ANNEXURE-I

UNIVERSITY OF JAMMU,
JAMMU COURSE SCHEME
B.E 5th Semester Information Technology
For Examination to be held in the Year December 2020,2021,2022,2023

Contact Hrs/Week: 22

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	%Change
			L	T	P	Internal	External			
PIT-501	Professional Core Course	Computer Networks	2	1	0	50	100	150	3	100%
PIT-502	Professional Core Course	RDBMS	3	1	0	50	100	150	4	100%
PIT-503	Professional Core Course	Microprocessor & Interfacing	2	1	0	50	100	150	3	100%
PIT-504	Professional Core Course	Theory of Computation	3	1	0	50	100	150	4	100%
MOC-505	Massive Open Online course	SWAYAM /NPTEL	3	0	0	100	-	100	3	100%
PIT-511	Professional Core Course	Computer Networks Lab	0	0	2	50	-	50	1	100%
PIT-512	Professional Core Course	RDBMS Lab	0	0	2	50	-	50	1	100%
PIT-513	Professional Core Course	Microprocessor Lab	0	0	2	50	-	50	1	100%
PIT-505	Summer Industry Internship	Industrial Training	-	-	-	50	-	50	2	100%
TOTAL			**13**	**4**	**6**	**500**	**400**	**900**	**22**	

***Note:** The Department shall offer the SWAYAM/NPTEL course out of the list of the courses offered by SWAYAM around the time of commencement of the semester. However the selected NPTEL course should not be similar to the regular courses offered as a part of the department curriculum.*

Examination to be held in the Year December 2020,2021,2022,2023

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

BRANCH: INFORMATION TECHNOLOGY

COURSE NO: PIT-501

COURSE TITLE: COMPUTER NETWORKS

DURATION OF EXAM: 3 HOURS

L	T	P	Marks Theory	Sessional
2	1	0	100	50

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	Acquire a thorough understanding of the state-of-the-art in modern network architecture, protocols, networked systems and applications.
CO2	Familiar with the components required to build different types of networks and be exposed to the required functionality at each layer.
CO3	Analyse simple protocols and independently study literature concerning computer networks.
CO4	Propose the solutions to improve the end to end performance of the network.
CO5	Use concepts of networking in developing networks for real time engineering and scientific situations.

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 **(05 hours)**

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

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

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

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

BOOKS RECOMMENDED:

1 Data Communication - William L. Schweber.
2 Computer Networks - Andrew S. TanenBaum.
3 Communication Network System for Computer - Davies &Barbq
4 Data Communication and networking - Behrouz A. Forouzan

NOTE: There will be eight questions of 20 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.

` Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDITS: 4**

BRANCH: INFORMATION TECHNOLOGY

COURSE NO: PIT-502

COURSE TITLE: RDBMS

DURATION OF EXAM: 3 HOURS

L	T	P	Marks: Theory	Marks: Sessional
3	1	0	100	50

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	Understanding Functional Components of DBMS.
CO2	Develop ER Model.
CO3	Design Queries using Relational Algebra, Relational Calculus & SQL
CO4	Design Database Schema.
CO5	Understand transition processing, Concurrency control & Recovery Techniques

Detailed Syllabus

Section - A

Basic Concepts: - Data Modelling-Records and Files-Abstraction and data Integration-Views-Data independence- Components of DBMS-Advantages and disadvantages, Data associations, Data model's classification. **(4 hours)**

Entity Relationship Model: -Basic Concepts, constraints, Design issues, Entity-relationship diagram, week Entity sets, Extended ER features, design of ER database scheme, Reduction of ER schemes to tables. **(6 hours)**

Relational Model: - Attributes and domains, Tuples, Relations and schemas, relation representation, keys, Integrity rules, Relational algebra, Relational Calculus. Data Manipulation using SQL. **(6 hours)**

Relational Data-base Design: - Normalization using functional dependency, Normalization using join dependencies, Normalization using join dependencies, Domain key normal form. **(6 hours)**

