UNIVERSITY OF JAMMU

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

NOTIFICATION

(24/Aug/Adp/56)

It is hereby notified for the information of all concerned that the Vice-Chancellor, in anticipation of the approval of the Competent Bodies, has been pleased to authorize the adoption of the revised Syllabi and Courses of Studies in **Bachelor of Technology (B. Tech) in Information Technology** for Semester V to VIII under the **Credit Based System** as per the new **AICTE Model** Curriculum adopted from batch 2022 and onwards **(as given in the Annexure)** for the candidates of **Govt. /Pvt., Engineering Colleges affiliated with the University of Jammu** for the Examinations to be held in the years indicated against each Semester as under:-

Branch	Semester	for the Examination to be held in the years
I.T	**Semester-V**	**Dec. 2024, 2025, 2026, and 2027**
	Semester-VI	**May 2025, 2026, 2027 and 2028**
	Semester-VII	**Dec. 2025, 2026, 2027 and 2028**
	Semester-VIII	**May 2026, 2027, 2028 and 2029**

The Syllabi of the course is available on the University Website: www.jammuuniversity.in.

-Sd/
DEAN ACADEMIC AFFAIRS

No. F.Acd/III/24/ 8609-18
Dated: 09/08/2024

Copy for information & necessary action to:-

1. Dean Faculty of Engineering
2. Principal, GCET/MBSCET/UIET/BCET/YCET
3. C.A to the Controller of Examinations
4. Joint /Assistant Registrar (Exams Prof. /Eval Prof. /Confidential)
5. Incharge University Website for uploading the same in the University Website.

Sumitra Sharma 8/8/2024
Deputy Registrar (Academic)

Subhiyaa 7/8/24 7/8/24 7/08/2024

Annexure

Item No-01: Resolved the syllabus of B.Tech. 5th Semester starting from session 2024-25 of Information Technology branch:-

B.Tech. Information Technology 5th Semester Examination to be held in the Year December 2024, 2025, 2026, 2027

B. Tech. Information Technology 5th Semester **Contact Hours: 24**

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	%Change
			L	T	P	Internal	External			
ITT-4501	Professional Core Course	Formal Language and Automata Theory	2	1	0	25	75	100	3	100%
ITT-4502	Professional Core Course	Essentials of Software Engineering	2	1	0	25	75	100	3	100%
CST-3502	Professional Core Course	Computer Networks	2	1	0	25	75	100	3	100%
CST-3503	Professional Core Course	Microprocessor & Interfacing	2	1	0	25	75	100	3	100%
CSO-3505	Open Elective Course	Python Programming	2	1	0	25	75	100	3	100%
ECO-1505		Internet of Things								
EEO-2505		Non-Conventional Energy Resources & Instrumentation								
MEO-5505		3DPrinting								
CEO-6505		Essentials of Civil Engineering								
MOC-4501	Massive Open Online Course	NPTEL	3	0	0	-	100	100	3	100%
CSP-3512	Professional Core Lab. Course	Computer Networks Lab.	0	0	2	25	-	25	1	100%
CSP-3513	Professional Core Lab. Course	Microprocessor & Interfacing Lab.	0	0	2	25	-	25	1	100%
CSO-3515	Open Elective Course Lab.	Python Programming Lab.	0	0	2	25	-	25	1	100%
ECO-1515		Internet of Things Lab.								
EEO-2515		Non-Conventional Energy Resources & Instrumentation Lab.								
MEO-5515		3DPrinting Lab.								
CEO-6515		Essentials of Civil Engineering Lab.								
SIT-4511	Summer Internship Training	Summer Training- I	-	-	-	25	-	25	1	100%
TOTAL			**13**	**5**	**6**	**225**	**475**	**700**	**22**	

REMARKS:

1. A New core course **"Formal Language and Automata Theory"** with Course code **ITT-4501** has been introduced in 5th semester.
2. A New core course **"Essentials of Software Engineering"** with Course code **ITT-4502** has been introduced in 5th semester which has been shifted from 6th semester with a title and content change.
3. The Course Code of the course titled **"Computer Networks"** has been changed from PIT-501 to **CST-3502** and its lab Code from PIT-511 to **CSP-3512**.
4. The Course Code of the course titled **"Microprocessor& Interfacing"** has been changed from PIT-503 to **CST-3503** and its lab Code from PIT-513 to **CSP-3513**.
5. Open Elective Course of 3 credits has been introduced with choice among following course: **Python Programming/Internet of Things/ Non -Conventional Energy Resources & Instrumentation/ 3D Printing / Essentials of Civil Engineering** along with their respective Lab Courses of 1 credit.
6. Professional Core course **"RDBMS"** with Course Code **PIT-502** along with its lab with course code **PIT-512** has been removed.
7. Professional Core course **"Theory of Computation"** with Course Code **PIT-504** has been removed.
8. The Course Code of Massive Open Online Course has been changed from MOC-505 to MOC-4501 . The department shall offer a **SWAYAM/NPTEL** course from the list of courses offered by SWAYAM/NPTEL around the commencement of the semester. However, the selected Massive Open Online Course should not be similar to the regular courses offered as part of the department curriculum.
9. The Course Code of **Summer Internship Training** has been changed from PIT-505 to **SIT-4511** with change in course title from Industrial Training to Summer Training I. Total marks of the course has been reduced to 25 from 50 and the credits have been reduced from 2 to 1.
10. Credits of Professional Core Courses have been reduced from 4 to 3.
11. Total marks of each Professional Core Course has been reduced from 150 (Internal 50, External 100) to 100 (Internal 25, External 75).
12. Lab credits of Professional Core Courses have been reduced from 1.5 to 1 and total Marks have been reduced from 50 to 25.
13. The total marks of 5th Semester have been reduced from 900 to 700 without any change in total credits of 22.
14. There total contact hours have changed from 22 to 24 Hrs in 5th Sem.

Item No-02: Resolved the syllabus of B.Tech.6th Semester starting from session 2024-25 of Information Technology Branch:

B. Tech. Information Technology 6th Semester Examination to be held in the Year May 2025, 2026, 2027, 2028

B. Tech Information Technology 6th Semester **Contact Hours: 26**

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	%Change
			L	T	P	Internal	External			
HMT-7601	Humanities & Social Science Course	Fundamentals of Economics	2	1	-	25	75	100	3	100%
ITT-4601	Professional Core Course	Machine Learning	2	1	-	25	75	100	3	100%
ITT-4602	Professional Elective Course	Data Warehousing and Data Mining	2	1	-	25	75	100	3	100%
ITT-4603		Interactive Computer Graphics								
ITT-4604		Wireless Sensor Networks								
CST-3601	Professional Core Course	Cyber Security	2	1	-	25	75	100	3	100%
CST-3602	Professional Core Course	Compiler Design	2	1	-	25	75	100	3	100%
CST-3604	Professional Core Course	Data Science	2	1	-	25	75	100	3	100%
ITP-4611	Professional Core Lab. Course	Machine Learning Lab.	-	-	3	50	-	50	1.5	100%
ITP-4612	Professional Elective Lab. Course	Data Warehousing & Data Mining Lab.	-	-	3	50	-	50	1.5	100%
ITP-4613		Interactive Computer Graphics Lab.								
ITP-4614		Wireless Sensor Networks Lab.								
MOC-4611	Massive Open Online Course	MOOC	-	-	2	25	-	25	1	100%
TOTAL			**12**	**6**	**8**	**275**	**450**	**725**	**22**	

REMARKS:

1. The Course Code of Humanities and Social Science course has been changed from HMC-601 to HMT-7601 with change in **course title from Managerial Economics to Fundamentals of Economics.** The credits of the course have been reduced from 4 to 3.

2. A new core course **"Machine Learning** "with Course code: **ITT-4601** along with lab Course titled" Machine Learning Lab. having code ITP-**4611** has been introduced in 6th Semester which has been shifted from 7th semester with a content change.
3. New Professional Elective Course titled **"Data Warehousing & Data Mining (ITT-4602) /Interactive Computer Graphics (ITT-4603) / Wireless Sensor Networks (ITT-4604) "** along with their respective labs titled **"Data Warehousing & Data Mining Lab. (ITP-4612) /Interactive Computer Graphics Lab. (ITP-4613) /Wireless Sensor Networks Lab. (ITP-4614)"** have been introduced and old Professional Elective Course titled Soft Computing (PIT-604(A))/ Micro Controller & Embedded Systems (PIT-604(B)) / Python Programming (PIT-604(C))/ along with their respective labs titled Soft Computing (PIT-611(A))/ Micro Controller & Embedded Systems (PIT-611(B)) / Python Programming (PIT-611(C)) have been removed.
4. New core course **"Cyber Security"** (CST-3601) has been introduced in 6th semester.
5. New core course **"Compiler Design"** (CST-3603) has been introduced in 6th semester which was shifted from 7th semester with change in course code.
6. Core Course **"Data Science"** (CST-3604) has been introduced in 6th semester. This course was earlier an Elective course in 8th semester.
7. The Course Code of Massive Open Online Course has been changed from MOC-605 to MOC-4611 with change in title from **SWAYAM/NPTEL to MOOC**. The credits of the course have been reduced from 3 to 1. The marks of the same have been reduced from 100 to 25.
8. **"Analysis and Design of Algorithms"** (PIT-602) has been removed from 6th semester.
9. **"Software Engineering"** (PIT-603) has been removed from 6th semester and shifted to 5th semester with title and content change.
10. **"Web Designing & Android Development Lab."** (PIT-612) has been removed from 6th semester.
11. Total marks of all the Professional Core courses have been reduced from 150 (Internal 50 , External 100) to 100 (Internal 25 , External 75)
12. Marks of Professional Core Lab Course and Professional Elective Lab Course is 50 and Credits of Professional Core Lab Course and Professional Elective Lab Course have been changed from 1 to 1.5
13. The total marks of 6th Semester have been reduced from 800 to 725 with change in total credits from 21 to 22.
14. Total contact hours of 6th Semester have changed from 21 to 26.

Item No-03: Resolved the syllabus of B.Tech.7th Semester starting from session 2024-25 of Information Technology Branch:

B. Tech. Information Technology 7thSemester Examination to be held in the Year December 2025, 2026, 2027, 2028

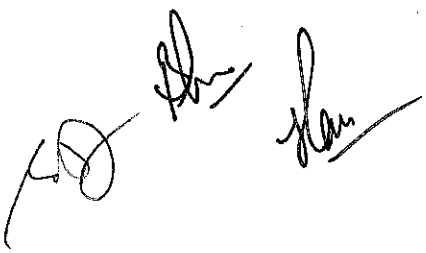
B. Tech. Information Technology 7th Semester **Contact Hours: 23**

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	%Change
			L	T	P	Internal	External			
HMT-7701	Humanities & Social Science Course	International Economics	2	1	0	25	75	100	3	100%
ITT-4701	Professional Core Course	Advanced Algorithms	2	1	0	25	75	100	3	100%
CST-3701	Professional Elective Course	Network Security	2	1	0	25	75	100	3	100%
ITT-4702		Digital Image Processing								
ITT-4703	Professional Elective Course / MOOC	Embedded Systems & IoT	2	1	0	25	75	100	3	100%
CST-3705		Blockchain Technologies								
MOC-4704		SWAYAM/ NPTEL	-	-	-	-	100			
ITP-4711	Professional Core Lab. Course	Advanced Algorithms Lab.	-	-	3	50		50	1.5	100%
CSP-3711	Professional Elective Lab. Course	Network Security Lab.	-	-	2	25	-	25	1	100%
ITP-4712		Digital Image Processing								
SIT-4711	Summer Internship Training	Summer Training II	-	-	-	50	-	50	2	100%
SEM-4711	Seminar	Seminar	-	-	4	50	-	50	2	100%
NCC-6701	Non-Credit Course	Disaster Management	2	0	0	Satisfactory / Unsatisfactory			Non-Credit	100%
TOTAL			**10**	**4**	**9**	**275/250***	**300/325***	**575**	**18.5**	

REMARKS:

1. New Humanities and Social Science course of 3 credits has been introduced titled **"International Economics"** with course code **HMT-7701**.

2. New Professional Core Course titled **"Advanced Algorithms"** with course code **ITT-4701** along with its lab titled **"Advanced Algorithms Lab."** with course code **ITP-4711** has been introduced with Advanced Algorithms of credit 3 and Advanced Algorithms Lab. of credit 1.5
3. The Course Code of Professional Elective Core Course "**Network Security**" has been changed from ITE-701(B) to CST-3701 and it's Lab course code has been changed from ITE-711 (B) to CSP-3711.
4. New Professional Elective Course titled **"Digital Image Processing"** with course code **ITT-7402** along with its lab titled **"Digital Image Processing Lab."** with course code **ITP-4712** has been introduced and old elective course code Linux Programming (ITE-701(A)) and its lab (ITE-711(A)) has been removed.
5. New Professional Elective courses: **Embedded Systems & IoT (ITT-4703)** and **Blockchain Technologies (CST-3705)** are introduced as well as **Massive Open Online Course (SWAYAM/NPTEL)** with code **MOC-4704**. Under MOOC, the department will offer a SWAYAM/NPTEL course from the list of courses offered by SWAYAM/NPTEL around the commencement of the semester. However, the selected MOOC shall not be similar to the regular courses offered as part of the department curriculum. The student has to opt for one course out of Professional Elective Courses/ Massive Open Online Course.
6. Core course "**Web Programming using PHP**" (PIT-701) along with it's Lab (PIT-712) has been removed
7. Core course "**Compiler Design**" (PIT-702) has been removed and shifted to 6th semester with new course code.
8. Core course "**Machine Learning**" (PIT-703) along with it's Lab (PIT-713) has been removed.
9. The Course Code of **Summer Internship Training** has been changed from SII-704 to SIT-4711 with change in course title from Industrial Training to Summer Training II. It's credits has been increased by 1 to 2 with no change in marks of 50.
10. The Course code of **Seminar** has been changed to from SEM-704 to SEM-4711 and it's credits has been increased by 1 to 2 with no change in marks of 50.
11. **Open Elective Lab** has been removed.
12. New Non- Credit course **"Disaster Management"** (NCC-6701) has replaced NCC course **"Essence of Indian Traditional Knowledge"** (NCC-701).
13. Credits of Professional Core Courses and Elective courses has been reduced from 4 to 3 and marks of the same has been reduced from 150 (Internal 50, External 100) to 100 (Internal 25, External 75).
14. The total marks of 7th Semester have been reduced from 900 to 575 with change in total credits from 20 to 18.5
15. Total contact hours of 7th Semester have been reduced from 24 to 23.



Item No-04: Resolved the syllabus of B.Tech.8th Semester starting from session 2024-25 of Information Technology Branch:

B. Tech. Information Technology 8th Semester Examination to be held in the Year May 2026, 2027, 2028, 2029

SCHEME-A

B.Tech. Information Technology 8th Semester **Contact Hrs: 26**

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	%Change
			L	T	P	Internal	External			
ITT-4801	Professional Core Course	Web Technology	2	1	-	25	75	100	3	100%
ITT-4802	Professional Core Course	Software Testing	2	1	-	25	75	100	3	100%
ITP-4811	Professional Core Lab. Course	Web Technology Lab.	-	-	2	25		25	1	100%
MOC-4811	Massive Open Online Course	MOOC	-	-	2	25	-	25	1	100%
PRJ-4811	Project	Project	-	-	16	150	50	200	8	100%
TOTAL			4	2	20	250	200	450	16	

OR

SCHEME – B

B.Tech. Information Technology 8th Semester **Contact Hrs: 26**

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	%Change
			L	T	P	Internal	External			
PII-4811	Professional Industry Internship	Industry Internship	-	-	24	325	100	425	15	100%
MOC-4811	Massive Open Online Course	MOOC	-	-	2	25	-	25	1	100%
TOTAL			-	-	26	350	100	450	16	

REMARKS:

- Students have the choice to opt among Scheme –A and Scheme –B .

SCHEME-A

1. Professional Elective courses: **Software Testing (ITE-801(A)) and Data Science (ITE-801(B))** has been removed.

2. Open Elective Course has been removed.
3. Non-Credit Course **"Disaster Management"** (NCC-804) has been removed.
4. Two new Professional courses: **Web Technology** (ITT-4801) along with its lab (ITP-4811) and **Software Testing** (ITT-4802) each of 3 credits and 100 marks, have been introduced.
5. The Course Code of Massive Open Online Course has been changed from MOC-843 to MOC-4811 with change in title from **"SWAYAM/NPTEL/any other MOOC Platform" to "MOOC".** The credits of the course have been reduced from 2 to 1. Marks of the course have been reduced from 50 to 25.
6. The Course Code of **Project** has been changed from PRJ-804 to PRJ-4811. The credits of the Project have remained same. However, marks have been reduced from 300(200+100) to 200(150+50).
7. The total marks of 8th Semester have been reduced from 650 to 450 with no change in total credits of 16.
8. There is no change in total contact hours of 26 in 8th Semester.

SCHEME-B

1. The Course code of **Industry Internship** has been changed from PII-804 to PII-4811 with change in marks from 600 (350 +250) to 425 (325 +100) and with increase in credits from 14 to 15.
2. The Course Code of Massive Open Online Course has been changed from MOC-804 to MOC-4811 with change in title from **"SWAYAM/NPTEL/any other MOOC Platform" to "MOOC".** The credits of the course have been reduced from 2 to 1. Marks of the course have been reduced from 50 to 25.
3. The total marks of 8th Semester have been reduced from 650 to 450 with no change in total credits of 16.
4. Total contact hours of 8th Semester have been reduced from 30 to 26.

