

UNIVERSITY OF JAMMU

(NAAC ACCREDITED 'A' GRADE' UNIVERSITY)
Baba Sahib Ambedkar Road, Jammu-180006 (J&K)

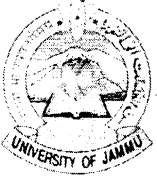
Academic Section

Email: academicsectionju14@gmail.com

NOTIFICATION (22/Nov./Adp/67)

It is hereby notified for the information of all concerned that the Vice-Chancellor, in anticipation of the approval of the Academic Council, is pleased to authorize the adoption of the revised Syllabi and Courses of Study in the subject of M.Tech (Computer Science) of Master Degree Programme for 1st to IV Semesters under the Choice Based Credit System (through regular mode) in the main campus for the examinations to be held in the years as per the details given below:-

Semester	Course Code	Course Title	Percentage (%) Change	For the examination to be held in the year	Remarks
1	PSMTTC-101	Advanced Data Structure	Nil	Dec. 2022, 2023 and 2024	
	PSMTTC-102	Computer Architecture	Nil	Dec. 2022, 2023 and 2024	
	PSMTTC-103	Operating System Concepts & Design	Nil	Dec. 2022, 2023 and 2024	
	PSMTTC-104	Advanced Mathematical Structures	Nil	Dec. 2022, 2023 and 2024	
	PSMTTC-105	Algorithmic Paradigms and Analysis	Nil	Dec. 2022, 2023 and 2024	
2	PSMTTC-201	Computer Graphics	Nil	May 2023, 2024 and 2025	
	PSMTTC-202	Network Security and Cryptography	Nil	May 2023, 2024 and 2025	
	PSMTTC-203	Data Warehousing and Data Mining	60%	May 2023, 2024 and 2025	
	PSMTTC-204	Internet Technologies	Nil	May 2023, 2024 and 2025	
	PSMTTC-205	Optimization Techniques	Nil	May 2023, 2024 and 2025	
3	PSMTTE-302	Artificial Intelligence	Nil	Dec., 2023, 2024 and 2025	
	PSMTTE-303	Image Processing	Nil	Dec., 2023, 2024 and 2025	
	PSMTTE-304	Natural Language Processing	Nil	Dec., 2023, 2024 and 2025	
	PSMTTE-305	Big Data Analytics using R	Nil	Dec., 2023, 2024 and 2025	
	PSMTTE-307	Internet of Things	Nil	Dec., 2023, 2024 and 2025	
	PSMTTE-311	VLSI and Embedded Systems	100%	Dec., 2023, 2024 and 2025	Course code changed (core to elective)
	PSMTTC-308	Research Methodology	Nil	Dec., 2023, 2024 and 2025	
	PSMTDC-310	Dissertation (Phase-I)	Nil	Dec., 2023, 2024 and 2025	
	PSMTTC-312	Machine Learning using Python	100%	Dec., 2023, 2024 and 2025	New Course introduced
4	PSMTDC-401	Dissertation (Phase-II)	Nil	May 2024, 2025 and 2026	



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The Syllabi of the courses are available on the University website: www.jammuuniversity.ac.in

- i) If the change in the Syllabi and Courses of Study is less than 25%, no alternative question papers be set.
- ii) If the change is 25% and above but below 50%, alternative question papers be set for one year.
- iii) If the change is 50% and above or whole scheme is changed, alternative question papers be set for two years.

Sd/-

DEAN ACADEMIC AFFAIRS

No. F. Acd/II/22/9186-9225

Dated: 07-11-2022

Copy to:

1. Dean, Faculty of Mathematical Sciences
2. HOD/Convener, Board of Studies in Computer Science & IT
3. All members of the Board of Studies
4. C.A. to the Controller of Examinations
5. Director, Computer Centre, University of Jammu
6. Asst. Registrar (Conf. /Exams. UG)
7. Incharge University Website for necessary action please

Sumitashama
Deputy Registrar (Academic) 7/11/22
8
7/11/22

M. TECH. (COMPUTER SCIENCE)

SYLLABUS

UNDER

CHOICE BASED CREDIT SYSTEM

FOR THE STUDENTS

TO BE ADMITTED IN THE SESSIONS

2022-2023, 2023-2024, 2024-2025

**DEPARTMENT OF COMPUTER SCIENCE & IT,
UNIVERSITY OF JAMMU**



M.TECH. (CS) COURSE STRUCTURE**Semester-Wise Distribution of Courses and Credits****SEMESTER-I**