Section- B

Section- B

Transactions: - Transaction concepts, transaction state, implementation of Atomicity and Durability, Concurrent execution, Serializability, Recoverability, implementation of isolation, transaction definition in SQL. **(6 hours)**

Concurrency Control: - Lock based protocols, Timestamp based protocols, Validation based protocols, Multiple Granularity, Multiversion Schemes, Deadlock Handling, Insert and Delete operations. **(12 hours)**

Recovery Systems: -Failure classification, Storage Structure, Recovery and Atomicity, Log Based Recovery, Shadow Paging, Recovery with Concurrent Transactions, Buffer Management. **(6hours)**

BOOKS RECOMMENDED:

1. Database concepts — Korth,Silberchatz–TMH
2. An Introduction to Database Systems — Bipin C. Desai
3.Principles of Database Management system — Aho Ullman
4. Oracle — Ivan Bayross.

NOTE: There will be eight questions of 20 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.

Examination to be held in the Year December 2020,2021,2022,2023

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

BRANCH: INFORMATION TECHNOLOGY

COURSE NO: PIT-503

COURSE TITLE: MICROPROCESSOR & INTERFACING

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	To understand the knowledge of general architecture of a microcomputer system and architecture & organization of 8085 and 8086 microprocessors.
CO2	To classify and apply the instruction set of 8085 and 8086 microprocessor and distinguish the use of different instructions.
CO3	To analyze architecture and operation of Programmable Interface Devices and realize the assembly language programming.
CO4	To create the interfacing of memory and various I/O devices with 8085 microprocessor.

Detailed Syllabus

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. **(6 hours)**

Section- B

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

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. **(12 hours)**

BOOKS RECOMMENDED:

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

NOTE: There will be eight questions of 20 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.

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDITS: 4**
BRANCH: INFORMATION TECHNOLOGY
COURSE NO: PIT-504
COURSE TITLE: THEORY OF COMPUTATION
DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
3	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	To Gain the knowledge of basic concepts of formal languages and finite automata techniques
CO2	Understand regular expressions and various problems to minimize FA
CO3	Apply various languages to construct context free grammar.
CO4	Evaluate problems relating to Push down automata and Turing Machines.

Detailed Syllabus

Section- A

Introduction: -Symbols, string Concatenation, alphabet, Language, Tree, Mathematical Induction Proofs, States, Transition Tables, Finite Automata, Regular Expressions, Push- down Automata, Turing Machine, Context Free grammars**.** **(8 hours)**

Finite Automata: - Deterministic Finite Automata (DFA), Designing, Non- deterministic finite Automata (NFA) without E-moves, Conversions, Equivalence, NFA with E-moves, Regular expression designing, Finite machine with output assigned, Moore and mealy machines, Conversion and Equivalence. **(12 hours)**

Section- B

Turing Machines: -Turing Hypothesis, Turing Computability, Non- deterministic, Multitape and other versions of Turing machines, Churches Hypothesis, Primitive Recursive functions, Universal Turing machines, decidability, Halting problem, Stack Automata. **(10 hours)**

Regular Grammar & Context free Languages: -Context Free Grammar, Context free Languages, reduced form of Grammar, Ambiguous and Non- Ambiguous grammar, acceptors and generators, Relations between Classes of Languages, Pumping lemma of regular sets, Chomsky's hierarchy of languages, derivation Trees.
(10 hours)

BOOKS RECOMMENDED:

1. Introduction to Automata Languages & Computation — A.V. AHO, J. E. Hopcreft& J.D. Ullman
2. Introduction Theory of Computer Science — E. V. Krishna Moorthy

NOTE: There will be eight questions of 20 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.

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDITS: 3**
BRANCH: INFORMATION TECHNOLOGY **Marks**
COURSE NO:MOC-505
COURSE TITLE: SWAYAM/NPTEL

L	T	P	Sessional
3	0	0	100

The department shall offer the SWAYAM / NPTEL course (12 weeks) out of the list of courses offered by SWAYAM around the time of commencement of the semester. However, the selected NPTEL course 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 teacher in charge of the department.