UNIVERSITY OF JAMMU

B.Tech. Information Technology 5th Semester Examination to be held in the Year December 2024, 2025, 2026, 2027

B.Tech. Information Technology 5th Semester **Contact Hrs: 24**

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	%Change
			L	T	P	Internal	External			
ITT-4501	Professional Core Course	Formal Language and Automata Theory	2	1	0	25	75	100	3	100%
ITT-4502	Professional Core Course	Essentials of Software Engineering	2	1	0	25	75	100	3	100%
CST-3502	Professional Core Course	Computer Networks	2	1	0	25	75	100	3	100%
CST-3503	Professional Core Course	Microprocessor & Interfacing	2	1	0	25	75	100	3	100%
CSO-3505	Open Elective Course	Python Programming	2	1	0	25	75	100	3	100%
ECO-1505		Internet of Things								
EEO-2505		Non-Conventional Energy Resources & Instrumentation								
MEO-5505		3DPrinting								
CEO-6505		Essentials of Civil Engineering								
MOC-4501	Massive Open Online Course	SWAYAM / NPTEL	3	0	0	-	100	100	3	100%
CSP-3512	Professional Core Course	Computer Networks Lab.	0	0	2	25	-	25	1	100%
CSP-3513	Professional Core Course	Microprocessor & Interfacing Lab.	0	0	2	25	-	25	1	100%
CSO-3515	Open Elective Course Lab.	Python Programming Lab.	0	0	2	25	-	25	1	100%
ECO-1515		Internet of Things Lab.								
EEO-2515		Non-Conventional Energy Resources & Instrumentation Lab.								
MEO-5515		3DPrinting Lab.								
CEO-6515		Essentials of Civil Engineering Lab.								
SIT-4511	Summer Internship Training	Summer Training- I	-	-	-	25	-	25	1	100%
TOTAL			**13**	**5**	**6**	**225**	**475**	**700**	**22**	

B.Tech. Information Technology 5th Semester Examination to be held in the Year December 2024, 2025, 2026, 2027

CLASS: B.Tech. 5th SEMESTER
BRANCH: INFORMATION TECHNOLOGY
COURSE TITLE: FORMAL LANGUAGE AND AUTOMATA THEORY
COURSE NO: ITT-4501
DURATION OF EXAM: 3 HOURS

CREDITS: 3

L	T	P	MARKS	
			External	Internal
2	1	0	75	25

COURSE OUTCOMES	
At the end of the course the student will be able to: -	
CO1	Illustrate the usage of different types of finite machines and explain the relationship among formal languages, classes and grammars with the help of Chomsky hierarchy.
CO2	Applying the concepts of regular grammars, context free grammars and finite automata for language recognition and its simplification.
CO3	Design pushdown automata based on its computational capabilities to recognize and generate context-free languages.
CO4	Apply the principles of Turing machines to design computational model for solving complex engineering problems.
CO5	Make use of capabilities of linear bounded automata in contrast to applicability Turing machines.

Detailed Syllabus

Section- A

Finite Automata: Deterministic Finite Automata, Acceptance by Finite Automata, Transition systems, Non-Deterministic Finite Automata, Equivalence of DFA and NDFA, Moore and Mealy machines, Equivalence of Moore and Mealy machine, Minimization of Finite Automata, Applications and limitations of Finite Automata. **(6 Hours)**

Formal Languages: Basics of strings, Alphabets, grammar, Formal language, Chomsky classification of languages, Languages and their relation, Operations on languages, Closure properties of language classes. **(4 Hours)**

Regular Grammar: Regular grammars, Regular expressions, Algebraic method using Arden's theorem, Equivalence of Finite Automata and Regular expressions, Properties of regular languages, Pumping lemma. **(6 Hours)**

Context Free Language: Derivation, Ambiguity, Simplification of context free grammar, normal forms– Chomsky Normal Form, Greibach Normal Form, Pumping lemma. **(6 Hours)**

Section-B

Push Down Automata: Description and definition, Acceptance by Push Down Automata, Equivalence of Push Down Automata and context free grammars and languages. **(7 Hours)**

Turing Machine: Definition and Model, Representation of Turing Machine, Design of Turing Machine, Variants of Turing Machine, Decidability and recursively enumerable languages, Halting problem, Post correspondence problem. **(7 Hours)**

Context Sensitive Language: Context sensitive language, Model of linear bounded automata, Relation between linear bounded automata and context sensitive language. **(6 Hours)**

BOOKS RECOMMENDED:

1. Introduction to Automata Theory — John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman,
2. Theory of Computer Science, Third Edition, PHI — K.L.P. Mishra and N. Chandrasekaran,
3. Formal Languages and Automata Theory, McGraw-Hill. — K.V.N. Sunitha, N. Kalyani,
4. Introduction to Computer Theory, Wiley India Pvt. Ltd. — Daniel, A.Cohen
5. Introduction to Formal Language Theory, Addison-Wesley — M. A. Harrison

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

B.Tech. Information Technology 5th Semester Examination to be held in the Year December 2024, 2025, 2026, 2027

CLASS: B.Tech. 5th SEMESTER
BRANCH: INFORMATION TECHNOLOGY
COURSE TITLE: ESSENTIALS OF SOFTWARE ENGINEERING
COURSE NO: ITT-4502
DURATION OF EXAM: 3 HOURS

CREDITS: 3

L	T	P	MARKS	
			External	Internal
2	1	0	75	25

COURSE OUTCOMES	
At the end of the course the student will be able to: -	
CO1	Explain software process models, fundamentals of software engineering and analyze software requirement for designing SRS documents for a given scenario.
CO2	Discuss project management including planning, cost estimation, scheduling and risk management.
CO3	Apply software design strategies to translate SRS to software design.
CO4	Apply coding standards and testing techniques for a given software design.
CO5	Recognize the importance of software maintenance , PSP, Six Sigma and re-engineering

Detailed Syllabus

Section- A

Introduction: Evolution and impact of software engineering, Software myths, Software application domains, Software crisis – Problem and causes. **(5 Hours)**

Software Process Models: Software process, Software process models – Waterfall model, Prototype model, Spiral model, Evolutionary model, RAD model, V-model and Component based model. **(6 Hours)**

Requirements Engineering: Feasibility study, Problem analysis, Requirement elicitation and specification, Functional and non-functional requirements, Software requirements specification document, Requirement validation and management. **(6 Hours)**

Project Management and Risk Analysis: Project planning, Cost estimation techniques– Size metrics, Empirical estimation, Heuristic estimation and analytical estimation, Project monitoring and control– Work breakdown structure, Activity chart, Gantt charts, PERT charts, Critical path method, Manpower management, Risk management- Identification, Analysis, Planning and Monitoring. **(7 Hours)**

Section- B

Software Design: Modular design– Coupling, Cohesion and abstraction, Function oriented design– Data flow diagrams, Structure chart, Object oriented design–Objects and object classes, Relationships between classes, User interface design. **(7 Hours)**

Coding & Testing: Coding standards and code reviews, Testing – Need of testing, Unit testing, Integration testing, System testing, White-Box testing, Black-box testing, Alpha, Beta and acceptance testing, Smoke testing, Sanity testing, Regression testing, Cyclometric Complexity, Verification and validation. **(7 Hours)**

Maintenance and Re-engineering: Software maintenance, Software re-engineering, Reverse engineering, Forward engineering, PSP and Six sigma. **(5 Hours)**

BOOKS RECOMMENDED:

1. Software Engineering, A Practitioner's Approach, McGraw Hill International. — Roger S. Pressman R.,
2. Fundamentals of Software Engineering, Prentice Hall of India. — Rajib Mall
3. Software Engineering, Addison-Wesley Publishing Company — Ian Sommerville
4. An Integrated Approach to Software Engineering, Naros — Jalote Pankaj.

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attemptfive questions selecting at least two questions from each section. Use of Calculator is allowed.

B.Tech. Information Technology 5th Semester Examination to be held in the Year December 2024, 2025, 2026, 2027

CLASS: B.Tech. 5th SEMESTER
BRANCH: IT/CSE/COMPUTER ENGINEERING
COURSE TITLE: COMPUTER NETWORKS
COURSE NO: CST-3502
DURATION OF EXAM: 3HOURS

CREDITS-3

L	T	P	Marks	
			External	Internal
2	1	0	75	25

COURSEOUTCOMES	
At the end of the course the student will be able to:	
CO1	Gain a thorough understanding of fundamental concepts in computer networking, including network architecture, models (OSI & TCP/IP), protocols, networked systems and applications
CO2	Analyze the components required for building different types of networks and to acquire knowledge of various networking protocols, methods and standards.
CO3	Gain an understanding of channel allocation protocols, framing techniques, error control methods and flow Control techniques.
CO4	Understand the concepts and applications of network addressing, subnetting and routing algorithms & be able to propose the solution for developing and optimizing networks.

Section-A

Introduction: Data Communication-communication system, synchronous and asynchronous systems, serial and parallel systems, dataflow-simplex, half-duplex, full-duplex, computer network - uses of computer network, categories of computer networks, protocol and standards, Reference Model-OSI and TCP/IP reference model, their comparison and critique, Network Topologies **(05hours)**

Physical Layer: Data Transmission-Digital to Digital Conversion-Line Coding Scheme, Transmission Media, RS-232 Interface, Switching mechanisms and Comparison–circuit, packet, message **(06 hours)**

Data Link Layer: Design Issues, Error Detection and Correction, Flow Control-Elementary of data-link protocol, Sliding Window Protocol, Example of Data Link Protocol (HDLC). **(06 hours)**

Medium Access Control Sub layer: Channel Allocation Problems, Multiple Access Protocol-ALOHA, Carrier Sense Multiple Access Protocols, Collision Free Protocols, IEEE standards-802.3, 802.4, 802.5. **(06 hours)**

Section-B

Network Layer - Design Issues, Routing Algorithms- The optimality principle, shortest path algorithm, flooding, distance vector routing, link state routing and hierarchical routing, Congestion Control- principles prevention policies, congestion control in virtual circuit subnet and datagram subnets, Traffic shaping algorithm-leaky bucket algorithm, token bucket algorithm, QOS, IP protocol, IP addresses, Internet Multicasting, Introduction to IPV6, IPV4 vs. IPV6, Internetworking devices –Repeaters, Hub, Bridges, Switches, Routers, Gateways. **(10hours)**

Transport Layer: Transport Layer Services, Primitives, Issues, and elements of transport protocol, Introduction to TCP and UDP **(04 hours)**

Session and Presentation Layer-Design issues, services and primitives **(04 hours)**

Application Layer: HTTP, FTP, DNS, E-Mail, Firewalls. **(04 hours)**

BOOKSRECOMMENDED:

1. Computer Networks — Andrew S. Tanenbaum, Prentice Hall
2. Data Communication and Networking — Forouzan A.B, McGraw Hill
3. Computer Networking Top Down Approach — Kurose L. and Rose, Pearson
4. Computer Networking with Internet Protocol and Technology — Stallings W., Pearson

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

B.Tech. Information Technology 5th Semester Examination to be held in the Year December 2024, 2025, 2026, 2027

CLASS: B.Tech. 5th SEMESTER
BRANCH: IT/CSE/COMPUTER ENGINEERING
COURSE TITLE: MICROPROCESSOR & INTERFACING
COURSE NO: CST-3503
DURATION OF EXAM: 3HOURS

CREDITS-3

L	T	P	Marks	
			External	Internal
2	1	0	75	25

COURSEOUTCOMES	
At the end of the course the student will be able to:	
CO1	Understand the knowledge of general architecture, organization and instruction sets of 8085 and 8086 microprocessors.
CO2	Understand, write structured and well-commented programs in assembly language with an ability to test And debug the min the laboratory.
CO3	Analyze architecture and operation of Programmable Interface Devices and realize the assembly language programming.
CO4	Understanding of digital interfacing and system connections.

Section-A

Architecture of 8085: Block diagram, Pin Description of 8085, Instruction Set and Instruction Format, Addressing Modes, Looping, Counting and Indexing. 8085 Interrupts. Interrupt handling in 8085, Enabling, disabling and masking of interrupts. **(10 hours)**

Counters and Time Delay Programs, Stack and Subroutines, Conditional Call and Return Instructions & Code Conversions, Timing diagram for different machine cycles. **(4 hours)**

Parallel Input/Output& Interfacing: - Basic Interfacing Concepts, Interfacing memory and I/O devices, Addressing memory, Interfacing a keyboard, Interfacing LED and seven segment displays. **(6hours)**

Section-B

Programmable Interface Devices: - Basics of Programmable I/O, General Purpose Programmable Peripheral Devices–8255A, 8259A, Direct Memory Access Controller–8237. **(8hours)**

Architecture of 8086: Memory Address space and data organization, segment registers and memory segmentation, Generating memory addresses, IO address space, addressing modes, Minimum mode and Maximum mode, system timing, Instruction Set and Programming Structure of 8086. **(12hours)**

BOOKS RECOMMENDED:

1. Microprocessor Architecture, Programming and Applications with 8085 — Ramesh S. Gaonkar
2. Microprocessor and Interfacing — Douglas V. Hall
3. Introduction to Microprocessors — Aditya Mathur

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

B.Tech. Information Technology 5th Semester Examination to be held in the Year December 2024, 2025, 2026, 2027

CLASS: B.Tech.5thSEMESTER **CREDITS: 3**
BRANCH: E&C/IT/Mechanical/Civil/Electrical
COURSE NO. CSO-3505

L	T	P	External	Internal
2	1	0	75	25

COURSETITLE: PYTHON PROGRAMMING
DURATION OF EXAM: 3 HOURS

COURSEOUTCOMES At the end of the course the student will be able to:	
CO1	Describe the syntax and semantics of Python programming language.
CO2	Understand the use of loops and decision-making statements to solve problems.
CO3	Identify the methods to create and manipulate lists, tuples and dictionaries.
CO4	Demonstrate proficiency in handling and creation of functions.

Detailed Syllabus

Section- A

Introduction to Python: Introduction to Python, history of Python, Unique features of Python, Python Syntax compared to other programming languages, First Python Program. **(4Hours)**

Beginning Python Basics: Python Identifiers, Keywords and Indentation, Python Data Types, The Integer, Floating-Point, and String Data Types, String Operations in Python, Storing Values in Variables, Comments, Simple Input & Output, Operators in python. **(7 Hours)**

Flow control: Boolean Values, Comparison Operators, Boolean Operators, Mixing Boolean and Comparison Operators, Indentation, The If statement and its related statement, an example with If and its related statement, the while loop, the for loop, the range statement, Break & Continue, Examples for looping **(7 Hours)**

Section–B

Python Data Structures: Lists: Definition and syntax, Indexing and slicing, List methods (e.g., append(), extend(), insert(), remove(), pop(), clear(), index(), count(), sort(), reverse()), Iterating through lists; Tuples: Definition and syntax, Immutable nature, Accessing elements, Tuple methods (e.g., count(), index()); Dictionaries: Definition and syntax, Key-value pairs, Accessing elements by key, Adding, updating, and deleting key-value pairs, Dictionary methods (e.g., keys(), values(), items()), Iterating through dictionaries. **(10 Hours)**

Functions in Python: Function definition, Function calling, Return statement, Scope, Default arguments, Variable-length arguments (Using *args and **kwargs), Docstrings, Lambda functions, Recursion, Function composition, Built-in functions (like print(), input(), len(), range(), map(), filter(), sorted()) **(10 Hours)**

BOOKSRECOMMENDED:

1. GowrishankarS,Veena A,"IntroductiontoPythonProgramming",1stEdition,CRCPress/Taylor&Francis, 2018. ISBN-13: 978-0815394372

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

(14)

B.Tech. Information Technology 5th Semester Examination to be held in the Year December 2024, 2025, 2026, 2027

CLASS: B.Tech .5thSEMESTER **CREDITS:3**

BRANCH: CSE/IT/Mechanical/Civil/Electrical

COURSE NO: ECO-1505

COURSE TITLE: Introduction to the Internet of Things

DURATION OF EXAM: 3 HOURS

L	T	P	Theory	Sessional
2	1	0	75	25

CourseOutcome(CO)	
At the end of the semester the students will be able to	
CO1	Demonstrate basic concepts, principles, and challenges in IoT.
CO2	Illustrate the functioning of hardware devices and sensors used f or IoT.
CO3	Analyze network communication aspects and protocols used in IoT
CO4	Apply IoT for developing real-life applications using Arduino programming.

