MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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

Flexible Scheme
2022-2023

B.Tech.

in

Mathematics and Computing

Department of Engineering Mathematics and Computing

Madhav Institute of Technology & Science, Gwalior-474005

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(A Govt. Aided UGC Autonomous & NAAC Accredited Institute affiliated to RGPV, Bhopal)
Department of Mathematics & Computing
Scheme of Evaluation
B. Tech. I Semester (Mathematics & Computing)

(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				L	T	P				
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem. Exam	$Proficiency in subject /course	Mid Sem. Exam.	Quiz/Assignment		Lab Work & Sessional	Skill Based Mini Project								
1.	250121	DC	Introduction to Computing	50	10	20	20	-	-	-	100	3	-	-	3	Blended	MCQ	1.5 Hrs
2.	250122	DC	Introduction to Computer Programming	50	10	20	20	60	20	20	200	3	-	2	4	Offline	AO	2 Hrs
3.	250123	DC	Statistical Methods	50	10	20	20	-	-	-	100	3	1	-	4	Offline	PP	2 Hrs
4.	250124	DC	Element of Calculus	50	10	20	20	-	-	-	100	3	1	-	4	Offline	PP	2 Hrs
5.	250125	DC	Computer Architecture & Organization	50	10	20	20	-	-	-	100	3	-	-	3	Blended	MCQ	1.5 Hrs
6.	250126	DLC	Computing Lab	-	-	-	-	60	20	20	100	-	-	2	1	Offline	SO	-
	Total			**250**	**50**	**100**	**100**	**120**	**40**	**40**	**700**	**15**	**02**	**04**	**19**	**-**	**-**	**-**
7.	3000004	Natural Sciences & Skills	Language	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 Science/ Language

MCQ: Multiple Choice Question   **AO:** Assignment + Oral   **OB:** Open Book   **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	
		Offline	Online						
11	-	4	2	2	2	1	3	1	19
57.89	-	21.05	10.52	10.52	28.57	14.28	42.85	14.28	

Syllabus

B.Tech.

in

Mathematics and Computing

(July- Dec. -2022)

Department of Engineering Mathematics and Computing

Madhav Institute of Technology & Science, Gwalior-474005

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE GWALIOR

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Department of Engineering Mathematics and Computing
B. Tech. (First Semester)

Introduction to Computing
(MAC-250121)

L	T	P	C
3	0	0	3

Course Objectives:

- Explain the needs of hardware and software required for a computation task.
- State typical provisions of cyber law that govern the proper usage of Internet and computing resources.
- Explain the working of important application software and their use to perform any engineering activity.
- Demonstrate the use of Operating system commands and Data Base Management System.

Unit 1:
Computer: Definition, Classification, Organization i.e. CPU, register, Instruction set, Memory & Storage Systems, I/O Devices, and System & Application Software. Operating System: Definition, Function, Types, Management of File, Process & Memory, Introduction to Assemblers, Interpreters, Compilers and Debuggers.

Unit 2:
Computer Networking: Introduction, Introduction to Internet, World Wide Web, E-commerce Computer Security Basics: Introduction to viruses, worms, malware, Trojans, Spyware and Anti-Spyware Software, Different types of attacks like Money Laundering, Information Theft, Email spoofing, Hacking Spamming, Cyber Defamation, pharming Security measures Firewall, Computer Ethics & Good Practices

Unit 3:
Data base Management System: Introduction, File oriented approach and Database approach, Data Models, Architecture of Database System, Data independence, Data dictionary, DBA, Primary Key, Data definition language and Manipulation Languages.

Unit 4:
Concept of operating system, Evolution of operating system, Types of OS. System Call, Handling System Calls, System Programs, Operating System Structures, The Shell, Open Source Operating Systems, A brief history of LINUX, architecture of LINUX, features of LINUX, Introduction to vi editor.

Unit 5:
Career opportunities Entrepreneurship, Start up: Scope, Funding Opportunities, Other career opportunities; Case Studies Success stories of Google, Facebook, Walmart, Uber etc. in socio-economic progress.

Course Outcomes
After completing this course, the students will be able to:

CO's	Description of CO's
CO1	Explain core components of computing and linking
CO2	Explaining ideas of networking aspect of computer engineering and communication
CO3	Apply knowledge of database system
CO4	Summarizing role of operating system
CO5	Implementing the role of computing in real world applications

RECOMMENDED BOOKS:
1. J. Glenn Brookshear, and Dennis Brylow: Computer Science: An Overview, Pearson, 2010
2. V. Rajaraman, Neeharika and A Dabala: Fundamentals of Computers, PHI, 2011
3. Peter Norton, Introduction to Computers:McGraw Hill Education, 2nd , 2012
4. PradeepSinha: Introduction to Computer Science: A Textbook for Beginners in Informatics, BPB Publication, 6th Ed.2015.
5. Patt Yale: Introduction to Computing Systems,McGraw Hill Education Ind=ia, 2nd, 2014

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Department of Engineering Mathematics and Computing
B. Tech. (First Semester)
Introduction to Computer Programming

(MAC – 250122)

L	T	P	C
3	0	2	4

Course Objective:

- Develop ability to write a computer program to solve specified problems.
- Develop skills in algorithmic problem-solving, expressed in a programming language like C.
- Learn what computer science is about, especially hardware, data representations, algorithms, encodings, form of programming.
- Understand fundamentals of programming such as variables, conditional and iterative statement, function and its execution etc.