The NPTEL/SWAYAM 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 the schedule.

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

Note :- *In case the student does not pass the certification exam or remains absent in the proctor examination, no certificate will be given to the candidate by the NPTEL and the student will be deemed to have failed in the course. The examination of the said NPTEL course will be taken by the department concerned in the next semester under the supervision of Examination Cell of GCET Jammu. The paper will be of 75 marks and assignment marks will be carried forward from the previous semester.*

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDIT: 1**

BRANCH: INFORMATION TECHNOLOGY **Marks**

COURSE NO.: PIT-511	**L**	**T**	**P**	**Practical**
COURSE TITLE: COMPUTER NETWORKS LAB	**0**	**0**	**2**	**50**

LABORATORY OUTCOMES **After Completion of this course the student will be able to: -**	
CO1	Understand fundamental underlining principles of computer networking.
CO2	Understand details and functionality of layered network architecture.
CO3	Apply mathematical foundations to solve computational problems in Computer Networking.
CO4	Analyse performance of various communication protocols.
CO5	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	To connect two computers in a local area network and to share file between them.
Experiment 5	To study about IP addressing.
Experiment 6	To implement various topologies using the LAN trainer kit.
Experiment 7	To study the UDP protocol and TCP protocol using the LAN trainer software.
Experiment 8	WAP on bit stuffing and character stuffing using any language.

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

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDIT: 1**

BRANCH: INFORMATION TECHNOLOGY

COURSE NO.: PIT-512

COURSE TITLE: RDBMS LAB

L	T	P	Marks Practical
0	0	2	50

LABORATORY OUTCOMES **After Completion of this course the student will be able to: -**	
CO1	Apply the basic concepts of Database Systems and Applications.
CO2	Design and Implement a database schema.
CO3	Devise queries using DDL, DML, DCL and TCL commands.
CO4	Design a commercial relational database system (Oracle) by writing SQL using the system.
CO5	Analyse and select storage and recovery techniques of database system.

Lab Experiments:

Experiment 1	Identify the case study and detail statement of problem. Design an Entity- Relationship (ER) / Extended Entity-Relationship (EER) Model.
Experiment 2	Mapping ER/EER to Relational schema model.
Experiment 3	Create a relational database system using DDL commands with constraints
Experiment 4	Update the database system using DML commands
Experiment 5	Apply Integrity constraints for the specified system.
Experiment 6	Query the database using simple and complex queries
Experiment 7	Apply Integrity Constraints for the specified system
Experiment 8	Perform Nested queries
Experiment 9	Perform Join operations
Experiment 10	High level programming language extensions (Control structures, Procedures and Functions)

NOTE: **Additional Lab experiments/ practical's will be performed based on the course contents requirements.**

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDIT: 1**

BRANCH: INFORMATION TECHNOLOGY

COURSE NO.: PIT-513

COURSE TITLE: MICROPROCESSOR & INTERFACING LAB

L	T	P	Marks Practical
0	0	2	50

LABORATORY OUTCOMES **After Completion of this course the student will be able to: -**	
CO1	To classify and apply the instruction set of 8085 and 8086 microprocessors.
CO2	To design, code and debugs Assembly Language programs to implement simple programs.
CO3	To apply programming knowledge using the capabilities of the stack, the program counter
CO4	To execute a machine code program on the training boards.
CO5	To develop ALP for fixed point and floating point and arithmetic operations using 8086 microprocessor

Lab Experiments:

Experiment 1	Block Transfer: - Data bytes are stored in memory locations from XX50H 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 to XX64H. 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. dd 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	Write a program for multiplication of Two 8 bit unsigned nos.
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 contents requirements**

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDIT:2**

BRANCH: INFORMATION TECHNOLOGY

COURSE NO.: PIT-515

COURSE TITLE: INDUSTRIAL TRAINING

L	T	P	Marks Practical
-	-	2	50

COURSE OUTCOMES **At the end of the course the student 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.
CO4	Submit a training report along with the certificate issued by the concerned department.