Detailed Syllabus

Section-A

Unit-I Introduction to IOT

Vision, Definition, Conceptual framework, Architecture view, Sources of IoT, Understanding IoT fundamentals, IOT Architecture and communication protocols, Various Platforms for IoT and cloud computing benefits, Real-time examples of IoT, Overview of IoT components and IoT Communication Technologies, Challenges in IoT (10 Hours)

Unit-II Arduino Simulation Environment

Arduino Uno Architecture and platform Board Anatomy, Setup the IDE, coding using an emulator. Overview of IOT- supported Hardware platforms such as Raspberry pi, and ARM cortex. (06Hours)

Unit-III Sensor & Actuators with Arduino

Overview of Sensors working, Analog and Digital Sensors, Actuators, Interfacing of Temperature, Humidity, Motion, Light and Gas Sensor with Arduino, Interfacing of Relay Switch and Servo Motor with Arduino. Interfacing LED, push button, buzzer with Arduino along with LCD and DC motor. (08 Hours)

Section-B

Unit-IV Basic Networking with ESP8266 Wi-Fi module

Basics of Wireless Networking, Introduction to ESP8266 Wi-Fi Module, Various Wi-Fi libraries, Web server-introduction, installation, configuration, posting sensor(s) data to the web server platforms, Thing Speak API and MQTT, Interfacing ESP8266 with Web services. (11 Hours)

Unit V -Challenges in IoT Design challenges:

Development Challenges, Security Challenges, Other challenges IoT Applications: Smart Metering, E-health, City Automation, Automotive Applications, home automation, smart cards, communicating data with H/W units, mobiles, tablets, Designing of smart street lights in a smart city. (10Hours)

Textbooks:

1. Olivier Hersent, David Boswarthick, Omar Elloumi"The Internet of Things key applications and protocols",Willey
2. Boswarthick,Omar Elloumi"The Internet of Things key applications and protocols",Willey
3. Jeeva Jose, Internet of Things, Khanna Publishing House
4. Michael Miller"The Internet of Things"by Pearson
5. Raj Kamal"INTERNET OF THINGS",McGraw-Hill,1STEdition,2016
6. Arshdeep Bahga,Vijay Madisetti "InternetofThings(Ahands-onapproach)"1STedition,VPIpublications,2014

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

B.Tech. Information Technology 5th Semester Examination to be held in the Year December 2024, 2025, 2026, 2027

CLASS:B.Tech.5thSEMESTER **CREDITS:3**

BRANCH:E&C/Computers/IT/Mechanical/Civil

COURSECODE: EEO-2505

COURSE TITLE:NON CONVENTIONAL ENERGY SOURCES AND INSTRUMENTATION

DURATIONOFEXAM:3HOURS

L	T	P	Theory	Sessional
2	1	0	75	25

Course Outcomes: Student will be able to	
CO1	Understand the need of energy, Various types of energy and scenario.
CO2	Identify non-conventional energy as alternate form of energy and to know how it can be tapped.
CO3	Understanding various methods of measurement and instrumentation.
CO4	Understanding different types of wattmeter and their errors.

SECTION-A

Module 1: Introduction: Limitations of conventional energy sources need & growth of alternate energy sources, basic schemes and applications of direct energy conversion. Photo voltaic effect, characteristics of photovoltaic cells, conversion efficiency, solar batteries and applications. Solar energy in India, solar collectors, solar furnaces & applications. Geo thermal system, Characteristics of geothermal resources, choice of generators, electric equipment and precautions. Low head hydro plants, definition of low head hydropower, choice of site and turbines. **(12hrs)**

Module 2: Wind Energy & MHD Generators: History of wind power, wind generators, theory of windpower, characteristics of suitable wind power sites, scope in India. Basic Principles and Half effect, generator and motor effect, different types of MHD generators, conversion effectiveness. Practical MHD generators, applications and economic aspects **(10hrs)**

SECTION-B

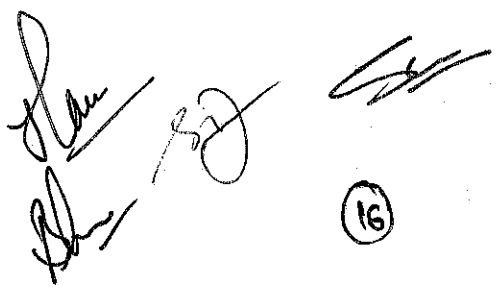
Module3: MEASURING INSTRUMENTS: Classification, effects utilized in measuring instruments .Indicating instruments: Deflection, controlling and damping forces, various damping's. Measurement of low resistance: -Potentiometer method, Kelvin double bridge. Ammeters and Voltmeters: Moving coil, moving iron ammeter and voltmeters, Errors in Ammeters and Voltmeters. **(11 hrs)**

Module 4: MEASUREMENT OF POWER: Wattmeter measurement in single phase A.C. circuits, Wattmeter errors. Measurement of three phase power by two watt meter methods. Energy meters for A.C. circuits, Theory of Induction type meters. **(10hrs)**

RECOMMENDEDBOOKS:

1. Non-conventional Energy Resources — D.S.Chauhan
2. Conventional energy sources — G.D.Rai
3. Non-Conventional energy sources — B.H.Khan
4. Solar Energy Fundamentals and Applications — H.P.Garg and Jai Prakash
5. A course in Electrical and Electronics Measurement & instrumentation — A.K.Sawhney

NOTE: There will be eight questions of 15marks each, four from each section. Students are required to attempt Five questions selecting at least two questions from each section. Use of calculator is allowed.



B.Tech. Information Technology 5th Semester Examination to be held in the Year December 2024, 2025, 2026, 2027

BRANCH: ECE/Electrical/Computers/IT/Civil **CREDITS: 3**
SEMESTER:5th
COURSE TITLE: 3D PRINTING
COURSE CODE: MEO-5505
DURATION OF EXAM: 3HOURS

L	T	P	Marks	
			External	Internal
2	1	0	75	25

COURSEOUTCOMES	
On completion of the course the students will be able to	
CO1	Identify key 3D printing technologies, and corresponding major industry segments
CO2	Identify key material properties for 3D printability for each printing technique
CO3	Compare and differentiate printing methods and printable materials based on specific application
CO4	Manufacture devices and tools using 3D printing
CO5	Assess the 3D printing industry and the global effects of 3D printing particularly on engineering and manufacturing

Section–A

3D Printing Materials: Types of Materials, Properties of materials, Application of materials in mechanical, chemical, electronics and software industry, Selection of Materials, Smart materials, Materials for 3D Printing, Bio materials, composite materials etc.

Introduction to Design, Prototyping fundamentals. Introduction to 3Dprinting, its historical development, commonly used terms in 3D modelling, Data Conversion, and transmission, Checking and preparing, Building, Postprocessing, RP data formats, Classification of 3D printing process, Applications to various fields.

Pre-Processing in 3D Printing (3DModelingand Design)

Creation of 2D geometry using AutoCAD, 2D drawing space, AutoCAD Modify commands, Construct orthographic sectional views of brackets with dimension in different layers, 3D solid Modeling Create 3D solid and edit solid, Create a new assembly, insert components into an assembly, Design for 3D printing.

(20Hours)

Section-B

Liquid Based 3D Printing: Stereo lithography apparatus (SLA): Models and specifications, process, working principle, photopolymers, photo polymerization, layering technology, laser and laser scanning, applications, advantages and disadvantages.

Solid ground curing (SGC): Models and specifications, process, working principle, applications, advantages and Disadvantages.

Solid Based 3DPrinting

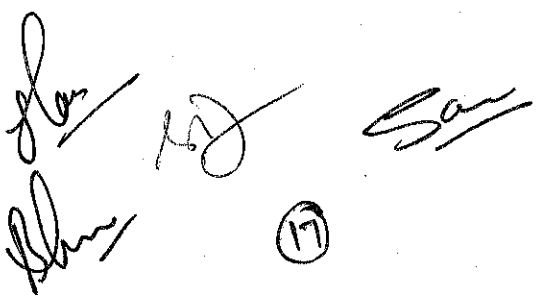
Laminated object manufacturing (LOM): Models and specifications, Process, Working principle, Applications, Advantages and disadvantages.

Fused Deposition Modeling (FDM): Models and specifications, Process, Working principle, Applications, Advantages and disadvantages. **(20Hours)**

RECOMMENDEDBOOKS:

1. Additive Manufacturing Technology — Ian Gibson, Davin Rosen
2. Additive Manufacturing Fundamentals and Advancement — Manu Srivastava, Sachin Maheshwari
3. 3DprintingandAdditiveManufacturing — Chua Chee Kai, Leong Kah Fai

NOTE:There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.



B.Tech. Information Technology 5th Semester Examination to be held in the Year December 2024, 2025, 2026, 2027

CREDITS: 3

L	T	P	Marks	
			External	Internal
2	1	0	75	25

BRANCH:ECE/Computers/IT/Mechanical/Civil
SEMESTER:5th
TITLE:ESSENTIALS OF CIVIL ENGINEERING
COURSE CODE: CEO-6505
DURATION OF EXAM: 3HOURS

COURSEOUTCOMES	
On completion of the course the students will be able to	
CO1	Able To Identify The Properties Of Building Materials.
CO2	Acquaint With The Masonry Construction And Finishes
CO3	Carry Out Surveying In The Field For Engineering Projects.
CO4	Plan And Schedule The Project By Various Network Techniques Of Construction Planning

Section-A

Brick: Classification of Bricks, Constituents of Good Brick Earth, Harmful Ingredients, Manufacturing Of Bricks, Testing Of Bricks.

Timber: Classification Of Timber, Structure Of Timber, Seasoning Of Timber, Defects In Timber And Prevention Of Timber.

Aggregates: Classification Of Aggregates And Various Tests Conducted On Aggregates.

Cement: Composition Of Cement, Types Of Cement, Manufacturing Of Cement, Tests On Cement.

Concrete : Grades Of Concrete, Strength Of Concrete, RMC (Manufacturing Of RMC, Transportation), Tests On Concrete. **(20 hours)**

Section-B

Masonry Construction Introduction: Various Terms Used, Stone Masonry-Dressing Of Stones, Classifications Of Stone Masonry, Safe Permissible Loads, Brick Masonry-Bonds In Brick Work, Laying Brick Work, Defects In Brick Masonry, Composite Stone And Brick Masonry.

Foundations: Purpose, Site Exploration, Methods of Testing Bearing Capacity Of Soils, Types Of Foundations.

Introduction to Surveying, Principles of Surveying, Measurement Of Distance. Chain Surveying, Field Equipment, Methods of Chain Surveying, Plotting From The Field Books And Degree Of Accuracy, Tape Corrections.

Levelling: Instruments Used and Field Book Recording, Height Of Instrument Method, Rise And Fall Method, Temporary And Permanent Adjustments In Levels. **(20 hours)**

BOOKSRECOMMENDED:

1	Building material & construction	Sushil kumar
2	Building material	Prabin singh
3	Surveying vol.-i	B.C Punmia.
4	Concrete technology	M.L Gambhir

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

B.Tech. Information Technology 5th Semester Examination to be held in the Year December 2024, 2025, 2026, 2027

CLASS: B.Tech. 5th SEMESTER **CREDITS: 3**

BRANCH: INFORMATION TECHNOLOGY
COURSE NO: MOC-4501
COURSE TITLE: SWAYAM/NPTEL

			Marks	
L	T	P	External	Internal
3	0	0	100	-

The department shall offer the 12 weeks NPTEL course, out of the list of courses listed by NPTEL around the time of commencement of the semester.

The courses offered shall be related to the core stream but should not be similar to the regular courses offered as a part of the department curriculum.

The overall monitoring of the NPTEL course will be under the supervision of the faculty Incharge of the department.

The NPTEL certification course comprises of Assignments (25%) and Proctored Examination (Online examination MCQ's based = 75%) conducted at the end of the semester by IIT Madras as per notified schedule.

The marks obtained by the student in the NPTEL certification course will be tabulated by the concerned department.

Note:-

(i) The Course is declared pass in the semester only after the production of the NPTEL Certificate, by the student. In case the student does not pass the certification exam or remains absent in the proctored examination, no certificate will be awarded by NPTEL and hence the student will be deemed to have failed in the said Course. The student has to appear again in the NPTEL examination conducted either in the same course or any other course as per the next semester schedule of NPTEL and earn the certificate bypassing the exam.

ii) The students must select their College name while registering for a particular course. Thereafter, the option of sharing the result with the institute also needs to be selected. Only those certificates will be accepted and validated by department whose information is shared by NPTEL to college authorities.

No certificate will be accepted without this and student will be marked absent in the college records.

B.Tech. Information Technology 5th Semester Examination to be held in the Year December 2024, 2025, 2026, 2027

BRANCH: IT/CSE/COMPUTER ENGINEERING **CREDITS: 1**
SEMESTER: 5th
COURSE NO.: CSP-3512
COURSE TITLE: COMPUTERS NETWORKS LAB

L	T	P	Marks
-	-	2	25

LABORATORYOUTCOMES	
After Completion of this course the student will be able to:-	
CO1	Understand fundamental underlining principles of computer networking and functionality of layered network architecture.
CO2	Analyze performance of various communication protocols.
CO3	Practice packet/file transfer between nodes.

Lab Experiments:

Experiment 1	To study different types of networking cables.
Experiment 2	To implement the cross-wired cable and straight through cable using crimping tool.
Experiment 3	To study about different networking devices.
Experiment 4	WAP on bit stuffing and character stuffing using any language.
Experiment 5	To connect two computers in a local area network and to share file between them.
Experiment 6	To study about IP addressing, different notations for IP address, Classful/Classless Addressing
Experiment 7	To implement various topologies using the LAN trainer kit.
Experiment 8	To demonstrate the simple network configuration with a router that connects three local area network (LAN) segments using Cisco Packet Tracer.
Experiment 9	To configure Static IP Routing using 3 Routers in Cisco Packet Tracer

NOTE: Additional Lab experiments/practicals will be performed based on the course content requirement.

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B.Tech. Information Technology 5th Semester Examination to be held in the Year December 2024, 2025, 2026, 2027

BRANCH: IT/CSE/COMPUTER ENGINEERING
SEMESTER :5th
COURSE NO.: CSP-3513
COURSE TITLE: MICROPROCESSOR & INTERFACING LAB

CREDITS:1

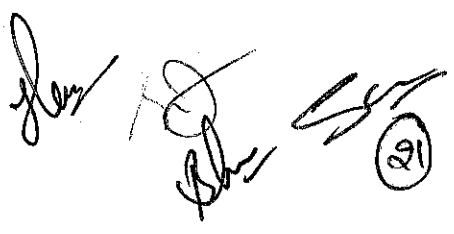
L	T	P	Marks
-	-	2	25

LABORATORYOUTCOMES	
After Completion of this course the student will be able to:-	
CO1	Classify and apply the instruction set of 8085 and 8086 microprocessors.
CO2	Design, code and debug Assembly Language programs to implement simple programs.
CO3	Apply programming knowledge using the capabilities of the stack, the program counter
CO4	Implement Time Delay Routine programming.

Lab Experiments:

Experiment 1	Block Transfer: -Data bytes are stored in memory locations fromXX50H to XX5FH to insert an additional five bytes of data, it is necessary to shift the data string by five memory location. Write a program to store a data string from XX55H toXX64H. Use any 16 bytes of data to verify your program.
Experiment 2	Addition with Carry: Six bytes of data are stored in memory locations starting at XX50H. Add all the data bytes. Use register B to save any carry generated while adding the data bytes. Store the sum at two consecutive memory locations XX70H and XX71H.
Experiment 3	Checking for a particular data byte: A set of eight readings is stored in memory location starting at XX50H. Write a program to check whether a byte 40H exists in the set. If it does, stop checking, and display its memory location, otherwise output FFH.
Experiment 4	Write a program for BCD to Seven Segment LED code conversion.
Experiment 5	Write a program for Binary to ASCII code conversion.
Experiment 6	Write a program for BCD addition.
Experiment 7	WriteaprogramformultiplicationofTwo8bitunsignednos.
Experiment 8	Write a program to implement Stack operation.
Experiment 9	Write a program to implement procedures.
Experiment 10	Write a program to implement delay loops.

NOTE: Additional Lab experiments/practicals will be performed based on the course content requirements



B.Tech. Information Technology 5th Semester Examination to be held in the Year December 2024, 2025, 2026, 2027

CLASS: B.Tech.5thSEMESTER **CREDITS: 1**
BRANCH: E&C/IT/Mechanical/Civil/Electrical
COURSENO.CSO-3515
COURSE TITLE: Python Programming (Lab)

L	T	P	Practical Marks
0	0	2	25

COURSEOUTCOMES At the end of the course the student will be able to:-	
CO1	To write, test, and debug simple Python programs.
CO2	To implement Python programs with conditions and loops.
CO3	Use functions for structured Python programs.
CO4	Represent compound data using Python lists, tuples, and dictionaries.

Lab Experiments:

Experiment1	Write a program to demonstrate different number data types in Python.
Experiment 2	Write a program to perform different Arithmetic Operations on numbers in Python.
Experiment 3	Write a python program to find largest of three numbers.
Experiment 4	Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula: c/5 = f-32/9]
Experiment 5	Write a program to create, concatenate and print a string and accessing sub-string from a given string
Experiment 6	Write a program to create, append, and remove lists in python.
Experiment 7	Write a program to demonstrate working with tuples in python.
Experiment 8	Write a program to demonstrate working with dictionaries in python.
Experiment 9	Write a Python program to construct the following pattern, using a nested for loop: * * * *** *** * *** * * *
Experiment 10	Write a python program to find factorial of a number using Recursion.

NOTE: Additional Lab Experiments/Practical will be performed based on the course contents requirements

B.Tech. Information Technology 5th Semester Examination to be held in the Year December 2024, 2025, 2026, 2027

BRANCH: Electrical / Computers/ IT/ Mechanical/Civil
SEMESTER:5th
COURSENO: ECO-1515
COURSE TITLE: Internet of Things Lab

CREDITS:1

L	T	P	Marks
-	-	2	25

LABORATORYOUTCOMES At the end of the semester, the students will be able to	
CO1	To develop the knowledge and interfacing of components using embedded C
CO2	To know about XBEE and its communication devices
CO3	To have the knowledge about Arduino module and its interfacing with GSM and Bluetooth
CO4	To demonstrate the ESP8266 module and its interfacing with Arduino.

LISTOF PRACTICALS:

SECTION-A

Embedded Experiments

1. Learning the Embedded C programming concepts
2. Interfacing of peripherals like LEDs, seven segment and LCD.
3. Interfacing of Relay and Buzzer Module.
4. Interfacing of various Sensors with Arduino Board.
5. Interfacing of Temperature Humidity Sensors and turning on Relay at threshold level.