S. No.	Course Code	Course Title	*L-T-P	Credits	External Marks	Internal Marks	Total
1	PSMTTC-101	Advanced Data Structure	3-1-0	4	60	40	100
2	PSMTTC-102	Computer Architecture	3-1-0	4	60	40	100
3	PSMTTC-103	Operating System Concepts & Design	3-1-0	4	60	40	100
4	PSMTTC-104	Advanced Mathematical Structures	3-1-0	4	60	40	100
5	PSMTTC-105	Algorithmic Paradigms and Analysis	3-1-0	4	60	40	100
6	PSMTLC-106	Software-Lab-I (Based on the above courses)	0-0-13	6	75	75	150
		TOTAL	33	26	375	275	650

SEMESTER-II

S. No.	Course Code	Course Title	*L-T-P	Credits	External Marks	Internal Marks	Total
1	PSMTTC-201	Computer Graphics	3-1-0	4	60	40	100
2	PSMTTC-202	Network Security and Cryptography	3-1-0	4	60	40	100
3	PSMTTC-203	Data Warehousing and Data Mining	3-1-0	4	60	40	100
4	PSMTTC-204	Internet Technologies	3-1-0	4	60	40	100
5	PSMTTC-205	Optimization Techniques	3-1-0	4	60	40	100
6	PSMTLC-206	Software-Lab-II (Based on the courses above)	0-0-13	6	75	75	150
		TOTAL	33	26	375	275	650



SEMESTER-III

S. No.	Course Code	Course Title	*L-T-P	Credits	External Marks	Internal Marks	Total
1	As per course opted	Elective	3-1-0	4	60	40	100
2	PSMTTC-312	Machine Learning using Python	3-1-0	4	60	40	100
3	PSMTTC-308	Research Methodology	2-2-0	4	60	40	100
4	PSMTLC-309	Software-Lab-III (Soft-Computing Lab)	0-0-13	6	75	75	150
5	PSMTDC-310	Dissertation (Phase-I)	0-2-0	2	50	50	100
6	Open Course*		--	4	60	40	100
		Total	31	24	365	285	650

*Students shall register for this Course from other Departments of University. He/she may opt for MOOC course of equivalent credits instead.

SEMESTER-IV

S. No.	Course Code	Course Title	*L-T-P	Credits	External Marks	Internal Marks	Total
1	PSMTDC-401	Dissertation (Phase-II)	0-12-24	24	350	200	550
		Total	36	24	350	200	550

*L- Lectures T- Tutorials P- Practical

Elective Courses

PSMTTE-302 Artificial Intelligence

PSMTTE-303 Image Processing

PSMTTE-304 Natural Language Processing

PSMTTE-305 Big Data Analytics using R

PSMTTE-307 Internet of Things

PSMTTE-311 VLSI and Embedded Systems

THE CREDITS INDICATED ARE COMPUTED AS FOLLOWS:

1 hour Lecture per week = 1 credits

1 hour Tutorial per week = 1 credit

1 hour Practical per week = 0.5 credits

CREDIT REQUIREMENTS FOR EARNING M. TECH. (CS) DEGREE

The total credits required for the M.Tech. (CS) programme are 100. The credits are distributed over three categories:

CATEGORIES	DESCRIPTION	CREDITS	
Post-graduate Semester Core Courses (PSCC)	Core Departmental Courses	92	96
Post-graduate Semester Elective Courses (PSEC)	Elective Departmental Courses	04	
Post-graduate Semester Open Category Courses (PSOCC)	Other Department Courses	04	
	TOTAL CREDITS	100	

Course credits assignment

Lectures and Tutorials: One lecture or tutorial hour per week per semester is assigned one credit.

Practical/Laboratory: One laboratory hour per week per semester is assigned half credit.