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 concern department for evaluation.

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

Distribution of Marks as per the University statues:

Total Marks for Evaluation		= 50 marks	
i)	Report	= 15	30%
ii)	Viva-Voce & Presentation	= 25	50%
iii)	Level of IT	= 10	20%

Due weight age 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.

ANNEXURE-II

UNIVERSITY OF JAMMU, JAMMU
COURSE SCHEME
B.E 6th Semester Information Technology
For Examination to be held in the Year May 2021,2022,2023,2024.

Contact Hrs/Week: 21

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	% Change
			L	T	P	Internal	External			
HMC-601	Humanities & Social Science Course	Managerial Economics	3	1	0	50	100	150	4	100%
MOC-605	Massive Open Online Course	SWAYAM/NPTEL	3	0	0	100	-	100	3	100%
PIT-602	Professional Core Course	Analysis & Design of Algorithms	3	1	0	50	100	150	4	100%
PIT-603	Professional Core Course	Software Engineering	3	1	0	50	100	150	4	100%
PIT-604	Professional Elective Course	Elective-I	3	1	0	50	100	150	4	100%
PIT-611	Professional Elective Course	Elective-I Lab	0	0	2	50	-	50	1	100%
PIT-612	Professional Core Course	Web Designing & Android Development Lab	0	0	2	50	-	50	1	100%
TOTAL			**15**	**4**	**4**	**400**	**400**	**800**	**21**	

Elective-I	
PIT-604 (A)	Soft Computing
PIT-604 (B)	Micro Controller & Embedded Systems
PIT-604(C)	Python programming
Elective-I Lab	
PIT -611(A)	Soft Computing Lab
PIT -611 (B)	Micro Controller & Embedded Systems Lab
PIT -611(C)	Python programming Lab

***Note:** The Department shall offer the SWAYAM/NPTEL course out of the list of the courses offered by SWAYAM around the time of commencement of the semester. However the selected NPTEL course should not be similar to the regular courses offered as a part of the department curriculum.*

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER **CREDITS: 4**

BRANCH: INFORMATION TECHNOLOGY

COURSE NO: HMC-601

COURSE TITLE: MANAGERIAL ECONOMICS

DURATION OF EXAM: 3 HOURS

L	T	P	Marks: Theory	Marks: Sessional
3	1	0	100	50

COURSE OUTCOMES

At the end of the course, students will be able to:

CO1	Understand in detail about managerial economics and hence shall be a good decision maker.
CO2	Understand about business environment of a country after acquiring knowledge in detail about demand analysis and consumer behaviour.
CO3	Be a good decision maker after acquiring knowledge about demand forecasting techniques.
CO4	Suggest producing the products at minimum cost by studying in detail about the cost curves and market structures.
CO5	Have knowledge of macroeconomics concepts such as, index numbers, business cycle, banking, inflation, etc. and will be able to apply them in day to day life.

Detailed Syllabus

Section A

Meaning and Importance of Managerial Economics: Introduction, Meaning, Scope of Managerial Economics, Role and responsibilities of managerial economist, Relationship of managerial economics with other disciplines: Importance of Managerial Economics in decision making, the basic process(steps) of decision making. **(05 hours)**

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) **(06 hours)**

Consumer Behavior: 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). **(05 hours)**

Demand Forecasting: Introduction, Meaning and importance of demand Forecasting: Methods or Techniques of Demand Forecasting, Survey Methods, Statistical Methods, Demand Forecasting for New Products**.** **(04 hours)**

Section B

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. **(06 hours)**

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(Sweezy's model) **(05 hours)**

Macroeconomic environment

Index Numbers-Meaning, construction and difficulties in measurement of Index number and its uses: meaning and phases of Trade /business cycle. **(05 hours)**

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). **(06 hours)**

BOOKS RECOMMENDED :

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 microeconomics

NOTE: There shall be total eight questions, four from each section. Each question carries 20 marks. Five questions will have to be attempted, selecting at least two from each section. Use of calculator is allowed.