SECTION-B

Wireless Experiments

6. How to communicate two XBEE modules in AT mode
7. How to configure a XBEE module in Broadcast and API Mode
8. How to read the destination address of XBEE module using API mode
9. Data sharing using Bluetooth module to the Android APP
10. Making a call and receiving a call using GSM module

SECTION-C

IoT Experiments

11. Interfacing Wi-Fi with Arduino Module
12. Study of various AT Commands for Wi-Fi
13. Setting a Link with things Speak Server.
14. Updating Data of Sensors on Thing Speak cloud using Wi-Fi Module
15. Study of AT commands for the GSM Module.
16. Updating data on Cloud using GSM module.

NOTE: Each student has to perform atleast ten experiments atleast two from each section, out of which 40% shall be simulation-based. Additional Practicals / Experiments will be performed based on the course content requirements

B.Tech. Information Technology 5th Semester Examination to be held in the Year December 2024, 2025, 2026, 2027

BRANCH: ECE/CSE/IT/Mechanical /Civil
SEMESTER :5th
COURSENO: EEO-2515
COURSETITLE: NON-CONVENTIONALENERGYRESOURCES AND INSTRUMENTATION LAB

CREDITS: 1

L	T	P	Marks
-	-	2	25

LABORATORYOUTCOMES	
At the end of the semester, the students will be able to	
CO1	Measure phase and frequency using CRO and Multimeter
CO2	Students will be able to understand Solar Radiation, distillation
CO3	To study Solar Energy solar cooker, streetlight and its applications
CO4	To study Fuel Cells

LIST OF PRACTICALS:

1. To study the extension of Ammeter and voltmeter ranges.
2. To Study BlockWise Construction of Multimeters & Frequency Counter
3. To Study BlockWise Construction of Analog Oscilloscope & Function Generator.
4. To study the connection of solar panels.
5. To study overall efficiency of solar PV and battery integrated system
6. To Study of Solar Radiation by using Pyranometer.
7. To Study of Solar Distillation or Solar Still.
8. To study the constructional details of a box type solar cooker.
9. To Study of Solar Street Lighting and Lanterns.
10. To Study of Fuel cells.

NOTE: Additional Lab Experiments/Practical will be performed based on the course content requirements.

B.Tech. Information Technology 5th Semester Examination to be held in the Year December 2024, 2025, 2026, 2027

BRANCH: ECE/CSE/IT/Electrical/Civil
SEMESTER: 5th
COURSE NO:MET-5515
COURSE TITLE: 3D PRINTINGLAB

CREDITS:1

L	T	P	Marks
-	-	2	25

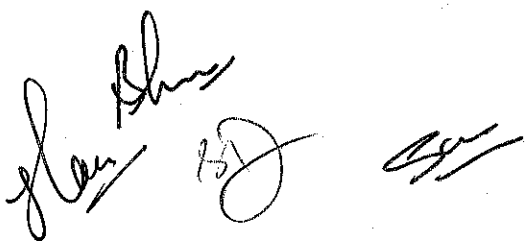
LABORATORYOUTCOMES	
At the end of the semester, the students will be able to	
CO613.1:	Develop CAD models for 3D printing and import and export AD data and generate .stlfile.
CO613.2:	Select a specific material and a 3D printing process for the given application.
CO613.3:	Produce a product sing 3D Printing.

LISTOFEXPERIMENTS:

1. To study the basic features of a 3D printing machine.
2. To study the different components of 3D printer.
3. To study the various type of 3DPrinter
4. To print a 3D model of nut/bolt using PLA material.
5. To print a 3D model of spanner using PLA material.
6. To print a 3D model of pyramid using PLA material.
7. To print a 3D model of gear using PLA material.
8. To print a 3D model of bearing using PLA material.

NOTE:

1. Atleast six practicals should be performed.
2. Additional lab/experiment will be performed based on course content requirement.
3. Simulation/virtual labs are used to enhance the practical ability of student



B.Tech. Information Technology 5th Semester Examination to be held in the Year December 2024, 2025, 2026, 2027

CLASS	**5thSEMESTER**					
BRANCH	**E&C/ELECTRICAL/COMPUTERS/IT/MECHANICALENGINEERING**					
COURSETITLE	**BASICCIVILTESTINGLAB**					
COURSENO.	**CEO-6515**	**L**	**T**	**P**	**Marks**	
DURATIONOFEXAM	**3HOURS**	**0**	**0**	**2**	**25**	**Credit**
						1

COURSEOUTCOMES	
On completion of the course the students will be able to:	
CO1	Perform tests on bricks and aggregates
CO2	Determine the physical properties of cement.
CO3	Determine the Work ability and Compressive strength of concrete
CO4	Determine the Specific gravity, Atterberg limits,Compaction characteristics of Soil

LIST OF THE EXPERIMENTS

1. To determine water absorption and compressive strength of bricks
2. To determine the consistency and initial and final setting time of a given sample of cement using Vicat'sapparatus.
3. To determine the Soundness and Compressive strength of cement.
4. To determine the fineness modulus and bulk density offine and coarse aggregates.
5. To determine flakiness index and Impact value of coarse aggregates.
6. To determine Work ability and Compressive strength of concrete
7. To determine the tensile strength of the steel.
8. To determine the Specific gravity and Atterberg limits of Soil.
9. To determine the compaction characteristics of soil by proctor's test.
10. To determine Cd for Venturimeter
11. To determine Cd for Orificemeter
12. To determine Cd for a Notch

B.Tech. Information Technology 5th Semester Examination to be held in the Year December 2024, 2025, 2026, 2027

CLASS: B.Tech. 5th SEMESTER **CREDITS: 1**

BRANCH: INFORMATION TECHNOLOGY
COURSE NO: SIT-4511
COURSE TITLE: INDUSTRIAL TRAINING

L	T	P	Marks
-	-	-	25

COURSEOUTCOMES	
On completion of the course the students will be able to	
CO1	Interact and study with a range of students and to practice multiple management skills, including communication, independent action and teamwork.
CO2	Understand the engineering code of ethics and be able to apply them as necessary.
CO3	Demonstrate knowledge of practical application of training.

Students are required to undertake 4 weeks Practical Training during the summer vacations in the field of Computer Engineering and applications in Govt./Semi-Govt./Private sector. Thereafter, each student shall be required to submit a report on the practical training to the department for evaluation.

OR

The students can opt to undertake an online course / MOOC (related to the discipline) from a reputed platform of not less than 40 hours (with Certificate).

OR

The students have an option to take a 4 weeks SWAYAM/NPTEL Course and earn a certificate for the same.

Guidelines for evaluation of Practical Training: The evaluation shall be done by the departmental committee during 5th semester. The committee shall have a convener and at least two members.

Distribution of Marks as per University statues:

Total marks of evaluation =25

i)	Report	=7.5	30%
ii)	Viva-Voce & Presentation	=12.5	50%
iii)	Level of IT	=5	20%

NOTE:

- In Case a student has earned a certificate from Swayam / Nptel Platform, the marks so obtained shall be awarded on a proportionate basis.
- DueweightagewillbegiventothosewhohaveoptedforIndustrialTrainingoutsidetheStateas well as keeping in view the profile of that Industry.

Award of the Marks:
Marks under (i), (ii) & (iii) will be awarded by the departmental committee constituted for the purpose.

UNIVERSITY OF JAMMU

B. Tech. Information Technology 6th Semester Examination to be held in the Year May 2025, 2026, 2027, 2028

B.Tech. Information Technology 6th Semester — **Contact Hrs: 26**

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	%Change
			L	T	P	Internal	External			
HMT-7601	Humanities & Social Science Course	Fundamentals of Economics	2	1	-	25	75	100	3	100%
ITT-4601	Professional Core Course	Machine Learning	2	1	-	25	75	100	3	100%
ITT-4602	Professional Elective Course	Data Warehousing and Data Mining	2	1	-	25	75	100	3	100%
ITT-4603		Interactive Computer Graphics								
ITT-4604		Wireless Sensor Networks								
CST-3601	Professional Core Course	Cyber Security	2	1	-	25	75	100	3	100%
CST-3602	Professional Core Course	Compiler Design	2	1	-	25	75	100	3	100%
CST-3604	Professional Core Course	Data Science	2	1	-	25	75	100	3	100%
ITP-4611	Professional Core Course	Machine Learning Lab.	-	-	3	50	-	50	1.5	100%
ITP-4612	Professional Elective Lab. Course	Data Warehousing & Data Mining Lab.	-	-	3	50	-	50	1.5	100%
ITP-4613		Interactive Computer Graphics Lab.								
ITP-4614		Wireless Sensor Networks Lab.								
MOC-4611	Massive Open Online Course	MOOC	-	-	2	25	-	25	1	100%
TOTAL			12	6	8	275	450	725	22	

B. Tech. Information Technology 6th Semester Examination to be held in the Year May 2025, 2026, 2027, 2028

CLASS: B.Tech.6th SEMESTER
BRANCH: IT/CSE/ME/ECE/EE
COURSE TITLE: FUNDAMENTALS OF ECONOMICS
COURSE NO.: HMT-7601
DURATION OF EXAM: 3 HOURS

CREDITS: 3

L	T	P	MARKS	
			External	Internal
2	1	0	75	25

COURSEOUTCOMES	
On completion of the course the students will be able to	
CO1	To understand micro economic concepts such as demand & utility analysis, consumer behavior and to Carry out economic analysis in the decision making process.
CO2	To develop the skills to create the goods and services at minimum cost by studying in detail about the Production and cost analysis.
CO3	To Understand about the market structure and pricing decisions.
CO4	To understand the concept of national Income, Banking, Inflation, Problem of Unemployment and Poverty in India.

Section A

Unit1-Meaning and Importance of Economics: Introduction, Meaning, Scope of Economics; Role and responsibilities of economist, Relationship of economics with other disciplines: Importance of Economics indecision making, the basic process (steps) of decision making. **(5 hours)**

Unit2-Demand Analysis: Introduction, Meaning of demand and Law of Demand, factors affecting demand; exceptions to the law of demand; Elasticity of Demand (Price, income and cross elasticity of demand)**(6hours)**

Unit 3-Consumer Behaviour: Cardinal utility analysis: Concept: law of diminishing marginal utility: law of equi marginal utility, Ordinal utility analysis: meaning and properties of Indifference curves and utility maximization (consumer equilibrium). **(5 hours)**

Unit 4-Production and cost Analysis: Meaning of Production function, Isoquants (meaning and properties) law of variable proportions, law of returns to scale, Cost Analysis: Concept of Fixed, Variable, Total, Average & Marginal Costs & their relationships in short run. **(6hours)**

Section B

Unit 5- Market structure and pricing decisions - Introduction, Perfect Competition, monopoly (Price-Output Determination under Perfect Competition and monopoly in short run and long run); kinked demand curve analysis of price stability in Oligopoly (Sweezy's model) **(5 hours)**

Unit 6-Macroeconomics- Meaning & Concept of National Income; Different methods of calculating national income and difficulties in measuring national income. **(5hours)**

Unit 7-Banking and Inflation- Functions of central bank and methods of credit control: functions of Commercial bank and methods of credit creation, Inflation: Types, effects and methods to control inflation. **(6 hours)**

Unit 8- Problem of Unemployment and Poverty in India: Meaning, types and causes of Unemployment; Poverty: meaning and causes. Poverty alleviation and employment generation programmes in India. **(6 hours)**

BOOKSRECOMMENDED:

1. K.K. Dewett: Modern Economic Theory
2. H.L Ahuja: Advanced Economic Theory
3. M.L. Jhingan: Macro Economic Theory
4. P.N Chopra: Business Economics/Advanced Eco. Theory
5. D.N. Dwivedi: Managerial Economics
6. A. Koutsoyiannis: Modern micro economics
7. Meenu Agrawal: Economic Reforms, Unemployment and Poverty
8. K.R.Gupta: Poverty in India

NOTE:There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed

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B. Tech. Information Technology 6th Semester Examination to be held in the Year May 2025, 2026, 2027, 2028

CLASS: : B.Tech.6th SEMESTER
BRANCH: INFORMATION TECHNOLOGY
COURSE TITLE: MACHINE LEARNING
COURSE NO.: ITT-4601
DURATION OF EXAM: 3 HOURS

CREDITS: 3

L	T	P	MARKS	
			External	Internal
2	1	0	75	25

COURSE OUTCOMES	
At the end of the course the student will be able to: -	
CO1	Explain the basics of machine learning.
CO2	Develop the learning models for the problems using supervised learning approach.
CO3	Apply the different clustering approaches to handle unsupervised based learning.
CO4	Explain the learning models for the problems using Bayesian learning and Decision trees.
CO5	Infer the reinforcement learning and examine the various ensemble models.

Detailed Syllabus

Section- A

Basics of Machine Learning: Definition of Machine learning, Applications, Feature set, Dataset division, Introduction to Machine Learning Techniques: Supervised Learning, Unsupervised Learning and Reinforcement Learning, bias-variance tradeoff, overfitting-underfitting **(6 Hours)**

Supervised learning: Classification and Regression: K-Nearest Neighbor, Linear Regression, Logistic Regression, gradient descent algorithm, Support Vector Machine (SVM), Evaluation Measures: SSE, MME, R2, confusion matrix, precision, recall, F-Score, ROC-Curve. **(9 Hours)**

Unsupervised learning: Introduction to clustering, Hierarchical clustering, K-means clustering, Density based clustering **(6 Hours)**

Section B

Bayesian learning: Probability theory and Bayes rule, Naive Bayes learning algorithm, Bayes nets **(6 Hours)**

Decision trees: Representing concepts as decision trees, Recursive induction of decision trees, best splitting attribute: entropy and information gain, Overfitting, noisy data, and pruning. **(8 Hours)**

Reinforcement learning and ensemble methods: Reinforcement learning through feedback network, function approximation, Bagging, boosting, stacking and learning with ensembles, Random Forest. **(8 Hours)**

BOOKS RECOMMENDED:

1. Machine Learning: The New AI — EthemAlpaydin
2. Machine Learning — Tom M. Mitchell
3. Machine Learning: a Probabilistic Perspective — Kevin P. Murphy

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

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B. Tech. Information Technology 6th Semester Examination to be held in the Year May 2025, 2026, 2027, 2028

CLASS: : B.Tech.6th SEMESTER
BRANCH: INFORMATION TECHNOLOGY
COURSE TITLE: DATA WAREHOUSING AND DATA MINING
COURSE NO.: ITT-4602
DURATION OF EXAM: 3 HOURS

CREDITS: 3

L	T	P	MARKS	
			External	Internal
2	1	0	75	25

COURSE OUTCOMES At the end of the course the student will be able to: -	
CO1	Elaborate the basics and building blocks of data warehousing and data mining
CO2	Apply OLAP operations to multi dimensional data.
CO3	Identify appropriate data mining classification algorithms to solve real world problems
CO4	Examine clustering algorithms and find patterns by applying association rule mining.
CO5	Use data mining tools for applications and case studies of data warehouse, web mining and data mining.

Detailed Syllabus

Section - A

Introduction to Data Warehousing and Data Mining: Data warehousing Definition, Architecture, Benefits of data warehousing, DBMS vs Data warehouse, The Information Flow Mechanism, Metadata, Two Classes of Data, The Lifecycle of Data, Data Flow from Warehouse to Operational Systems, Data Warehouse v/s Data Mining, Difference between Data Mining and Machine Learning. **(6 Hours)**

The Building Blocks of a Data Warehouse: Data Warehouse: The Need for an Operational Data Store (ODS), Operational Data Store, Data Marts: Comparative Study of Data Warehouse with OLTP and ODS, Data Warehouse Schema, Introduction to Data Warehouse Schema: Dimension, Measure, Fact Table, Multi-dimensional view of data, Star Schema, Snowflake Schema, Fact Constellation Schema (Galaxy Schema), Comparison among Star, Snowflake and Fact Constellation Schema. **(9 Hours)**

Online Analytical Processing: Introduction to Online Analytical Processing, Defining OLAP, OLAP applications, Features of OLAP, OLAP Benefits, Strengths of OLAP, Comparison between OLTP and OLAP, Differences between OLAP and data mining. **(5 Hours)**

Section- B

Data Mining Techniques: Types of Data, Data Mining Functionalities, Introduction to Data Preprocessing, Data Preprocessing Methods, Introduction to Classification, Types of Classification, Input and Output Attributes, Working of Classification, Guidelines for Size and Quality of the Training Dataset, Decision Tree Classifier, Naïve Bayes Method. **(7 Hours)**

Cluster Analysis and Association Mining: Cluster Analysis, Applications of Cluster Analysis ,Desired Features of Clustering , Distance Metrics: Euclidean distance, Manhattan distance, Chebyshev distance, Major Clustering Methods/Algorithms, Partitioning Clustering, Hierarchical Clustering Algorithms (HCA), Introduction to Association Rule Mining, Defining Association Rule Mining, Representations of Items for Association Mining, The Metrics to Evaluate the Strength of Association Rules, The Apriori Algorithm. **(8 Hours)**

Data mining tools and Applications: Introduction to WEKA, Application of Data Warehousing (Data Visualization) and Data Mining (Web Mining: Web Content Mining, Web Structure Mining, Web Usage mining) **(8 Hours)**

B. Tech. Information Technology 6th Semester Examination to be held in the Year May 2025, 2026, 2027, 2028

BOOKS RECOMMENDED:

1.	Data Mining and Data Warehousing: Principles and Practical Techniques, Cambridge University Press.	Parteek Bhatia
2.	Data Warehousing, Oxford University Press.	Reema Thareja
3.	Data Mining Concepts & Techniques, Elsevier Pub.	Jiawei Han and Micheline Kamber
4.	Data Warehousing Fundamentals, John Wiley & Sons, Inc.	Paulraj Ponniah
5.	Data Mining: Introductory and Advanced topics, Pearson Education	Margret H. Dunham

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

B. Tech. Information Technology 6thSemester Examination to be held in the Year May 2025, 2026, 2027, 2028

CLASS: B.Tech. 6TH SEMESTER **CREDITS: 3**
BRANCH: INFORMATION TECHNOLOGY
COURSETITLE: INTERACTIVE COMPUTER GRAPHICS
COURSE NO. : ITT-4603
DURATION OF EXAM: 3 HOURS

L	T	P	MARKS	
			EXTERNAL	INTERNAL
2	1	0	75	25

COURSE OUTCOMES

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

CO1	Apply the concepts of mathematical foundations and programming to solve diverse problems related to computer graphics
CO2	Compare and contrast various computer graphic algorithms and their suitability to real world problems
CO3	Utilize models for transformation of 2D and 3D objects.
CO4	Identify the areas of computer graphics to apply advance algorithmic techniques for changing the formations of geometrical objects.
CO5	Apply algorithmic techniques for visualizing objects.