Unit 1:

Introduction to Programming, Machine Level Languages, Assembly Level Languages, High Level Languages, Program Execution and Translation Process, Problem solving using Algorithms and Flowcharts. Introduction to Programming: Data Types, Constants, Keywords, Operators & Expressions, Precedence of operators and input/output functions.

Unit 2:

Control Statements and Decision Making: The go to statement, The if statement, The if-else statement, Nesting of if statements, The conditional expression, The switch statement, The while loop, The do…while loop, The for loop, The nesting of for loops, The break and continue statement.

Unit 3:

Arrays, Strings & Pointers: One dimensional Arrays, Passing Arrays to Functions, Multidimensional Arrays, Strings, Basics of Pointers & Addresses, Pointer to Pointer, Pointer to Array, Array of Pointers, Types of pointers, Pointer to Strings.

Unit 4:

Functions & Structures: Function Basics, Function Prototypes, Passing Parameter by value and by reference, Passing string to function, Passing array to function, Function returning address, Recursion, Structures & Union, Pointer to Structure, Self-Referential Structures, Dynamic memory allocation by call of function, Storage Classes.

Unit 5:

File Handling: Defining and Opening a file, Closing Files, Input/output Operations on Files, Predefined Streams, Error Handling during I/O Operations, Command Line Arguments, Pre-processor, Directives, Formatted I/O.

Course Outcomes:

After completing this course, the students will be able to:

CO's	Description of CO's
CO1	Recognizing the concept of programming Languages.
CO2	Testing the principles of imperative and structural programming.
CO3	Apply the concept of Arrays and Pointer in programming
CO4	Illustrate the problems and choose suitable programming techniques to develop solutions
CO5	Implementing input/ output operations and basic commands

Reference Books

1. E. Balagurusamy: Programming in ANSI C, Tata McGraw Hill,Sevenths Edition, 2017.
2. ReemaThareja: Programming in C, Oxford publication, Second Edition , 2016.
3. W. Kernighan and Dennis M. Ritchie: The C Programming Language, Pearson , 2015.
4. Matthias Felleisen, Robert BruceFindler , Mathew Flatt, ShriramKrishnamurthi: How to Design Programs: An Introduction to Programming and Computing, MIT Press,Second Edition, 2018.
5. E. Balagurusamy: Object Oriented Programming with C++, Tata McGraw Hill, 2009.
6. B.S. Gottfried: Programming with C, Tata McGraw Hill,3rd Edition, 2018.

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Department of Engineering Mathematics and Computing
B. Tech. (First Semester)
Statistical Methods
(MAC - 250123)

L	T	P	C
3	1	0	4

Course Objective
- To have knowledge of Data and Central Tendency
- To describe Concept of probability theory and distribution
- To familiarize Correlation and Regression
- To know about the Sampling and Hypothesis analysis

Unit 1:

Data: quantitative and qualitative, attributes, variables, scales of measurement nominal, ordinal, interval and ratio. Presentation: tabular and graphical, including histogram and ogive, Measures of Central Tendency, Measures of Dispersion: range, quartile deviation, mean deviation, standard deviation, coefficient of variation, Moments and moment generating function, skewness and kurtosis.

Unit 2:

Definition of Bivariate, Correlation and Regression analysis, rank of correlation, Coefficient of correlation, Principle of least squares and Curve fitting (polynomials and exponential curves).

Unit 3:

Basic concept of Probability, Compound probability, Conditional Probability, Bayes' theorem, Definition of random variable, discrete and continuous random variables, functions of random variables, probability mass function and probability density function with illustrations, concepts of expectation, Probability distribution function, discrete and continuous Probability distribution, Binomial, Poisson, Normal, Exponential, uniform distribution

Unit 4:

Sampling Theory, Methods of sampling, sampling distribution of a statistic, types of sampling, test of significance, Weak law of large numbers, Central Limit Theorem, Theory of estimation, types of estimation, interval estimation for large sampling, Maximum likelihood estimator

Unit 5:

Testing of hypothesis, Null and alternative hypothesis, Chi-square χ^2 distribution, t-distribution, Fisher's Z-distribution, Analysis of variance.

Course Outcomes
After completing this course, the students will be able to:

CO's	Description of CO's
CO1	Determine the Central of tendency, Skewness and Kurtosis.
CO2	Acquire the knowledge of correlation and regression analysis
CO3	Evaluate the Probability distributions
CO4	Analyze the sampling and estimation
CO5	Validate the test using hypothesis.

Recommended Books:

1. M Ray and H.S. Sharma:Mathematical Statistics, Ram Prasad Publications, 3rd Edition 2017.
2. V. K. Kapoor, S.C. Gupta: Statistical Methods, S. Chand& Company, 11th Edition 2018.
3. T. Veerarajan: Probability, Statistics and Random Processes, McGraw Hill, 3rd Edition 2008.
4. S. M. Rose: Introduction to Probability Models, Elsevier, 10th Edition 2011.