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER **CREDITS: 3**
BRANCH: INFORMATION TECHNOLOGY
COURSE NO: MOC-605
COURSE TITLE: SWAYAM/NPTEL

L	T	P	Marks Sessional
3	0	0	100

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

Note :- *In case the student does not pass the certification exam or remains absent in the proctor examination, no certificate will be given to the candidate by the NPTEL and the student will be deemed to have failed in the course. The examination of the said NPTEL course will be taken by the department concerned in the next semester under the supervision of Examination Cell of GCET Jammu. The paper will be of 75 marks and assignment marks will be carried forward from the previous semester.*

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER **CREDITS: 4**
BRANCH: INFORMATION TECHNOLOGY
COURSE NO: PIT-602
COURSE TITLE: ANALYSIS & DESIGN OF ALGORITHMS
DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
3	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	Gain knowledge about the techniques for effective problem solving in computing.
CO2	Implement various design and analysis techniques such as greedy algorithms, dynamic programming.
CO3	Interpret the techniques used for designing different graph algorithms.
CO4	Apply backtracking, branch and bound techniques for real time problems.
CO5	Evaluate the concepts of P, NP and NP-Complete problems and synthesize algorithm in common engineering designing situations.

Detailed Syllabus

Section- A

Introduction to Algorithms: Analysing the Performance of an Algorithm, Space/Time complexity, Asymptotic Notation, Recurrence Relations, Performance measurement, write Algorithms in SPARK's**.** **(04 hours)**

Heap & Hash Tables: - Representing a Heap, Operations on Heaps, Applications, building a Heap, Hash Table, Hashing Functions, Resolving Collision by separate Chaining, Open Addressing, Quadratic Probing, Double Hashing, Rehashing. **(06 hours)**

Lower Bound Theory: - Comparison Trees for searching & Sorting, Parallel Comparison trees, Oracle& Adversary Arguments, Lower Bounds through Reduction. **(04 hours)**

NP-Hard and NP-Complete Problems: -Basic concepts, Non-Deterministic Algorithms, Polynomial Time Algorithms, NP-hard & NP –complete classes, Cook's Theorem, Introduction to Approximation Algorithms. **(04 hours)**

Section- B

Design Techniques: -

Divide and Conquer: - General methods, Binary Search, Finding the Maximum & Minimum, Merge sort, Quick Sort & Selection sort, Strassen's Matrix, Multiplication. **(08 hours)**

Greedy Method: - General Methods, Optimal Storage on Tapes, Knapsack Problem, Job Sequencing with Deadlines, Optimal Merge Patterns, Single Source, shortest path. **(06 hours)**

Dynamic Programming: - General Methods, Multistage Graphs, I/O Knapsack, Reliability Design, Travelling Salesperson problem. **(04 hours)**

Back Tracking: - General Method, The 8- Queens Problem, Hamiltonian Cycles, Knapsack Problem.

Branch &Bound: - The method, I/O Knapsack Problem, Travelling Salesperson Problem. **(03 hours)**

BOOKS RECOMMENDED:

1. Fundamentals of Computer Algorithms. Ellis Horowitz, SartajSahni.
2. Data Structure & Algorithm J.M. Hopcraft , Ullman

NOTE: There will be eight questions of 20 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.

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6thSEMESTER **CREDITS: 4**
BRANCH: INFORMATION TECHNOLOGY
COURSE NO: PIT-603
COURSE TITLE: SOFTWARE ENGINEERING
DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
3	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	Understand the basics of software and its engineering paradigms
CO2	Analyse the software requirement, planning and estimation techniques
CO3	Implement the various software design procedures and data flow diagrams
CO4	Analyse and evaluate the quality of software
CO5	Compare and analyse the various software testing techniques and maintenance.