Detailed Syllabus

Section – A

Introduction: Overview of computer graphics, Computer graphics applications, Different I/O devices with specialized graphics features, Graphic systems – Video display devices, Raster scan systems, Random scan systems. Video basics – Video controller, Raster-scan display processor. **(6 Hours)**

2D Primitives: Scan conversion basics, Algorithm for scan converting a point, Scan converting a line –Bresenham's line algorithm. Scan converting circle – Bresenham's circle drawing algorithm, Midpoint circle drawing algorithm. Scan converting ellipse– Midpoint ellipse algorithm. Filling Techniques – Scan line polygon fill algorithm, Boundary-fill, Flood-fill. Anti-aliasing. **(8 Hours)**

2-D Transformations: Geometric and coordinate transformations. Geometric transformations – Scaling, Rotation, Translation, Reflection, Shear. Matrix representations, Homogeneous coordinates, Composite transformations. **(7 Hours)**

Section – B

2D Viewing and Clipping: The viewing pipeline, Window-to-viewport transformation, Point clipping, Line clipping algorithms – Cohen-Sutherland, Liang-Barsky, Nicholl-Lee-Nicholl. Polygon clipping algorithms –Sutherland-Hodgeman, Curve and text clipping. **(6 Hours)**

3D Transformations and Viewing: 3D geometric transformations – Scaling, Rotation, Translation, Reflection, Shear. Composite transformations, 3D viewing, Viewing pipeline, Parallel projections, perspective projections, classifications of projections. **(7 Hours)**

Visible-Surface Detection and Surface Rendering: Classification, Techniques–Back face detection, Depth-buffer method, A-buffer method, Scan line method, Depth sorting method, Surface Rendering: Light sources, Illumination models, Polygon rendering methods – Constant-intensity shading, Gouraud shading, Phong shading. **(8 Hours)**

Books Recommended:

1. Computer Graphics‖, Second Edition, PHI/Pearson Education. — D. Hearn and M.P. Baker,
2. Theory and Problems of Computer Graphics‖, Second Edition, Tata McGraw-Hill. — Zhigang Xiang, Roy Plastock,
3. Computer Graphics Principles & Practice‖, Second Edition, Pearson Education. — C. Foley, Van Dam, Feiner and Hughes,
4. Computer Graphics‖, First Edition, Tata McGraw-Hill. — Amarendra N. Sinha, Arun D. Udai,
5. Introduction to Computer Graphics‖, First Edition, Tata McGraw-Hill. — N. Krishnamurthy,

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

B. Tech. Information Technology 6thSemester Examination to be held in the Year May 2025, 2026, 2027, 2028

CLASS: B.Tech. 6TH SEMESTER **CREDITS: 3**
BRANCH: INFORMATION TECHNOLOGY
COURSETITLE: WIRELESS SENSOR NETWORKS
COURSE NO. : ITT-4604
DURATION OF EXAM: 3 HOURS

L	T	P	MARKS	
			EXTERNAL	INTERNAL
2	1	0	75	25

COURSE OUTCOMES

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

CO1	Outline the basics of wireless sensor networks and its emerging technologies.
CO2	Apply the design principles of WSN architectures and operating systems for simulating environment situations.
CO3	Identify the issues pertaining to sensor networks and the challenges involved in managing sensor networks
CO4	Recognize appropriate infrastructure, topology, joint routing and information aggregation for wireless sensor networks.
CO5	Analyse the sensor network platform and tools for programming.

Detailed Syllabus

Section – A

Introduction to wireless communication: Fundamentals of wireless communication technology, the electromagnetic spectrum radio propagation, characteristics of wireless channels: Path loss, fading, interference, Doppler effect, Transmission rate constraints. Modulation Techniques, Multiple Access Techniques, wireless LANs, PANs, WANs, and MANs. **(7 Hours)**

Wireless Sensor Networks: History of Wireless Sensor Networks, Introduction to Wireless sensor networks, Key definitions, Unique constraints and challenges, Differentiate between traditional networks and wireless sensor networks, advantages of ad-hoc/sensor network, Design issues and challenges in wireless sensor networks. **(8 Hours)**

Basic Wireless Sensor Technology: Introduction, Sensor Node Technology, Architecture of a wireless sensor Network, Node architecture, Protocol stack, Communication in wireless sensor network: flooding, gossiping. data dissemination and Data Aggregation **(6 Hours)**

Section-B

MAC Protocols in WSN: Overview, design issues in MAC protocols, Wireless MAC Protocols, Characteristics of MAC Protocols in Sensor Networks, classification of MAC protocols, Contention Free MAC Protocols, Contention-Based MAC Protocols with Reservation, Contention-Based MAC Protocols with Scheduling Mechanisms and Hybrid MAC Protocols **(7 Hours)**

Routing Protocols: Overview, Routing metrics, Issues in designing a routing protocol, Flooding and Gossiping classification of routing protocols, Data-Centric Routing, Proactive Routing/ table-driven, On-Demand Routing, Hierarchical Routing, Location-Based Routing and QoS-Based Routing Protocols. **(7 Hours)**

Applications and Future Trends: Applications and case studies on Structural Health Monitoring, Habitat Monitoring, Health Monitoring, Traffic Control, Precision Agriculture, Tracking Chemical Plumes. Future Research Directions: Security and privacy in sensor networks, Embedded Systems Networks of High-Data-Rate Sensors Light weight Signal Processing **(7 Hours)**

Books Recommended:

1. AdHoc Wireless networks, Pearson Education. — C. Siva Ram Murthy, and B. S. Manoj
2. Wireless sensor networks, Elsevier publication. — Feng Zhao and LeonidesvGuibas
3. Mobile Communications, Pearson Education. — Jochen Schiller
4. Wireless Communications and Networks, Pearson Education. — William Stallings

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

B. Tech. Information Technology 6th Semester Examination to be held in the Year May 2025, 2026, 2027, 2028

CLASS: B.Tech. 6TH SEMESTER
BRANCH: IT/CSE/COMPUTER ENGINEERING
COURSE TITLE: CYBER SECURITY
COURSE NO.: CST-3601
DURATION OF EXAM: 3 HOURS

CREDITS: 3

L	T	P	MARKS	
			External	Internal
2	1	0	75	25

COURSE OUTCOMES	
At the end of the course the student will be able to	
CO1	Understand the concept of Cyber security and its challenges.
CO2	Comprehend the various cyber-crimes and their associated legal remedies.
CO3	Analyze the privacy and security concerns on online Social media platforms and digital banking Along with reporting procedures and RBI Guidelines .
CO4	Exhibit Knowledge to secure Systems, protect personal data and configuration of Security mechanisms.

Section-A

Introduction to Cyber Security: Defining Cyber space and Overview of Computer and Web-technology, Architecture of cyber space, Communication and web technology, Internet, World wide web, Regulation of cyberspace, Concept of cyber security, Issues and challenges of cyber security. **(08 hours)**

Cyber Crimes & Cyber Laws: Classification of Cybercrimes, Common cyber crimes-cyber crime targeting computers and mobiles, cyber crime against women and children, financial frauds, social engineering attacks, malware and ransom are attacks, Cyber criminals modus - operandi, Reporting of cyber-crimes, Remedial and mitigation measures, Legal perspective of cyber-crime, IT Act 2000 and its amendments, Cyber crime and offences, Organizations dealing with Cyber crime and Cyber security in India. **(14 hours)**

Section-B

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, Aadhaar enabled payments, Digital payments related common frauds and preventive measures. RBI guidelines on digital payments and customer protection in unauthorized banking transactions. **(10 hours)**

Digital Devices Security, Tools and Technologies: End Point device and Mobile phone security, Password policy, Security patch management, Data backup, Downloading and management of third-party software0 , Device security policy, Cyber Security best practices, Significance of host firewall and Anti-virus, Wi-Fi security, Configuration of basic security policy and permissions. **(10 hours)**

BOOKS RECOMMENDED:

1. Cyber Crime Impact in the New Millennium, by R.C Mishra, Author Press. Edition2010.
2. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011)
3. Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform. (Pearson, 13th November, 2001)
4. Electronic Commerce by Elias M. Awad, Prentice Hall of India Pvt Ltd.

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed

B. Tech. Information Technology 6th Semester Examination to be held in the Year May 2025, 2026, 2027, 2028

CLASS: B.Tech. 6TH SEMESTER
BRANCH: IT/CSE/COMPUTER ENGINEERING
COURSE TITLE: COMPILER DESIGN
COURSE NO.: CST-3602
DURATION OF EXAM: 3 HOURS

CREDITS: 3

L	T	P	MARKS	
			External	Internal
2	1	0	75	25

COURSEOUTCOMES	
At the end of the course the student will be able to	
CO1	Gain a comprehensive understanding of the internal organization and behaviour of various components of a compiler and other language processors
CO2	Analyse various phases, algorithms, and techniques for designing and implementing lexical analysers and syntax parsers, as well as error handling.
CO3	Analyse various phases, algorithms, and techniques for designing and implementing lexical analysers and syntax parsers, as well as error handling.
CO4	Acquire knowledge of code optimization techniques to improve the efficiency of generated code and understand the final code generation process.

Section-A

Introduction–Languages Processors, the typical structure of a Complier, Boot Strapping, Cross Compiler **(03 hours)**

Lexical analysis –Role of Lexical Analyzer, input buffering, A simple approach to Design of Lexical Analyzers, Regular Expressions, Finite Automata, Regular expression to Finite Automata, Conversion of NFA to DFA, Minimizing the number of states of a DFA. **(07hours)**

The Syntactic Specification of Programming Languages –Definition of Grammars (Context free grammar),derivate ion, parse tree, ambiguity, non-context free language constructs. **(04 hours)**

Basics Parsing Techniques –Parsers- Shift reduce parsing, Operator precedence parsing, LR parsers. Predicative parsers, LL(1) parser **(08 hours)**

Section-B

Syntax directed translation – Syntax directed translation schemes, Implementation of syntax directed translations with examples. **(04 hours)**

Intermediate code Generation - Intermediate code, postfix notation, three address code-quadruples triples, translation of Assignment statement, Boolean Expression, Statements that alter the flow of control. **(04 hours)**

Symbol Table Organization –The content of symbol table, Data structure of symbol table Run- Time memory Allocation-Static and Dynamic memory allocation, Static allocation of space – Activation trees, activation records, Procedure calls, parameter passing. **(05 hours)**

Error Detection and Recovery-Classification of Errors- lexical, syntactic, semantic errors with examples, Detection of syntactic error in LL and LR parsers, panic mode error recovery and other strategies. **(04 hours)**

Code Optimization- Need of code optimization, Local and Loop optimization, DAG Representation of basic blocks, Global data flow Analysis. **(03 hours)**

Code generation- Issues in the design of code generator, Peephole optimization, a simple code generator Register Allocation & Assignment. **(03 hours)**

RECOMMENDED BOOKS:-

1. Aho A.V., Ullman J. D., Sethi R., Compilers Principles, Techniques and Tools, Pearson Education
2. John Levine, Tony Mason, Doug Brown, Lex and Yacc, O'Reilly
3. Kenneth C. Louden, Compiler Construction and Practices, Thomson Publication
4. Dhamdhere, Compiler Construction. Macmillan Publication

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

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B. Tech. Information Technology 6th Semester Examination to be held in the Year May 2025, 2026, 2027, 2028

CLASS: B.Tech. 6TH SEMESTER
BRANCH: IT/CSE/COMPUTER ENGINEERING
COURSE TITLE: DATA SCIENCE
COURSE NO.: CST-3604
DURATION OF EXAM: 3 HOURS

CREDITS: 3

L	T	P	MARKS	
			External	Internal
2	1	0	75	25

COURSEOUTCOMES At the end of the semester the students will be able to	
CO1	Understand the fundamental concepts and significance of data science.
CO2	Proficiently use the descriptive statistics and data visualization techniques.
CO3	Apply supervised and unsupervised machine learning algorithms to solve various problems.
CO4	Evaluate the performance of machine learning models using appropriate evaluation metrics.
CO5	Understand probabilistic model principles and apply them to real-world problems.

Section-A

Introduction to Data Science: What is data science, Applications of Data Science, Data lifecycle: acquisition, cleaning, analysis, and interpretation, Ethical considerations in data science, Relation to data mining, machine learning, big data and statistics, Data sources and types, Data collection methods, Data cleaning and pre-processing techniques **(10 Hours)**

Exploratory Data Analysis: Descriptive Statistics: Means, mode, median, variance, standard deviation, weighted averaging. Data visualisation techniques: Histograms, Boxplots,Scatterplots,Time series, Spatial DataVisualisation. Exploratory data mining: Introduction, Association discovery- Definition, challenges, Apriori algorithm, Clustering- Definition, Challenges. **(10 Hours)**

Section–B

Machine Learning Fundamentals: Introduction to machine learning, Supervised vs. unsupervised learning, Classification vs Regression, Decision trees, Rule learners, Linear regression, logistic regression, Nearest neighbour learning. Support vector machines, K-means clustering, hierarchical clustering, and DBSCAN **(10Hours)**

Measuring performance of a model: Confusion Matrix, Accuracy, Precision, Recall, F1-Score, ROC curves, AUC-ROC, precision-recall curves, Loss functions for regression, Interpretation of results-Confidence interval for accuracy, Hypothesis tests for comparing models and algorithms. **(8 Hours)**

Probabilistic Models: Introduction- Probabilities, Rule of Bayes and Conditional Independence, Naïve Bayes Classifier, Bayesian Belief Networks **(6 Hours)**

BOOKS RECOMMENDED:

1. Introduction to Data Science — Jeffrey Stanton and Jeffrey M. Stanton
2. Data Science from Scratch — First Principles with Python" by Joel Grus

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

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B. Tech. Information Technology 6th Semester Examination to be held in the Year May 2025, 2026, 2027, 2028

CLASS: B.Tech. 6TH SEMESTER
BRANCH: INFORMATION TECHNOLOGY
COURSE TITLE: MACHINE LEARNING LAB
COURSE NO.: ITP-4611

CREDITS: 1.5

L	T	P	MARKS	
			External	Internal
-	-	3	-	50

COURSE OUTCOMES After Completion of this course the student will be able to: -	
CO1	Implement the basic operations of Linear Algebra in Machine Learning.
CO2	Implement Supervised Learning techniques like Linear Regression and Nonlinear Regression.
CO3	Apply Statistical approaches for multiple Learning techniques.
CO4	Construct models for Classification.

Lab Experiments:

Experiment 1	Write a Program to perform the following operations on matrices: a) Matrix addition b) Matrix Subtraction c) Matrix Multiplication d) Matrix Inversion e) Transpose of a Matrix
Experiment 2	Write a Program to perform the following operations: a) Find the minimum and maximum element of the matrix b) Find the minimum and maximum element of each row in the matrix c) Find the minimum and maximum element of each column in the matrix d) Find trace of the given matrix e) Find rank of the given matrix
Experiment 3	Write a Program to find the mean, median, standard deviation and mode.
Experiment 4	Write a program to implement the Linear Regression
Experiment 5	Write a program to implement the Non-linear Regression
Experiment 6	Write a program to implement the Logistic Regression
Experiment 7	Write a program to implement the naïve Bayesian
Experiment 8	Write a program to implement k-Nearest Neighbor algorithm
Experiment 9	Write a program to implement Support Vector Machine algorithm
Experiment 10	Write a program to demonstrate the working of the decision tree

NOTE: Additional Lab experiments/practicals may be performed based on the course contentsrequirement.

B. Tech. Information Technology 6th Semester Examination to be held in the Year May 2025, 2026, 2027, 2028

CLASS: B.Tech. 6TH SEMESTER
BRANCH: INFORMATION TECHNOLOGY
COURSE TITLE: DATA WAREHOUSING & DATA MINING LAB
COURSE NO.: ITP-4612

CREDITS: 1.5

L	T	P	MARKS	
			External	Internal
-	-	3	-	50

COURSE OUTCOMES	
After Completion of this course the student will be able to: -	
CO1	Learn to perform data mining tasks using a data mining toolkit (such as open source WEKA).
CO2	Understand the data sets and data preprocessing.
CO3	Demonstrate the working of algorithms for data mining tasks such association rule mining, classification, clustering and regression.

Lab Experiments:

Experiment 1	Installation of WEKA Tool
Experiment 2	Explore WEKA Data Mining/Machine Learning Toolkit
Experiment 3	Creating new Arff File
Experiment 4	Perform data preprocessing tasks on i. Add attribute ii. Add expression iii. Copy attribute iv. Remove attribute
Experiment 5	Demonstrate performing classification on data sets
Experiment 6	Demonstrate performing association rule mining on data sets
Experiment 7	Demonstrate performing regression on data sets
Experiment 8	Demonstrate performing SVM classification on data sets
Experiment 9	Demonstrate performing clustering on data sets
Experiment 10	Demonstrate performing knowledge flow on WEKA

NOTE: Additional Lab experiments/practicals may be performed based on the course contents requirement.