Department of Engineering Mathematics and Computing

B. Tech. (First Semester)
Elements of Calculus
(MAC-250124)

L	T	P	C
3	1	0	4

Objective of Course

- To understand the basic concepts of differential calculus
- To explore the applications of derivatives
- To familiarize the integral calculus
- To describe multiple integral
- To understand the concepts of Convergence and divergence

Unit 1:
Maclaurins's and Taylor's theorem, Partial differentiation, Euler's theorem, Tangent and Normal, Maxima and Minima of one and two variables.

Unit 2:
Jacobian, Rolle 's Theorem, First mean value theorem, Second mean value theorem, Curvature, radius of curvature, Asymptotes of Cartesian and Polar forms.

Unit 3:
Definite integral as limit of a sum, application in summation of series, Improper integral, Beta and Gamma function and its properties, some transformation of Beta function, some transformations of Gama function, relation between Beta and Gama function, Legendre's duplication formula.

Unit 4:
Multiple integral and their applications, Double and Triple integral, Change of order of integration, Length of the curves, Volumes and Surfaces of solids of revolution.

Unit 5:
Concept of convergence and divergence, Basic test of convergence for sequence and series, P-Series test, Ratio test, Comparison test, Integral test, Cauchy's root test, Test of convergence and divergence of improper integral.

Course Outcomes
After completing this course, the students will be able to:

CO's	Description of CO's
CO1	Applying various theorems to expand the functions of one and two variables.
CO2	Demonstrate the application of derivatives
CO3	Examine the various integrals
CO4	Evaluate the volume and area of surface by using multiple integrals
CO5	Summarising the various convergence test

Recommended Books:
1. E. Kreyszig: Advance Engineering Mathematics, John Wiley & Sons, 10th Edition (2011).
2. R. K. Jain, S. R. K. Iyengar: Advance Engineering Mathematics,Narosa Publishing House Pvt.Ltd, 5th Edition (2016).
3. F. B. Hildebrand: Advanced Calculus for application, Englewood Cliffs, N. J. Prentice- Hall, 2nd Edition (1980).
4. B. S. Grewal: Higher Engineering Mathematics, Khanna Publishers, 43rd Edition (2015).
5. B.V. Ramanna: Higher Engineering Mathematics, McGraw Hill, 1st Edition (2017).

Department of Engineering Mathematics and Computing

B. Tech. (First Semester)
Computer Architecture & Organization
(MAC-250125)

L	T	P	C
3	0	0	3

Course Objectives:
- To explain the computer architecture
- To understand the and CPU
.• To Explore the arithmetic operation
- To ability of recall the knowledge of understand memory organization and Input –output

UNIT-I

Introduction to Computer Architecture. Von Neuman Architecture, Flynn Classification.
Register Transfer and Micro operations: Register transfer language, Arithmetic Micro-operations, Logic Micro-operations, Shift Micro-operations, Bus and memory transfers. Computer Organization and Design: Instruction cycle, computer registers, common bus system, computer instructions, addressing modes, design of a basic computer

UNIT-II

Central Processing Unit: General register organization, stack organization, Instruction formats, Data transfer and manipulation, program control. RISC, CISC characteristics. Pipeline and Vector processing: Pipeline structure, speedup, efficiency, throughput and bottlenecks. Arithmetic pipeline and Instruction pipeline.

UNIT-III

Computer Arithmetic: Adder, Ripple carry Adder, carry look Ahead Adder, Multiplication, Add and Shift, Array multiplier and Booth Multiplier, Division, restoring and Non-restoring Techniques, Floating Point Arithmetic, Floating point representation, Add, Subtract, Multiplication, Division.

UNIT-IV

Memory organization : Memory Hierarchy, Main memory, Associative Memory, Cache memory-organization and mappings , Virtual memory, Memory management, Introduction to pipelining & Multiprocessor.

UNIT-V

Input –output organization : peripheral devices, I/O interface, Asynchronous Data transfer, Modes of transfer, priority interrupt, DMA (DMA controller, DMA transfer), Input output processor (IoP), Data Transfer- Serial, parallel , Simplex, Half Duplex, Full Duplex.

Course Outcomes:

After completing this course student will be able to:

CO's	Description of CO's
CO1	Acquire the knowledge of Computer Architecture
CO2	Understand the theory and architecture of central processing unit.
CO3	Analyze the arithmetic requirements for a problem
CO4	Learn the concepts of memory organization
CO5	Acquire in a better way the Input -Output of the system.

Recommended Books:

1. Computer Organization and Architecture –William Stallings Sixth Edition, PHI Fundamentals of Computer organization and design- Sivaraama Dandamudi, Springer
2. Structured Computer Organization- Andrew S Tanenbaum, Fourth Edition PHI.
3. Computer Organization and Architecture - William Stallings (Pearson Education Asia)
4. Computer Organization and Architecture -John P. Hayes (McGraw -Hill)
5. Computer Organization -V. Carl. Hamacher (McGraw-Hill)