Detailed Syllabus

Section A

Introduction to Software Engineering: - Software Considerations: Software characteristics Software crisis Software myths, Software Engineering paradigms**.** **(04 hours)**

System and software Planning: - Planning phase of system definition, system analysis, Modelling the system architecture, system specification, Software planning objectives, Software scope, Software project estimation, Decomposition techniques, Empirical estimation models, Automated estimation models, Software project scheduling, Software acquisition, Software re-engineering. **(06 hours)**

Software requirement analysis: - Requirement analysis, Analysis principles, specifications requirement analysis tools, Data flow diagrams**.** **(06 hours)**

Software Design Fundamentals: - The design process, Design fundamentals, Effective modular design, Data design, Architectural design, procedural design, Design documentation. **(04 hours)**

Section B

Data flow-oriented design: Design and information flow, design process considerations, transform analysis, transaction analysis, Design post processing, Design optimization. Design process considerations. Jackson System development**.** **(06 hours)**

Software Quality Assurance: - Software quality and software quality assurance, Software reviews, software quality metrics, software reliability, complexity measures, storage and processing time analysis. **(06 hours)**

Software testing and maintenance: - Software Testing Fundamentals, Whitebox Testing, Basic Path Testing, Control Structure Testing, Black Box Testing. Software Testing Strategies, Unit Testing Integration Testing, Validation Testing, System Testing. **(06 hours)**

Software maintenance: Definition, Maintenance characteristics, Maintainability, Maintenance Tasks, Maintenance Side Effects, Reverse Engineering and Re-engineering**.** **(04 hours)**

Reference books:-

1. **Software Engineering, A practitioner's approach:** **R.S. Pressman.**
2. **Integrated approach to Software Engineering:** **Pankaj Jalote**
3. **Software Engineering:** **M.L. Shooman.**

NOTE: There will be eight questions of 20 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.

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER **CREDITS: 4**

BRANCH: INFORMATION TECHNOLOGY

COURSE NO: PIT -604 (A)(ELECTIVE-I)	**L**	**T**	**P**	**Marks Theory**	**Sessional**
COURSE TITLE: SOFT-COMPUTING	**3**	**1**	**0**	**100**	**50**

DURATION OF EXAM: 3 HOURS

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	Acquire knowledge about Artificial Neural Networks and learning mechanisms.
CO2	Master basic neural network models and their training using BPN.
CO3	Implement Fuzzy reasoning in developing Fussy Associative Memory (FAM).
CO4	Understand the concept of Neuro-Fuzzy modelling by its implementation in classification and regression trees
CO5	Acquire the knowledge of evolutionary computation and genetic algorithm to tackle real world problems.

Detailed Syllabus

Section- A

Artificial Neural Networks: Basic concepts - Single Layer Perception-Multilayer Perception-Supervised and Unsupervised learning–Back propagation Networks-Kohen's self-organizing Networks-Hopfield network, Feed forward network, Hopfield network. **(06 hours)**

Neural network models: neural network models, layers in neural network and their connections. Instar, outstar, weights on connections, threshold function, application-Adaline and Madeline **(04 hours)**

Back propagation: feed forward back propagation network-mapping, layout, training, BPN applications **(04 hours)**
Learning and training: objectives of learning, Hebb's rule, delta rule, learning vector quantizer, associative Memory models, one-shot learning, resonance, stability, training and convergence **(06 hours)**

SECTION B

Fuzzy Systems: Fuzzy sets and Fuzzy Reasoning-Fuzzy Matrices-Fuzzy Functions-Decomposition-Fuzzy automata and languages - Fuzzy Control Methods-Fuzzy decision making. **(06 hours)**

BAM- Bidirectional associative memory, inputs and outputs, weights and training. FAM-fuzzy associative memory, association. **(04 hours)**

Neuro - Fuzzy Modelling: Adaptive networks based Fuzzy interface systems - Classification and Regression Trees -Data clustering algorithms - Rule based structure identification - Neuro-Fuzzy controls -Simulated annealing – Evolutionary computation. **(06 hours)**

Genetic Algorithms: Survival of the Fittest - Fitness Computations - Cross over - Mutation -Reproduction -Rank method - Rank space method. **(04 hours)**

BOOKS RECOMMENDED:

1. Neuro-Fuzzy and Soft computing — Jang J.S.R., Sun C.T. and Mizutani E
2. Fundamentals of Neural Networks — Laurene Fausett.
3. Artificial Intelligence - A New Synthesis — N. J. Nelsson

NOTE: There will be eight questions of 20 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.