B. Tech. Information Technology 6th Semester Examination to be held in the Year May 2025, 2026, 2027, 2028

CLASS: B.Tech. 6TH SEMESTER
BRANCH: INFORMATION TECHNOLOGY
COURSE TITLE: INTERACTIVE COMPUTER GRAPHICS LABORATORY
COURSE CODE: ITP-4613

CREDIT: 1.5

L	T	P	MARKS	
			External	Internal
-	-	3	-	50

COURSE OUTCOMES At the end of the course the student will be able to: -	
CO1	Develop computer programs for elementary graphic operations.
CO2	Implement scan conversion algorithms for line drawing.
CO3	Write programs to implement circle and ellipse drawing algorithms.
CO4	Design programs to demonstrate geometric transformations on 2D and 3D objects.
CO5	Develop programs to demonstrate clipping and filling techniques for modifying an object.

Special Instruction related to resources requirement: Any programming language like C/C++ could be used for the programs.

List of Experiments:

Experiment 1	Write a program for creating a simple two-dimensional shape of any object using lines, circle, etc.
Experiment 2	Write a program to Draw a color cube and spin it using transformation matrices
Experiment 3	Implement the DDA algorithm for drawing line (programmer is expected to shift the origin to the center of the screen and divide the screen into required quadrants).
Experiment 4	Write a program to input the line coordinates from the user to generate a line using Bresenham's Algorithm.
Experiment 5	Write a program to generate a complete moving wheel using Midpoint circle drawing algorithm and DDA line drawing algorithm.
Experiment 6	Write a program to draw an ellipse using the Midpoint ellipse generation algorithm for both the regions.
Experiment 7	Write a program to draw any 2-D object and perform the transformations on it according to the input parameters from the user, namely: Translation, Rotation and Scaling.
Experiment 8	Write a program to rotate a triangle about any one of its end coordinates.
Experiment 9	Write program to draw a house like figure and perform the following operations. a) Scaling about the origin followed by translation. b) Scaling with reference to an arbitrary point.
Experiment 10	Write a program to draw a 4×4 chessboard rotated 45° with the horizontal axis. Use Bresenham's algorithm to draw all the lines. Use seed fill algorithm to fill black squares of the rotated chessboard
Experiment 11	Write a program to perform clipping on a line against the clip window using any line clipping algorithm. The output must be twofold showing the before clipping and after clipping images.
Experiment 12	Write a program to implement the Sutherland-Hodgeman Polygon Clipping algorithm for clipping any polygon

NOTE: Additional Lab experiments/practicals may be performed based on the course contents requirements.

B. Tech. Information Technology 6thSemester Examination to be held in the Year May 2025, 2026, 2027, 2028

CLASS: B.Tech. 6TH SEMESTER
BRANCH: INFORMATION TECHNOLOGY
COURSE TITLE: WIRELESS SENSOR NETWORKS LABORATORY
COURSE NO. ITP-4614
DURATION OF EXAM: 3 HOURS

CREDITS: 1.5

L	T	P	MARKS	
			External	Internal
-	-	3	-	50

COURSE OUTCOMES	
At the end of the course the student will be able to: -	
CO1	Design wireless network environment for any application using latest wireless protocols and standards.
CO2	Implement different type of applications with latest network topologies.
CO3	Examine the network security issues in Mobile and ad hoc networks.
CO4	Apply the knowledge to identify the suitable routing algorithm based on the network and user requirement.
CO5	Simulate and experiment with sensor network software and hardware.

Lab Experiments:

1.	Study of Wireless sensor network simulation tools and its comparison with merits and demerits.
2.	Installation and configuration of any simulation tool MATLAB/NS2/ OPNET++ /etc.
3.	Implementation of basic network topology using any simulation Tool and analysis.
4.	Implementation of cluster and hierarchical topologies using any simulation Tool.
5.	Implementation of LEACH protocol using any simulation Tool.
6.	Implementation of DSR routing protocol using any simulation Tool
7.	Implementation of AODV routing protocol using any simulation Tool.
8.	Study other wireless sensor network simulators (Mannasim,Contiki)
9.	Analyze the performance comparison of implemented protocols (any two).

NOTE: Additional Lab experiments/practicals may be performed based on the course contentsrequirement.

B. Tech. Information Technology 6th Semester Examination to be held in the Year May 2025, 2026, 2027, 2028

CLASS: B.Tech. 6th SEMESTER
BRANCH: INFORMATION TECHNOLOGY
COURSE NO: MOC-4611
COURSE TITLE: MOOC

CREDITS: 1

L	T	P	Marks
-	-	2	25

The students shall select a MOOC of 4 weeks/minimum 40 hours; available at the time on any reputed platform and shall pursue the same after due approval, from the departmental Academic Committee. However, the selected MOOC course should not be similar to the regular courses offered as a part of the department curriculum.

The overall monitoring of the MOOC course will be under the supervision of the teacher In charge of the department. The Departmental Academic Committee shall assess the student work based on a presentation of the course undertaken/ project completed along with a relevant course completion certificate.

Note :- In Case a student opts for a 4 week NPTEL Course the following points need to be followed:

i) The Course is declared pass in the semester only after the production of the NPTEL Certificate, by the student. In case the student does not pass the certification exam or remains absent in the proctored examination, no certificate will be awarded by NPTEL and hence the student will be deemed to have failed in the said Course. The student has to appear again in the NPTEL examination conducted either in the same course or any other course as per the next semester schedule of NPTEL and earn the certificate by passing the exam.

ii) The students must select their College name while registering for a particular course. Thereafter, the option of sharing the result with the institute also needs to be selected. Only those certificates will be accepted and validated by department whose information is shared by NPTEL to college authorities.

No certificate will be accepted without this and student will be marked absent in the college records

UNIVERSITY OF JAMMU

B. Tech. Information Technology 7th Semester Examination to be held in the Year December 2025, 2026, 2027, 2028

B.Tech. Information Technology 7th Semester **Contact Hrs: 23**

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	%Change
			L	T	P	Internal	External			
HMT-7701	Humanities & Social Science Course	International Economics	2	1	0	25	75	100	3	100%
ITT-4701	Professional Core Course	Advanced Algorithms	2	1	0	25	75	100	3	100%
CST-3701	Professional Elective Course	Network Security	2	1	0	25	75	100	3	100%
ITT-4702		Digital Image Processing								
ITT-4703	Professional Elective Course / MOOC	Embedded Systems & IoT	2	1	0	25	75	100	3	100%
CST-3705		Blockchain Technologies								
MOC-4704		SWAYAM/ NPTEL	-	-	-	-	100			
ITP-4711	Professional Core Lab. Course	Advanced Algorithms Lab.	-	-	3	50		50	1.5	100%
CSP-3711	Professional Elective Lab. Course	Network Security Lab.	-	-	2	25	-	25	1	100%
ITP-4712		Digital Image Processing								
SIT-4711	Summer Internship Training	Summer Training II	-	-	-	50	-	50	2	100%
SEM-4711	Seminar	Seminar	-	-	4	50	-	50	2	100%
NCC-6701	Non-Credit Course	Disaster Management	2	0	0	Satisfactory / Unsatisfactory			Non-Credit	100%
TOTAL			**10**	**4**	**9**	**275/250***	**300/325***	**575**	**18.5**	

***In case of SWAYAM / NPTEL**

B. Tech. Information Technology 7th Semester Examination to be held in the Year December 2025, 2026, 2027, 2028

CLASS: B.Tech. 7TH SEMESTER
BRANCH: IT/CSE/EE
COURSE TITLE: INTERNATIONAL ECONOMICS
COURSE NO.: HMT-7701
DURATION OF EXAM: 3 HOURS

CREDITS: 3

L	T	P	MARKS	
			External	Internal
2	1	0	75	25

COURSE OUTCOMES	
At the end of the semester the students will be able to	
CO1	Understand the concept of international trade in general as well as with the classical and modern theories.
CO2	Analyze the concept of foreign exchange rate and exchange control in detail and hence shall be able to Understand the international market conditions.
CO3	Compete in international corporate world by understanding the various concepts of terms of trade like tariffs, quotas etc.
CO4	Understanding the concept of balance of trade, balance of payment and role of international organizations in economic development.

Section A

UNIT - I: Concept of International Trade
Meaning, Significance and scope of International Economics, concepts of internal, interregional and international trade and their comparison, Theories of international trade: Absolute Cost Advantage, Comparative Cost Advantage, Opportunity cost theory (features, assumptions and limitations) **(07 hours)**

UNIT - II: Theories of International Trade
Modern Theories of International Trade: Heckscher- Ohilin Theory, Rybznski Theorem, The Stopler – Samuelson Theorem. **(06 hours)**

UNIT- III: Terms of trade: Concepts and Significance
Meaning, Concept and significance of Terms of Trade, Different Terms of Trade Indexes (Net Barter, Gross Barter, Income, Single and Double Factoral), Factors influencing Terms of Trade. **(07 hours)**

Section B

Unit- IV: Foreign Exchange Rate
Meaning, Types of Foreign exchange rate, Fluctuating Exchane Rate system, Fixed Exchange Rate system Exchange Control: Meaning, Features, Objectives and methods of Exchange Control; Merits and Demerits of Exchange Control. **(07 hours)**

Unit- V: Trade barriers
Tariffs (Meaning, classifications and their impact), Import Quotas: Meaning, types and effects of Quotas, devaluation (concept, merits and demerits). **(06 hours)**

Unit VI: Balance of payment and International organisations
Concept and components of balance of trade and balance of payment, equilibrium and disequilibrium in BOP, consequences of disequilibrium in BOP, Various measures to correct deficit in BOP. International organisations: IMF, World bank, World Trade organisations- objectives, functions. **(07 hours)**

BOOKS RECOMMENDED

1. International Economics -H.G Mannur
2. International Economics -Paul R. Krugman and Maurice Obstfeld
3. International Economics - Dominick Salvatore
4. International Economics - Sodersten Bo
5. International Economics - OsShrivastva
6. International Economics - M.L. Jhingan

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

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B. Tech. Information Technology 7thSemester Examination to be held in the Year December 2025, 2026, 2027, 2028

CLASS: B.Tech. 7TH SEMESTER
BRANCH: INFORMATION TECHNOLOGY
COURSE TITLE: ADVANCED ALGORITHMS
COURSE NO.: ITT-4701
DURATION OF EXAM: 3 HOURS

CREDITS: 3

L	T	P	MARKS	
			External	Internal
2	1	0	75	25

COURSE OUTCOMES

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

CO1	Explain the resource utilization of an algorithm in terms of time and space for a given problem.
CO2	Apply divide and conquer, greedy and dynamic programming approach for finding optimal solution of a given problem.
CO3	Use string matching algorithms for pattern matching.
CO4	Apply graph traversal techniques to search a node and find optimal path.
CO5	Use backtracking and NP completeness strategy to find solution.

Detailed Syllabus

Section-A

Introduction: Algorithms, Algorithm Specification, Performance Analysis: Space complexity,Time complexity, Asymptotic Notations- Big-Oh notation (O), Omega notation (Ω), Theta notation (Θ), and Little-oh notation (o), Mathematical analysis of Non-Recursive and recursive Algorithms with Examples. **(4 Hours)**

Divide and Conquer: General method, solving recurrences using recurrence trees, repeated substitution, statement of Master Theorem, applications – Binary search, Merge sort, Quick sort, Strassen's Matrix Multiplication, Finding the maximum and minimum. **(6 Hours)**

Greedy Algorithms: Greedy choice, optimal substructure property, minimum spanning trees-Prims and Kruskals, Dijkstra shortest path using arrays and heaps, fractional knapsack, Travelling salesperson problem and Huffman coding. **(6 Hours)**

Dynamic Programming: Introduction to dynamic programming and application of the algorithm to solve multistage graphs, edit distance, matrix chain multiplication, All pairs shortest path problem and Knapsack problem. **(5 Hours)**

Section-B

Backtracking: General method, N-Queens problem, Sum of subsets problem, Graph coloring, Hamiltonian cycles. **(5 Hours)**

Application of Graph Traversal Techniques: Representation of graphs, BFS (as a method for SSSP on unweighted graphs), DFS, connected components, topological sorting of DAGs, biconnected components, and strongly connected components in directed graphs. **(6 Hours)**

String Matching: Introduction, Brute Force algorithm, Rabin-Karp algorithm, KMP algorithm, Boyer-Moore algorithm. **(5 Hours)**

NP Completeness: classes NP, P, NP-complete, and polynomial time reductions, Introduction to approximation algorithms, Absolute approximations, E-approximations. **(6 Hours)**

Books Recommended:

1. Fundamentals of Computer Algorithms, Universities Press. — Ellis Horowitz, Sartaj Sahni and S. Rajasekharan,
2. Design and Analysis of algorithms, Pearson Education. — Aho, Ullman and Hopcroft,
3. Design and Analysis of Algorithms, Pearson Education. — P. H. Dave, H. B. Dave
4. Algorithm Design: Foundations, Analysis and Internet examples, John Wiley and sons. — M. T. Goodrich and R. Tomassia
5. Design and Analysis of Algorithms, Oxford Univ. Press — S. Sridhar

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

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B. Tech. Information Technology 7th Semester Examination to be held in the Year December 2025, 2026, 2027, 2028

CLASS: B. Tech 7th SEMESTER
BRANCH: IT/CSE/COMPUTER ENGINEERING
COURSE TITLE: NETWORK SECURITY
COURSE NO: CST-3701
DURATION OF EXAM: 3 HOURS

CREDITS: 3

L	T	P	MARKS	
			EXTERNAL	INTERNAL
2	1	0	75	25

COURSE OUTCOMES

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

CO1	Understand about the significance of Network Security.
CO2	Know about key principles/policies of Cyber Security.
CO3	Acquire knowledge about the Latest Concepts & Techniques in Cryptography.
CO4	Analyze Private/Public Key Management Basics and Implement Digital signature,MD5 & Authentication Protocols

Section A

Introduction: Introduction to N/w Security, Security Approaches, Security Policies, Principle of Security, Introduction to common attacks, IP-Spoofing, Model for N/w Security, Encryption & Decryption. **(06 hours)**

Cryptography: Concepts & Techniques: Introduction to Cryptography, Private/Public Key Cryptography, Plain Text, Cipher Text, Substitution and Transposition techniques, Steganography. **(06 hours)**

Symmetric & Asymmetric Key Cryptography: Overview, Algorithm types & modes, DES scheme, RC5, Blowfish, AES scheme, Differential and Linear Crypto analysis, Key distribution and management. Overview, Key management basics, RSA Algorithm, Digital signatures, Message digest, Hash function (SHA), Message Authentication Code (MAC), Authentication protocols. **(08 hours)**

Section- B

IP Security: Architecture, Authentication header, Encapsulating, Security payload, Security associations, Key management, E-mail security, Web security, Viruses & related threats. **(04 hours)**

Firewalls & Intrusions: Design principles, Characteristics, Types of firewalls, Intruders, Audit Records, Intrusion Detection Systems. **(08 hours)**

Information Security & Cyber Laws: Information security & laws, IPR, Patent law, Copyright law, Overview of cybercrimes, Security metrics – Classification, Benefits, Security tools--Attack & Penetration Tools, Defensive tools. **(08 hours)**

BOOKS RECOMMENDED:

1. Cryptography & Network Security Atul Kahate
2. Cryptography & Network Security William Stallings
3. Computer Networks (Latest Edition) Andrew S. Tanenbaum

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

B. Tech. Information Technology 7th Semester Examination to be held in the Year December 2025, 2026, 2027, 2028

CLASS: B. Tech 7th SEMESTER **CREDITS: 3**
BRANCH: INFORMATION TECHNOLOGY
COURSE TITLE: DIGITAL IMAGE PROCESSING
COURSE NO: ITT-4702
DURATION OF EXAM: 3 HOURS

L	T	P	MARKS	
			EXTERNAL	INTRERNAL
2	1	0	75	25

COURSE OUTCOMES

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

CO1	Remember the fundamental knowledge of Digital Image Processing.
CO2	Understand frequency domain filters and spatial filters for image enhancement.
CO3	Describe the image degradation models which include linear, position-invariant models.
CO4	Apply various filtering techniques used to restore the image and analyze multi resolution view of wavelet transformation functions in 1D and 2D.
CO5	Evaluate image compression and segmentation techniques.

