name of Department: - **Master of Computer Applications**

1. Subject Code: **TMC 106**

   Course Title: Career Skills

2. Contact Hours: **L:** 3 **T**: 0 **P** 0

3. Examination Duration (Hrs): **Theory** 3 **Practical** 0

4. Relative Weight: **CIE** 25 **MSE** 25 50

5. Credits: 3

6. Semester: I

   Core

Learning Outcomes:

LO 1 Solve the different types of questions based on orientation of direction and understanding of distances and turns.

LO 2 Apply the concept of blood relations and learn to draw a family tree using the different notations.

LO 3 Analyze the relation between speed, distance and time to effectively solve the problems of relative speed, boats and streams and trains.

LO 4 Apply the concepts of Ratio and Proportion to solve the different types ofquestions in mixtures and solutions.

LO 5 Comprehend different types of data sets used in Data Interpretation and use quick calculation techniques for solving different types of questions.

LO 6 Discern an understanding of grammatical structures using the Concept of Subject Verb Agreement, conditionals, Tenses etc. in conversations and discussions including academic discourse settings.

UNIT 1: **7 Hours**
(7 hours lecture)

Introduction to Reasoning, Basic concept and understanding of directions including the orientation of the 4 basic directions of east, west, north and south. Understanding turns of different degrees towards right, left, clockwise and anticlockwise.

Basic concept of coding-decoding using alphabets, digits, words and their combinations. Understanding and practice of different questions in coding decoding.

Basic concept of series completion using numbers, alphabets, and their combinations thereof. Understanding of different types of series (based on differences, based on products, based on exponentials). Practice of different questions in coding decoding.

Blood relation concepts including basic introduction, making a family tree, standard notations and names for gender and relations. Discussion of different types of questions asked in blood relations, their solutions and practice.

UNIT 2: **6 Hours**
(6 hours lecture)

Understanding the concept of set theory, clocks, calendar,

Understanding the concept and application of relative speed and practice of problems based on trains and boats and streams.

UNIT 3: **6 Hours**
(6 hours lecture)

Concept of ratio proportion and its application. Concept, understanding and practice of mixtures and solutions including alligation and replacement of part of a solution.

Concept and understanding of Chain Rule, Partnership and its application. Practiceof problem based on age related concepts.

Concept and understanding of average, weighted average and its application. Practiceof problem based on age related concepts.

UNIT 4: **6 Hours**
(2 hours lecture + 3 hours tutorial)

Logarithm with its different properties and applications.

Concept of percentage and percentage equivalent of fractions, multiplication factor, importance and understanding of the base in calculations, concept and application ofthe successive percentage change rule.

Concept and understanding of simple and compound interest and their difference, understanding CI as an application of the successive percentage change rule, conceptof effective rate of interest and practice of all the types of problems in SI and CI.

UNIT 5: **5 Hours**
(4 hours lecture)

Introduction to Data Interpretation (DI), understanding different methods of data representation including tabular, bar graph, pie chart, line graph and caselet. Techniques of quick arithmetic calculations, concepts of percentage as applicable in DI, growth and growth rate and practice of various DI sets.

UNIT 6: Applied Grammar & Usage I

(7hours lecture+3hours tutorial)

a. Subject Verb Agreement
b. Conditionals
c. Comparison Based Errors (Adjectives)
d. Tenses

UNIT 7 : Sentence Completion
(3hours lecture + 2 hours tutorial)

Application of Vocabulary (Pure and Contextual)

Reference books and study material:

1. Lalit Singh and P.A.Anand, verbal ability and reasoning for competitive exams, Wiley
2. R.S.Aggarwal, verbal and non-verbal reasoning for competitive exams.
3. Shakuntala Devi, puzzles to puzzle you, Orient Paperbacks.

4. George Summers, puzzles and teasers, Jaico Publishing.
5. P.A.Anand, reasoning book, Savera publication.
6.Arihant Publications ,Objective General English.