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER **CREDITS: 4**
BRANCH: INFORMATION TECHNOLOGY
COURSE NO: PIT-604 (B)(ELECTIVE-I)
COURSE TITLE: MICROCONTROLLER & EMBEDDED SYSTEMS
DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
3	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	To understand the knowledge of general architecture of a microcontroller.
CO2	To classify and apply the instruction set of 8051 and AVR microcontrollers and the use of different instructions.
CO3	To analyse architecture and operation of embedded system using aurdino and raspberry pie development boards.
CO4	To create the interfacing of memory and various I/O devices with microcontrollers.

Detailed Syllabus

Section- A

8051 Microcontroller: Introduction to Microcontrollers, Evolution, Microprocessors vs. Microcontrollers, MCS-51 Family Overview, Important Features, Architecture. 8051 Pin Functions, Architecture, Addressing Modes, Interrupt Organization, Processing Interrupts, Serial Port Interrupts, External Interrupts, and Interrupt Service Routines. Memory Address Decoding, 8031/51 Interfacing with External ROM And RAM. **(10 hours)**

Assembly programming and instruction of 8051: Introduction to 8051 assembly programming, Assembling and running an 8051 program, Data types and Assembler directives, Arithmetic, logic instructions and programs, Jump, loop and call instructions, IO port programming.

8051 interfacing with 8255- Programming the 8255, 8255 interfacing, C programming for 8255. **(12 hours)**

Section- B

Embedded system : concept - characteristic features - architecture - application areas - specialties - embedded operating system - types - activities of an embedded OS like task, task scheduling, context switching, mutual exclusions and inter task communications - memory management and timer services - general architecture of OS - kernel - categories of embedded OS - examples - concept of arduino and raspberry pie development boards. **(10 hours)**

Introduction to AVR microcontroller: Overview of AVR family, AVR Microcontroller architecture, status register, Special function registers, RAM, ROM & EEPROM space, On-Chip peripherals, ATmega32 pin configuration & function of each pin, Fuse bits of AVR. **(05 hours)**

AVR assembly language programming: AVR data types and assembler directives, addressing modes of AVR, Data transfer, Arithmetic, Logic and Compare, Rotate and Shift, Branch and Call instructions, AVR studio setup for assembly language programming, AVR I/O Port Programming, Time delay loop, Look-up table. **(08 hours)**

BOOKS RECOMMENDED:

1. The 8051 Microcontroller and Embedded Systems, second edition, Pearson publications — Mazidi Muhammad Ali
2. The AVR Microcontroller and Embedded Systems using assembly and C - - Pearson Education. — Muhammad Ali Mazidi, SarmadNaimi and SepehrNaimi
3. Programming and Customizing the AVR Microcontroller — DhananjayGadre, McGraw Hill Education

NOTE: There will be eight questions of 20 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.

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER **CREDITS: 4**

BRANCH: INFORMATION TECHNOLOGY

COURSE NO: PIT -604 (C) (ELECTIVE-I)

COURSE TITLE: Python Programming

DURATION OF EXAM: 3 HOURS

L	T	P	Marks: Theory	Marks: Sessional
3	1	0	100	50

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	To Understand basics of python
CO2	To develop console application in python
CO3	To develop database application in python
CO4	Apply the concept of file handling in python and basic machine learning application

Detailed Syllabus

Section- A

Introduction to Python Programming Language: -Introduction to Python Language, Strengths and Weaknesses, IDLE, Dynamic Types, Naming Conventions, String Values, string Operations, String Slices, String Operators, Numeric Data Types, Built In Functions. **(10 hours)**