SECTION A

Introduction and Fundamentals to Digital Image Processing: What is Digital Image Processing, Origin of Digital Image processing, Examples that use Digital Image Processing, Fundamentals steps in Digital Image Processing, Components of Digital Image Processing System, Image sensing and acquisition, Image sampling and quantization and representation, Basic relationship between pixels **(7 hours)**

Image Enhancement in the Spatial Domain and Frequency Domain: Background, Basic Intensity transformation functions, Basic grey level transformation, Histogram processing, Basics of spatial filtering: Smoothing, sharpening filters (Convolution and Order Statistics). Introduction to Fourier transform, Frequency domain filters: Smoothing, Sharpening filters (Band pass and Homomorphic) **(7 hours)**

Image Restoration: Noise models, Image Restoration-Mean Filters (Arithmetic Mean, Contra Harmonic Mean, Geometric Mean, Harmonic Mean)Order statistics filters (Median, Maximum, Minimum, Midpoint, Alpha-Trimmed), Restoration techniques (Constrained method-Inverse filtering, Unconstrained method-Weiner filtering) **(7 hours)**

SECTION B

Color Image Processing: Color fundamentals, color models (RGB, CMY and CMYK, HSI and conversions), Psuedocolor image processing, Full color image processing, color transformations (Formulation, Intensity modification, Color negative, Color slicing, Smoothing, Sharpening, Segmentation) **(7 hours)**

Image Compression: **Redundancies** (Coding, Psychovisual, and Inter-Pixel), Encoding-Mapping, Quantizer, Coder, and Compression (Lossless compression: Variable length coding – Run Length coding, LZW coding, Arithmetic coding, Huffman encoding) Lossy Compression (Lossy predictive, Bit allocation), JPEG, MPEG. **(7 hours)**

Image Segmentation & Representation: Erosion, Dilation, Opening and closing, Thickening, Thinning, Pruning, Detection of discontinuities, Edge detection operators, Region based segmentation, Signatures, Boundary segments, Skeleton of a region. **(7 hours)**

BOOKS RECOMMENDED:

1.	Digital Image Processing	Rafael C. Gonzalez And Richard E. Wood
2.	Digital Image Processing	Pratt N.K.
3.	Digital Picture Processing	Rosenfeld And Kak.

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

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B. Tech. Information Technology 7th Semester Examination to be held in the Year December 2025, 2026, 2027, 2028

CLASS: B. Tech 7th SEMESTER
BRANCH: INFORMATION TECHNOLOGY
COURSE TITLE: EMBEDDED SYSTEMS & IoT
COURSE NO: ITT-4703
DURATION OF EXAM: 3 HOURS

CREDITS: 3

L	T	P	MARKS	
			EXTERNAL	INTERNAL
2	1	0	75	25

COURSE OUTCOMES

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

CO1	Interpret embedded systems components for a real time product applying all the relevant Standards with realistic constraints across all domains
CO2	Build a hardware platform encompassing microcontrollers, sensors and peripherals
CO3	Make use of modern real-time operating systems in embedded systems for engineering practices.
CO4	Analyze complex real-world problems through challenges posed by IoT leading to new low-cost architectural models.

Detailed Syllabus

Section- A

Processor Trends in Embedded Systems: Embedded Systems Vs. General Computing Systems - Architecture of Embedded Systems- Classification of Embedded Systems - Characteristics and Quality attributes of Embedded Systems. Embedded Firmware - System on Chip (SoC) -CISC and RISC Architectures- FPGA Architecture **(6 Hrs)**

RTOS Based Embedded System Design and Development: Types of Real-time Operating Systems - Context switching mechanisms - CPU Scheduling policies; Rate-monotonic and Earliest Deadline First scheduling - Priority inversion - Embedded Firmware Development Languages - Assemblers - Compilers - Simulators - Emulators**(7 Hrs)**

Embedded Design Programming: 8051 Microcontroller and Assembly language programming - Embedded C Programming - Arithmetic, Logic Instructions and Programs - 1/0 port programming - Timers - Interrupts and Serial Port Programming. **(8 Hrs)**

Section- B

Introduction to Internet of Things: Basic Building blocks of an IoT Device - Physical and Logical Design of IoT Communication Protocols- IoT Deployment Levels - IoT Physical Servers and Cloud offerings -IoT and M2M. **(7 Hrs)**

IoT Hardware Platforms: Overview of PIC - AVR and ARM family of processors - Raspberry pi -- Arduino - NodeMCU - Intel Galileo boards - Beagle Bone Black. **(7 Hrs)**

Sensors and Actuators: Data Acquisition Sensors: Temperature, Pressure, Humidity, Water Quality, Soil Moisture, Gas and Smoke, Proximity - Infrared Sensors (IR), U|trasonic, GPS, Accelerometers Actuators-Servo motors- Relay switches. **(7 Hrs)**

BOOKS RECOMMENDED:

1.	Introduction to Embedded Systems	Shibu K V, Mc Graw Hill, 2nd Edition
2.	Internet of Things-A Hands-on Approach	Arshdeep Bahga and Vijay Madisetti
3.	Internet of Things: Principles and Paradigms	Rajkumar Buyya and Amir Vahid Dastjerdi

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

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B. Tech. Information Technology 7th Semester Examination to be held in the Year December 2025, 2026, 2027, 2028

CLASS: B. Tech 7th SEMESTER
BRANCH: IT/CSE/COMPUTER ENGINEERING
COURSE TITLE: BLOCKCHAIN TECHNOLOGIES
COURSE NO: CST-3705
DURATION OF EXAM: 3 HOURS

CREDITS: 3

L	T	P	MARKS	
			EXTERNAL	INTERNAL
2	1	0	75	25

COURSE OUTCOMES

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

CO1	Understand the fundamental characteristics of block chain.
CO2	Demonstrate the application of hashing and public key cryptography in protecting the blockchain
CO3	Perform a transaction on different test nets and Develop smart contracts in Ethereum framework.
CO4	Learn applications of Blockchain in real world sceneries

Section-A

Overview: Introduction, Basic Concepts, Evolution, Possibilities, Challenges and Future prospects. **(08 hours)**

Blockchain in Depth: Building Blocks of Blockchain technology, Cryptography in Blockchain, Distributed Consensus, Forking in Blockchain, Smart Contracts, Crypto Assets and Wallets **(12 hours)**

Blockchain for Enterprises: Introduction to Enterprise Blockchain, Enterprise Blockchain Architecture, Enterprise Blockchain Platform. **(08 hours)**

Section-B

Introduction to Ethereum Blockchain: Ethereum Basics, Solidity Smart Contract Programming for Ethereum Blockchain , Creating a dApp on Ethereum Blockchain. **(12 hours)**

Emerging Applications of Blockchain in industry: Central Bank Digital Currency (CBDC), Regulatory Discussions, Emerging Risks, Metaverse, etc. **(06 hours)**

BOOKS RECOMMENDED:

1 Blockchain Revolution Don and Alex Tapscott Pearson, Latest Edition
2.InfosysSpringboard https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01255779688268595211 _shared/overview

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

B. Tech. Information Technology 7th Semester Examination to be held in the Year December 2025, 2026, 2027, 2028

CLASS: B.Tech. 7th SEMESTER
BRANCH: INFORMATION TECHNOLOGY
COURSE NO: MOC-4704
COURSE TITLE: SWAYAM/NPTEL

CREDITS: 1

L	T	P	Marks
3	-	-	100

The department shall offer the 12 weeks NPTEL course out of the list of courses listed by NPTEL around the time of commencement of the semester.

The courses offered shall be related to the core stream but should not be similar to the regular courses offered as a part of the department curriculum.

The overall monitoring of the NPTEL course will be under the supervision of the faculty Incharge of the department.

The NPTEL certification course comprises of Assignments (25%) and Proctor Examination (Online examination MCQ's based = 75%) conducted at the end of the semester by IIT Madras as per notified schedule.

The marks obtained by the student in the NPTEL certification course will be tabulated by the concerned department.

Note :-

i) *The Course is declared pass in the semester only after the production of the NPTEL Certificate, by the student. In case the student does not pass the certification exam or remains absent in the proctored examination, no certificate will be awarded by NPTEL and hence the student will be deemed to have failed in the said Course. The student has to appear again in the NPTEL examination conducted either in the same course or any other course as per the next semester schedule of NPTEL and earn the certificate by passing the exam.*

ii) *The students must select their College name while registering for a particular course. Thereafter, the option of sharing the result with the institute also needs to be selected. Only those certificates will be accepted and validated by department whose information is shared by NPTEL to college authorities.*

No certificate will be accepted without this and student will be marked absent in college records.

B. Tech. Information Technology 7thSemester Examination to be held in the Year December 2025, 2026, 2027, 2028

CLASS: B.Tech. 7TH SEMESTER
BRANCH: INFORMATION TECHNOLOGY
COURSE TITLE: ADVANCED ALGORITHMS LAB
COURSE NO.: ITP-4711

CREDITS: 1.5

L	T	P	MARKS	
			External	Internal
-	-	3	-	50

COURSE OUTCOMES

After Completion of this course the student will be able to: -

CO1	Apply data structure operations.
	Apply Greedy, divide and conquer algorithms.
CO2	Develop dynamic programming algorithms for various real-time applications.
CO3	Illustrate and apply backtracking algorithms, further able to understand non-deterministic algorithms

Special Instruction related to resources requirement: Any programming language like C/C++/Python could be used for the programs.

Lab Experiments:

Experiment 1	Write a program to implement the following operations on Binary Search Tree: a) Insert b) Delete c) Search d) Display
Experiment 2	Write a program to perform a Binary Search for a given set of integer values
Experiment 3	Write a program to implement Merge sort for the given list of integer values
Experiment 4	Write a program to implement Quick sort for the given list of integer values.
Experiment 5	Write a program to find the solution for the knapsack problem using the greedy method
Experiment 6	Write a program to find minimum cost spanning tree using Prim's algorithm
Experiment 7	Write a program to find minimum cost spanning tree using Kruskal's algorithm
Experiment 8	Write a program to find a single source shortest path for a given graph.
Experiment 9	Write a program to find the solution for job sequencing with deadlines problems.
Experiment 10	Write a program to find the solution for a 0-1 knapsack problem using dynamic programming.
Experiment 11	Write a program to solve Sum of subsets problem for a given set of distinct numbers using backtracking.
Experiment 12	Implement N Queen's problem using Back Tracking

NOTE: Additional Lab experiments / practicals may be performed based on the course contents requirements.

B. Tech. Information Technology 7th Semester Examination to be held in the Year December 2025, 2026, 2027, 2028

CLASS: B.Tech. 7TH SEMESTER
BRANCH: IT/CSE/COMPUTER ENGINEERING
COURSE TITLE: NETWORK SECURITY LAB
COURSE NO.: CSP-3711

CREDITS: 1

L	T	P	MARKS	
			External	Internal
-	-	2	-	25

COURSE OUTCOMES

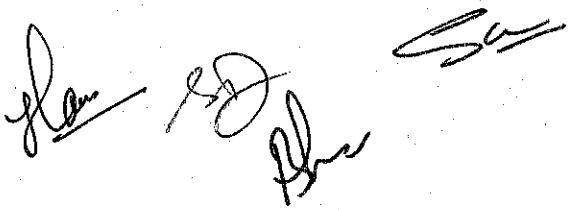
After Completion of this course the student will be able to: -

CO1	Implementation of Encryption /Decryption Algorithm using **C/C++.**
CO2	Implementation of Symmetric Cryptography Algorithm using **C/C++.**
CO3	Implementation of Asymmetric Cryptography Algorithm using **C/C++.**
CO4	Implementation of Firewalls and Study of Information Security Tool.

Lab Experiments:

Experiment 1	To implement the simple substitution technique named Caesar cipher using C language.
Experiment 2	To write a C program to implement the Play fair Substitution technique.
Experiment 3	To write a C program to implement the Hill Cipher substitution technique.
Experiment 4	To write a C program to implement the Rail Fence Transposition technique.
Experiment 5	To write a C program to implement the Data Encryption Standard (DES).
Experiment 6	To write a C program to implement the RSA Encryption algorithm.
Experiment 7	To implement the Diffie-Hellman Key Exchange algorithm using C language.
Experiment 8	To write a C program to implement the MD5 hashing technique.

NOTE: Additional Lab experiments/practical may be performed based on the course contents requirements.



B. Tech. Information Technology 7th Semester Examination to be held in the Year December 2025, 2026, 2027, 2028

CLASS: B.Tech. 7TH SEMESTER **CREDITS: 1**
BRANCH: INFORMATION TECHNOLOGY
COURSE TITLE: DIGITAL IMAGE PROCESSING LAB
COURSE NO.: ITP-4712

L	T	P	MARKS	
			External	Internal
-	-	2	-	25

COURSE OUTCOMES

After Completion of this course the student will be able to: -

CO1	Install MATLAB and its working environment.
CO2	Understand load and save operations on an image.
CO3	Demonstrate conversion of RGB to CMY and RGB TO HIS.
CO4	Create Histogram, negative, contrast enhancement and binary image from an image file.
CO5	Implement various Filters on image.

Lab Experiments:

Experiment 1	Image sampling and quantization
Experiment 2	Analysis of spatial and intensity resolution of images.
Experiment 3	Intensity transformation of images.
Experiment 4	DFT analysis of images
Experiment 5	Transforms (Walsh, Hadamard, DCT, Haar)
Experiment 6	Histogram Processing
Experiment 7	Image Enhancement-Spatial filtering
Experiment 8	Image Enhancement- Filtering in frequency domain
Experiment 9	Image segmentation – Edge detection, line detection and point detection
Experiment 10	Analysis of images with different color models

NOTE: Additional Lab experiments/practical may be performed based on the course contents requirements.

B. Tech. Information Technology 7th Semester Examination to be held in the Year December 2025, 2026, 2027, 2028

CLASS: B.Tech. 7th SEMESTER **CREDITS: 2**

BRANCH: INFORMATION TECHNOLOGY
COURSE NO: SIT-4711
COURSE TITLE: SUMMER TRAINING-II

L	T	P	Marks
-	-	-	50

COURSEOUTCOMES On completion of the course the students will be able to	
CO1	Interact and study with a range of students and to practice multiple management skills, including communication, independent action and teamwork.
CO2	Understand the engineering code of ethics and be able to apply them as necessary.
CO3	Demonstrate knowledge of practical application of training.

Students are required to undertake 4 to 6 weeks Practical Training during the summer vacations in the field of Computer Engineering and applications in Govt./Semi-Govt./Private sector. Thereafter, each student shall be required to submit a report on the practical training to the department for evaluation.

OR

The students can opt to undertake an online course / MOOC (related to the discipline) from a reputed platform of not less than 60 hours (with Certificate).

OR

The students have an option to take an 8 week SWAYAM/NPTEL Course and earn a certificate for the same.

Guidelines for evaluation of Practical Training: The evaluation shall be done by the departmental committee during 5th semester. The committee shall have a convener and at least two members.

Distribution of Marks as per University statues:

Total marks of evaluation	=50	
i. Report	=15	30%
ii. Viva-Voce & Presentation	=25	50%
iii. Level of IT	=10	20%

NOTE:

- In Case a student has earned a certificate from Swayam / Nptel Platform, the marks so obtained shall be awarded on a proportionate basis.
- Due weightage will be given to those who have opted for Industrial Training outside the State as well as keeping in view the profile of that Industry.

Award of the Marks:

Marks under (i), (ii) & (iii) will be awarded by the departmental committee constituted for the purpose

B. Tech. Information Technology 7th Semester Examination to be held in the Year December 2025, 2026, 2027, 2028

CLASS: B.Tech. 7th SEMESTER
BRANCH: INFORMATION TECHNOLOGY
COURSE NO: SEM-4711
COURSE TITLE: SEMINAR

CREDITS: 2

L	T	P	Marks
-	-	4	50

COURSEOUTCOMES On completion of the course the students will be able to	
CO1	Select a topic relevant to the field of Information Technology / Computer engineering.
CO2	Undertake a review of the literature on the chosen topic.
CO3	Prepare and present a technical report

This will involve a detailed study of a topic of interest reproduced in the candidate's own style. For this, a student has to prepare a seminar by doing proper survey of literature, compilation of information so gathered and then presentation of the same followed by question-answer session. The report of which has to be submitted by the student well before the conduct of seminar. The handout submitted by the student will be in accordance with the standards of technical papers.

Guidelines and evaluation of Seminar in 7th semester:

The topic of the Seminar is to be finalized and approved by the departmental committee having a convener and at least two faculty members.

Distribution of Marks:

Total Marks for Seminar Evaluation = 50 marks
i) Project Report 15 marks
ii) Presentation 25 marks
iii) Attendance 10 marks.

Award of Marks:
Marks Under (1) will be awarded by the Seminar in charge.
Marks Under (2) and (3) will be awarded by the Departmental committee constituted for the purpose.

B. Tech. Information Technology 7th Semester Examination to be held in the Year December 2025, 2026, 2027, 2028

CLASS: B. Tech 7th SEMESTER
BRANCH: INFORMATION TECHNOLOGY
COURSE TITLE: DISASTER MANAGEMENT
COURSE NO: NCC-6701
DURATION OF EXAM: 3 HOURS

CREDITS: 0

L	T	P	
2	-	-	**Satisfactory/Unsatisfactory**

COURSE OUTCOMES

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

CO1	Identify various types of disasters, their causes and Impacts
CO2	To understand the disaster management principles, objectives and approaches
CO3	To understand various elements of disaster management.
CO4	To study the modern techniques used in disaster mitigation and management

Module I

Introduction to Disaster Management: Define and describe disaster, hazard, emergency, vulnerability, risk and disaster dimensions. Important phases of Disaster Management Cycle. Disasters classification- Natural disaster (floods, draught, volcanoes, earthquakes, tsunami, landslides, forest fires etc.); manmade disasters (industrial pollution, nuclear radiation, chemical spills, transportation accidents, terrorist strikes, etc.)

Module II

Disaster Management: principles, objectives, and approaches, psychological and social impacts of disaster, impact of disaster on family, businesses, role of NGOs, community – based organizations and media.
Disaster Mitigation: Hazard assessment, Vulnerability assessment, and Risk assessment. Emergency Management Systems (EMS): Emergency medical and essential public health services, response and recovery operations.

BOOKS RECOMMENDED:

1. Disaster Management BY Harsh K Gupta
2. Disaster Management Techniques and Guidelines BY B K Singh
3. Disaster Risk Reduction in South Asia BY Pradeep Sahni
4. Disaster management, A P H Publishers BY Sharma S.R

NOTE: Evaluation of the course. There will be internal evaluation based on two internal sessional tests of 30 marks each.