EVALUATION:

The evaluation system shall comprise of internal examination and university examination for theory papers and practicals for Semester I, II and III. The weightage in each theory and practical paper shall be as follows:

Weightage in each theory paper

Minor Tests : 40 Marks
Major Test : 60 Marks

Weightage in each practical paper

Internal Test : 75 marks
External Test : 75 marks



EXAMINATION:

The examination in each semester shall be as per the detail given below:

THEORY	Syllabus to be covered in the examination	Time allotted for the exam.	Weightage (Marks)
Minor Test I (after one month)	Upto 25%	1½ hours	20%
Minor Test II (after two months)	Upto 50%	1½ hours	20%
Major Test * (after end of semester)	Upto 100%	3 hours	60%
*(i) 80% weightage in Major Test shall be given to those units which have not been covered in the two Minor Tests. (ii) Certain questions may be framed in such a way which may require knowledge of more than one unit or one question may have multiple parts either subjective and/or objective from one or more units i.e. certain questions may be from across units.			
Total			100

PRACTICAL					
Daily evaluation of practical records/ Viva voce etc. (Internal Evaluation)	1.	Viva voce 1	15	35	75
	2.	Viva voce 2	15		
	3.	Practical File	5		
	4.	Internal Exam.+Viva voce 3	25+15	40	
Final Practical performance and viva voce(External Evaluation)	100% syllabus				75
Total					150

SCHEME FOR PAPER SETTING (MAJOR EXAMINATION)

The question paper shall be divided into three sections (A, B & C). No question shall be repeated in the question paper.

Section A

In this section the examiner needs to set 10 objective questions/definitions/fill in the blanks distributed uniformly over the entire syllabus. Each question shall carry 1½ marks and the candidates are required to answer all the questions.

(10 x 1½ = 15 marks)

Section B

There shall be 5 short answer type questions and shall carry 3 marks each. In this section, questions shall be covered from each unit and the candidates are required to answer all the questions.

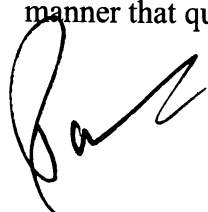
(5 x 3 = 15 marks)

Section C

There shall be 3 long answer type questions each set from Unit –III, IV and V with internal choice. Each question shall carry 10 marks.

(3 x 10 = 30 marks)

Note: The Paper Setter/Examiner is requested to ensure that the question paper be set in such a manner that questions are uniformly distributed over the entire syllabus.



ATTENDANCE:

Each course (theory, practical etc.) shall be treated as an independent unit for the purpose of attendance. A student shall be required to attend a minimum of 75% of the total instruction hours in a course including tutorials and seminars in each semester. A student who fails to secure 75% attendance in a course shall not be eligible to appear in the semester examination in that course and shall be required to repeat that course.

CRITERIA FOR PROMOTION OF A STUDENT TO NEXT HIGHER SEMESTER:

A student will be eligible to proceed from 1st semester to 2nd semester, from 2nd semester to 3rd semester and from 3rd semester to 4th semester, if he/she has earned 50% credits in Theory/Practical Courses cumulatively in earlier semesters of the programme and has completed the minimum attendance requirements.

ABSOLUTE GRADE SYSTEM

Marks	Grades	Grade Points	Description
≥ 90	A+	10	Outstanding
≥ 80 and < 90	A	9	Excellent
≥ 70 and < 80	B+	8	Very good
≥ 60 and < 70	B	7	Good
≥ 50 and < 60	C	6	Average
< 50	D	Fail	Poor

The 'D' grade stands for *unsatisfactory performance*. The student shall have to repeat all the compulsory courses where D grade is obtained. The Weightage of 'D': grade shall not be counted in the SGPA or the CGPA. Other grades would include:

I	-	Incomplete
W	-	Withdrawal
X	-	Continued Project
S	-	Satisfactory Completion
Z	-	Non Completion

CONVERSION FROM CGPA TO PERCENTAGE

The conversion of SGPA or CGPA to Percent score will be carried out by multiplication of respective SGPA or CGPA by a factor of 9.17.

A CGPA of 6 shall be considered equivalent to 55% marks.

DISSERTATION EVALUATION

Each student shall be allotted a supervisor by the Dissertation Committee. The evaluation of the dissertation work phase-I (semester-3rd) shall be done by the dissertation committee including the supervisor.

For dissertation work phase-II (semester-4th), the internal evaluation of the dissertation work shall be done by the dissertation committee including the supervisor. The external evaluation shall be done jointly by the supervisor and the external examiner to be invited by the Head of the Department out of the panel recommended by the BOS. The supervisor shall act as internal examiner for evaluation of the dissertation as well as for the conduct of the viva voce. The head of the department shall remain the overall in charge for both internal as well as external examinations of the dissertation work. One examiner shall be invited for a maximum of ten dissertations depending on the specialization/domain of expertise of the examiner.