UNIVERSITY OF JAMMU

B. Tech. Information Technology 8thSemester Examination to be held in the Year May 2026, 2027, 2028, 2029

SCHEME-A

B.Tech. Information Technology 8th Semester **Contact Hrs: 26**

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	%Change
			L	T	P	Internal	External			
ITT-4801	Professional Core Course	Web Technology	2	1	-	25	75	100	3	100%
ITT-4802	Professional Core Course	Software Testing	2	1	-	25	75	100	3	100%
ITP-4811	Professional Core Lab. Course	Web Technology Lab.	-	-	2	25		25	1	100%
MOC-4811	Massive Open Online Course	MOOC	-	-	2	25	-	25	1	100%
PRJ-4811	Project	Project	-	-	16	150	50	200	8	100%
TOTAL			4	2	20	250	200	450	16	

B. Tech. Information Technology 8th Semester Examination to be held in the Year May 2026, 2027, 2028, 2029

CLASS: B. Tech 8th SEMESTER
BRANCH: INFORMATION TECHNOLOGY
COURSE TITLE: WEB TECHNOLOGY
COURSE NO: ITT-4801
DURATION OF EXAM: 3 HOURS

CREDITS: 3

L	T	P	MARKS	
			EXTERNAL	INTERNAL
2	1	0	75	25

COURSE OUTCOMES

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

CO1	Demonstrate the basic concepts of Internet, its working, Internet protocols
CO2	Apply the concept of HTML, CSS and Javascript in designing web pages
CO3	Create web based applications using Advanced Javascript and XML
CO4	Create database for a given problem scenario.

Detailed Syllabus

Section- A

Internet and WWW: Introduction to Internet, Working of Internet, Internet Protocols, Internet Service Provider, WWW vs Internet, Internet Applications, Web Browser, Client side Scripting vs Server-side scripting. **(4 Hrs)**

HTML and CSS: HTML tags, Self closing HTML Tags, Anchor Tag, HTML Forms, Frames, Relative and Absolute Path, HTML vs HTML5, Introduction to CSS, need for CSS, Stylesheets, Selectors, CSS Properties, manipulating Text, using Fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS Grid, CSS Layout. **(9 Hrs)**

Javascript: Introduction to Javascript, statements, comments, variables, operators, Keywords , Data Types, Control Flow, Functions, Arrays, Objects, Loops, DOM Manipulation: Document Object Model, DOM Selectors, DOM Events, Validations. **(9 Hrs)**

Section- B

XML: Introduction to XML, Use of XML, Key Components, DTD and Schema, Well formed document, XML namespace, Introduction to XSL, XSL Elements, transforming with XSLT. **(5 Hrs)**

PHP - Basic Syntax - Defining variable and constant - PHP Data types - Operator and Expression - Operator Precedence - Decisions and Loop - Functions & Recursion - String Processing, Form Processing, Cookies. **(9 Hrs)**

Databases: Introduction to Databases, SQL: Create, Alter, Insert, Update, Select, Conditional Selections, Functions, Joining Tables, Delete from, Drop table, setting up database, connecting to database, deleting database. **(5 Hrs)**

BOOKS RECOMMENDED:

1. Fundamentals of the Internet and the World Wide Web, Raymond Greenlaw and Ellen Hepp 2001, TMH.
2. Internet & World Wide Programming, Deitel, Deitel& Nieto, 2000, Pearson Education.
3. HTML & XHTML: The Definitive Guide Chuck Musciano, Bill Kennedy, 2000, 4th Edition.

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

B. Tech. Information Technology 8th Semester Examination to be held in the Year May 2026, 2027, 2028, 2029

CLASS: B. Tech 8th SEMESTER
BRANCH: INFORMATION TECHNOLOGY
COURSE TITLE: SOFTWARE TESTING
COURSE NO: ITT-4802
DURATION OF EXAM: 3 HOURS

CREDITS: 3

L	T	P	MARKS	
			EXTERNAL	INTERNAL
2	1	0	75	25

COURSEOUTCOMES	
At the end of the semester the students will be able to	
CO1	Apply software testing knowledge and engineering methods.
CO2	Design and conduct a software test process for a software testing project.
CO3	Identify the needs of software test automation, and define and develop a test tool to support test automation.
CO4	Understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods.
CO5	Use software testing methods and modern software testing tools for their testing projects.

Detailed Syllabus

SECTION- A

Principles of testing Software development life cycle model: Phases of software project, Quality, Quality assurance and quality control. Testing Verification and validation. Process models to represent various phases. Life cycle models, Software testing life cycle. (08 hours)

White Box Testing (WBT) and Black Box Testing: Static testing, Structural testing, Challenges in WBT.Black box testing process. (04 hours)

Integration Testing: Definition, As a type of testing: Top-down integration. Bottom-up integration. Bi-directional integration. System integration. Choosing integration method, As a phase of testing, Scenario testing: System scenarios. Use case scenarios. Defect bash. (07 hours)

SECTION-B

System and Acceptance Testing. Functional vs non Functional .Functional system testing, on- functional sytem testing. Acceptance testing. (06 hours)

Performance testing, Regression testing, Internationalization testing, adhoc testing. Factors governing performance of testing, methodology, tools and process for performance testing. regression Testing. Introduction, Types of regression testing, Regression testing process. Adhoc testing: Introduction, Buddy testing. pair testing, Exploratory testing. Iterative testing, Agile and Extreme testing. XP work flow. Defect seeding (09 hours)

Testing Object Oriented Software: Introduction. Comparison of object oriented and procedural software, System testing example, tools for testing object oriented software, Testing web applications. (08 hours)

BOOKS RECOMMENDED:		
1.	Software Testing and Practices	Srinivasan Desikan,GopalaswamyRamesh
2.	Introducing Software Testing	Loise Tares
3.	Software Testing Techniques	Boris Beizer

NOTE: There will be eight questions of 15 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

60

B. Tech. Information Technology 8th Semester Examination to be held in the Year May 2026, 2027, 2028, 2029

CLASS: B.Tech. 8TH SEMESTER
BRANCH: INFORMATION TECHNOLOGY
COURSE TITLE: WEB DEVELOPMENT LAB
COURSE NO.: ITP-4811

CREDITS: 1

L	T	P	MARKS	
			External	Internal
-	-	2	-	25

COURSE OUTCOMES	
After Completion of this course the student will be able to: -	
CO1	Apply the concept of HTML and CSS in designing web pages
CO2	Implement the concept of Javascript, XML and PHP in designing web pages
CO3	Create a website using HTML, CSS, Javascript, PHP and XML.

Lab Experiments:

Practical Set-1: HTML	
Experiment 1	Create web pages for an organization/brand/university using various HTML tags.
Experiment 2	Create your Class Time-Table using table tag.
Experiment 3	Create user feedback form (use textbox, text area , checkbox, radiobutton, select box etc.)
Experiment 4	Develop a webpage having two frames that divide the webpage into two equal rows and then divide the row into equal columns fill each frame with a different background color.
Practical Set-2: CSS	
Experiment 5	Design a page using <style> tag which should include the following: • Class Selector • Id Selector • Various HTML pages Use different font, styles: In the style definition you define how each selector should work. Then, in the body of your pages you refer to these selectors to activate the styles
Experiment 6	Design a HTML page for biodata using CSS. Implement External style sheet and internal style sheet
Practical Set-3: Javascript	
Experiment 7	Create HTML Page with JavaScript which takes Integer number as input and tells whether the number is ODD or EVEN.
Experiment 8	Develop simple calculator for addition, subtraction, multiplication and division operation using JavaScript
Experiment 9	Implement the concept of Validation.
Practical Set-4: XML	
Experiment 10	Create XML file to store student information like Enrollment Number, Name ,Mobile Number , Email Id.
Experiment 11	Convert XML Document to HTML Document using XSL.
Practical Set-5: PHP & Database	
Experiment 12	Implement conditional statements, looping statements & functions in PHP
Experiment 13	Implement Database connectivity in PHP with MySQL

NOTE: Additional Lab experiments / practicals may be performed based on the course contents requirements.

B. Tech. Information Technology 8th Semester Examination to be held in the Year May 2026, 2027, 2028, 2029

CLASS: B.Tech. 8th SEMESTER
BRANCH: INFORMATION TECHNOLOGY
COURSE NO: MOC-4811
COURSE TITLE:MOOC

CREDITS: 1

L	T	P	Marks
-	-	2	25

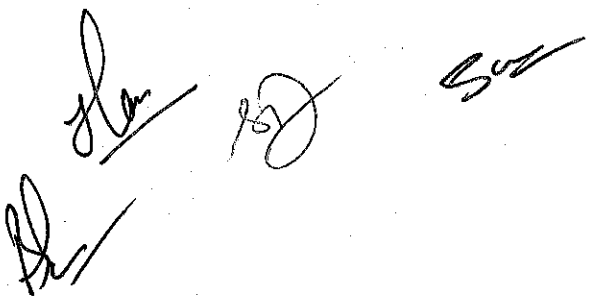
The students shall select a MOOC of 4 weeks/minimum 40 hours; available at the time on any reputed platform and shall pursue the same after due approval, from the departmental Academic Committee. However, the selected MOOC course should not be similar to the regular courses offered as a part of the department curriculum.

The overall monitoring of the MOOC course will be under the supervision of the teacher In charge of the department. The Departmental Academic Committee shall assess the student work based on a presentation of the course undertaken/ project completed along with a relevant course completion certificate.

Note :- In Case a student opts for a 4 week NPTEL Course the following points need to be followed:

i) *The Course is declared pass in the semester only after the production of the NPTEL Certificate, by the student. In case the student does not pass the certification exam or remains absent in the proctored examination, no certificate will be awarded by NPTEL and hence the student will be deemed to have failed in the said Course. The student has to appear again in the NPTEL examination conducted either in the same course or any other course as per the next semester schedule of NPTEL and earn the certificate by passing the exam.*
ii) *The students must select their College name while registering for a particular course. Thereafter, the option of sharing the result with the institute also needs to be selected. Only those certificates will be accepted and validated by department whose information is shared by NPTEL to college authorities.*

No certificate will be accepted without this and student will be marked absent in the college records.



B. Tech. Information Technology 8th Semester Examination to be held in the Year May 2026, 2027, 2028, 2029

CLASS: B.Tech. 8th SEMESTER
BRANCH: INFORMATION TECHNOLOGY
COURSE NO: PRJ-4811
COURSE TITLE: PROJECT

CREDITS: 8

L	T	P	Marks		TOTAL
			External	Internal	
0	0	16	50	150	200

COURSEOUTCOMES At the end of the semester the students will be able to	
CO1	Identify a problem statement from a rigorous literature survey or the industry requirements analysis.
CO2	Simulate and design a solution for the identified problem by applying acquired technical knowledge.
CO3	Develop and test the prototype/algorithm to solve the engineering problem.
CO4	Accomplish all objectives of the project in an allocated period with efficient teamwork.
CO5	Present project work orally and through a comprehensive report.

Major Project Guidelines:

After interactions with project guides/industry experts, based on comprehensive literature survey/ Industry requirements analysis, the student shall identify the title and define the aim and objectives of a project. The student is expected to work on detailed specifications, methodology, resources required, critical issues in design and implementation, and submit the project proposal within the first two weeks of semester. The student is expected to work on the design, development, and testing of the proposed project work as per the schedule.

The detailed project report is to be submitted at the end of the semester. This report includes a summary of the literature survey, detailed objectives, project specifications, design, , developed system/Algorithm, results, contributions, and innovations in project work . A copy of the certificate if awarded should also be appended to the report

Sub-distribution of marks:
For External Examiner : 50
For Internal Examiner : 150

Mark distribution of internal Project work as per the University statues shall be based on:

Distribution	Mid–Sem		Internal Final	%age
Viva-Voce	25	50%	30	30%
Presentation	25	50%	30	30%
Report	--	--	40	40%
	50		100	
Total (INTERNAL)	150			

The External Evaluation of 50 marks shall be done by the External Expert and shall be based on the work done, Viva-voce and Presentation.

B. Tech. Information Technology 8th Semester Examination to be held in the Year May 2026, 2027, 2028, 2029

SCHEME – B

B.Tech. Information Technology 8th Semester

Contact Hrs: 26

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	%Change
			L	T	P	Internal	External			
PII-4811	Professional Industry Internship	Industry Internship	-	-	24	325	100	425	15	100%
MOC-4811	Massive Open Online Course	MOOC	-	-	2	25	-	25	1	100%
TOTAL			-	-	**26**	**350**	**100**	**450**	**16**	

B. Tech. Information Technology 8th Semester Examination to be held in the Year May 2026, 2027, 2028, 2029

CLASS: B.Tech. 8th SEMESTER
BRANCH: INFORMATION TECHNOLOGY
COURSE NO: PII-4811
COURSE TITLE: INDUSTRY INTERNSHIP

CREDITS: 15

L	T	P	Marks		TOTAL
			External	Internal	
0	0	24	100	325	425

COURSEOUTCOMES At the end of the semester the students will be able to	
CO1	To provide exposure to work independently in the Industry/Organisation
CO2	To develop skills in the emerging technologies
CO3	To utilize the knowledge for seeking placements in the Industry

The Project Industrial Internship letters shall be issued to the students in the 7th Semester based on the student request application, specifying the details of the company /industry/organisation from where they intend to do their Industrial Internship; along with company's consent letter and the detailed plan of the Project/Internship to be undertaken during the 8th Semester, as per the Performa provided. The Departmental Academic Committee will finalize and approve the projects. Subsequently, an internal Supervisor shall be allotted to each student who will periodically review the student's performance during the Internship/project as decided by the department.

At the Completion of the Project internship, the students have to submit a detailed project/Internship report individually to the department through their internal guides and a copy of the successful completion certificate should also be appended to the report. They shall also submit a monthly progress of their Internship/project duly signed by the concerned authority in the Organisation/Company via mail to their respective Supervisor. Following guidelines must be followed by the department while permitting the students for Industrial Internship:

Case 1:

i. Preference shall be given to the Students who are placed in the company/Industry and their respective companies/Industries etc mandates the student to work in their Industries for 8th Semester before joining the Jobs after Completion of course. The students shall have to submit an undertaking that he/she will join the company after the completion of the course.

Case 2:

i. No student shall be allowed to undertake Industrial Internship having backlog in any subject (Theory/Practical) upto the semester for which the result is declared by the University of Jammu (Except case1).

ii. The aggregate % of marks for applying shall be minimum 60% upto the Semester for which the result is declared by the university. (Except case 1).

iii. Number of students permitted (case 1 and 2) in any batch for the Industrial Internship shall not be more that the 50% of the strength of the class.

iv. If the number of applications are more, then the permission shall be granted as per the merit drawn (aggregate % of marks) upto the semester for which the result is declared by the university (Except case1).

v. Students with offer letters from reputed organisations/Industries and National Institutions, preferably with stipend, shall be given preference.

vi. Students who wish to initiate a Start Up shall submit a Detailed plan for the same and may be allowed if the DAC approves their proposal.

B. Tech. Information Technology 8th Semester Examination to be held in the Year May 2026, 2027, 2028, 2029

NOTE: The Final decision to allow external Project Industrial Internships shall be taken by the Department Academic Committee in accordance with the above listed guidelines and shall be binding on all the students.

Guidelines for evaluation of Industrial Internship in 8th semester:
There shall be a mid-semester online/offline evaluation, followed by an End Semester (Final) Evaluation

Sub-distribution of marks:

- For External Evaluation : 100
- For Internal Evaluation : 325

Sub-distribution of internal Evaluation:

- Out of the total 325 marks for internal evaluation, 125 marks are for mid-sem evaluation and 200 marks are for final internal evaluation
- Mark distribution of internal evaluation of Industrial Internship shall be as per below table:

	Distribution	Mid-Sem (Internal Supervisor)	Internal Final (Departmental Committee)	
a.	Viva-Voce	50	60	30%
b.	Presentation/Demonstration	75	60	30%
c.	Report	---	80	40%
		125	200	
	Total Internal	325		

The External Evaluation of 100 marks shall be done by the External Expert and shall be based on the Profile of Company/ Organisation, level of the work done, Viva-voce and Presentation.

B. Tech. Information Technology 8th Semester Examination to be held in the Year May 2026, 2027, 2028, 2029

CLASS: B.Tech. 8th SEMESTER **CREDITS: 1**

BRANCH: INFORMATION TECHNOLOGY
COURSE NO: MOC-4811
COURSE TITLE:MOOC

L	T	P	Marks
-	-	2	25

The students shall select a MOOC of 4 weeks/minimum 40 hours; available at the time on any reputed platform and shall pursue the same after due approval, from the departmental Academic Committee. However, the selected MOOC course should not be similar to the regular courses offered as a part of the department curriculum.

The overall monitoring of the MOOC course will be under the supervision of the teacher In charge of the department. The Departmental Academic Committee shall assess the student work based on a presentation of the course undertaken/ project completed along with a relevant course completion certificate.

Note :- In Case a student opts for a 4 week NPTEL Course the following points need to be followed:

i. *The Course is declared pass in the semester only after the production of the NPTEL Certificate, by the student. In case the student does not pass the certification exam or remains absent in the proctored examination, no certificate will be awarded by NPTEL and hence the student will be deemed to have failed in the said Course. The student has to appear again in the NPTEL examination conducted either in the same course or any other course as per the next semester schedule of NPTEL and earn the certificate by passing the exam.*

ii. *The students must select their College name while registering for a particular course. Thereafter, the option of sharing the result with the institute also needs to be selected. Only those certificates will be accepted and validated by department whose information is shared by NPTEL to college authorities.*

No certificate will be accepted without this and student will be marked absent in the college records.