M.Tech. (Computer Science) Semester-I

Total Marks = 100

No. of Credits = 4

Time allotted for Major Test = 3 hours

Examination to be held: December 2022, 2023, 2024

COURSE NO: PSMTTC-101

COURSE TITLE: ADVANCED DATA STRUCTURES

Minor Test I = 20 Marks

Minor Test II = 20 Marks

Major Test = 60 marks

Course Objectives & Learning Outcomes:

- To understand the concepts of Data Structures.
- To design and analyze programming problem statements.
- Students would be able to comprehend and select algorithm design approaches in a problem specific manner.
- Students would be able to evaluate algorithms and data structures in terms of time and memory complexity of basic operations.

UNIT-I Linear Structures

Arrays, Linked Lists, Stack, Queue, Priority Queue, Memory Representation, Operations on these Structures, Operation Complexities, Computational and Asymptotic Complexities, Recursion and its types, Applications.

(10 HOURS)

UNIT-II Non-Linear Structures

Trees and Graphs, Binary Trees, Memory Representations, Operations on these Structures, Operation Complexities, Complete Binary Tree, Threaded Binary Trees, Spanning Trees, Topological Sorting, Shortest Path Algorithms, Applications.

(10 HOURS)

UNIT-III Search Lists

Skip Lists, Self organizing Lists, Binary Search Tree Models, Balanced Trees, AVL Trees, 2-3 Trees, 2-3-4 Trees, Red-Black Trees, Top-Down Rebalancing, Finger Trees, Joining and Splitting Balanced Search Trees, m-way Search Trees, B-Trees, B+ Trees, Applications.

(10 HOURS)

UNIT-IV Heaps


Heap, Array-Based Heaps, Heap-Ordered Trees, Half-Ordered Trees, Leftist Heaps, Skew Heaps, Binomial Heaps, Changing Keys in Heaps, Fibonacci Heaps, Heaps of Optimal Complexity, Double-Ended Heaps, Multidimensional Heaps, Applications.

(10 HOURS)

UNIT-V Data Structures for Strings

Strings and Pattern Matching Algorithms, Suffix Arrays, Suffix Trees, Tries, Compressed Tries, Dictionaries, Text Compression, Text Similarity Testing. Hashing, Hash Tables, Collision Resolution, Universal Families of Hash Functions, Perfect Hash Functions, One-way Hash Function, Hash Trees, Extendible Hashing, Membership Testers and Bloom Filters, Applications.

(10 HOURS)



M.Tech. (Computer Science) Semester-I

Contd.

Total Marks = 100

No. of Credits = 4

Time allotted for Major Test = 3 hours

Examination to be held: December 2022, 2023, 2024

COURSE NO: PSM TTC-101

COURSE TITLE: ADVANCED DATA STRUCTURES

Minor Test I = 20 Marks

Minor Test II = 20 Marks

Major Test = 60 marks

Text Books & References:

1. Vishal Goyal, "A Simplified Approach to Data Structures", Shroff Publishers Pvt. Ltd, 2014
2. GAV Pai, "Data Structures and Algorithms", Tata McGraw Hills, 2017
3. Seymour Lipschutz, "Data Structures with C", Schaum Outlines, 2011
4. Reema Thareja, "Data Structures using C", 2nd Edition, Oxford University Press, 2014
5. Peter Brass, "Advanced Data Structures", 1st Edition, Cambridge University Press, 2008.
6. Ellis Horowitz, Sartaj Sahni and Susan Anderson-Freed, "Fundamentals of Data Structures in C", Universities Press (India) Pvt. Ltd, 2008
7. Yedidiah Langsam, Moshe J. Augenstein and Aaron M. Tenenbaum, "Data Structures using C and C++", 2nd Edition, Pearson Prentice Hall, 2007.
8. Adam Drozdek, "Data Structures and Algorithms in C++", 2nd Edition, Thomson Asia Pvt. Ltd, 2001.
9. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and Algorithms", Pearson Education India, 2001.
10. Jean-Paul Tremblay and Paul G. Sorenson, "Introduction to Data Structures with Application", 2nd Edition, Tata McGraw-Hill, 2001.

SCHEME FOR PAPER SETTING

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Section A

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(10 x 1½ = 15 marks)

Section B

There shall be 5 short answer type questions and shall carry 3 marks each. In this section, questions shall be covered from each unit and the candidates are required to answer all the questions.

(3 x 5 = 15 marks)

Section C

There shall be 3 long answer type questions each set from Unit –III, IV and V with internal choice. Each question shall carry 10 marks.

(3 x 10 = 30 marks)

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