Data Collections and Language Component: - Introduction, Control Flow and Syntax, Indenting, The if Statement, Relational Operators, Logical, Operators, True or False, Bit Wise Operators, The while Loop, break and continue, The for Loop, Lists, Tuples, Sets, Dictionaries, Sorting Dictionaries, Copying Collections. **(5 hours)**

Functions and Modules :- Introduction Defining Your Own Functions Parameters Function Documentation Keyword and Optional Parameters Passing Collections to a Function Variable Number of Arguments Scope Functions - "First Class Citizens" Passing Functions to a Function Mapping Functions in a Dictionary Lambda Modules Standard Modules – sys Standard Modules – math Standard Modules – time The dir Function **(6 hours)**

Section- B

Object and Classes: - Classes in Python, Principles of Object Orientation, Creating Classes, Instance Methods Special Methods Class Variables, Inheritance, Polymorphism. **(6 hours)**

I/O and Error Handling In Python: Introduction, Data Streams, Creating Your Own Data Streams, Access Modes, Writing Data to a File, Reading Data From a File, Additional File Methods, Handling IO Exceptions, Working with Directories, Errors, Run Time Errors, The Exception Model, Exception Hierarchy, Handling Multiple Exceptions. **(10 hours)**

Text Book:

1. Think Python, by Allen B. Downey, second edition, O'Reilly, Sebastopol, California.
2. Online Version www.greenteapress.com/thinkpython2.pdf.
3. How to think like a computer Scientist, by Brad Miller and David Ranum.
4. Python Programming: An Introduction to Computer Science, by John Zelle.

Online Version: www.interactivepython.org/runstone/static/thinkscpy/index.html.

NOTE: There will be eight questions of 20 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.

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER **CREDIT: 1**
BRANCH: INFORMATION TECHNOLOGY
COURSE NO.: PIT -611 (A) (ELECTIVE-I)
COURSE TITLE: SOFT-COMPUTING LAB

L	T	P	Marks Practical
0	0	2	50

LABORATORY OUTCOMES **After Completion of this course the student will be able to: -**	
CO1	Install MATLAB and its working environment.
CO2	Implement single layer and multilayer Perceptron Models using NN.
CO3	Understand the implementation of KSOM, BPNN and Associative memory.
CO4	Implement Fuzzy associative memory (FAM).
CO5	Acquire the knowledge of evolutionary computation and genetic algorithms.

Lab Experiments:

Experiment 1	Introduction to Neural Networks and Perceptron Example
Experiment 2	Multilayer Perceptron and Application
Experiment 3	Probabilistic Neural Networks and Application
Experiment 4	Introduction to Fundamental of Fuzzy Logic and Basic Operations
Experiment 5	Fuzzy Inference System(FIS)
Experiment 6	Fuzzy Weighted Average and Application
Experiment 7	Fuzzy Control and Application

NOTE: **Additional Lab experiments/practical's will be performed based on the course contents requirements**.

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER **CREDIT: 1**

BRANCH: INFORMATION TECHNOLOGY

COURSE NO.: PIT -611 (B) (ELECTIVE-I)

COURSE TITLE: MICRO CONTROLLER & EMBEDDED SYSTEMS LAB

L	T	P	Marks Practical
0	0	2	50

LABORATORY OUTCOMES **After Completion of this course the student will be able to: -**	
CO1	Apply programming language using 8051 microcontroller to meet the requirements of the user.
CO2	Design, code and debug Assembly Language programs to implement simple programs.
CO3	Interface peripherals like switches, LEDs, stepper motor, Traffic lights controller, etc.
CO4	Apply programming language using AVR microcontroller kit.

Lab Experiments:

Experiment 1	Study and familiarization of 8051 Microcontroller trainer kit
Experiment 2	Assembly Language Program for addition of 8-bit numbers stored in an array
Experiment 3	Assembly Language Program for Multiplication by successive addition of two 8-bit numbers
Experiment 4	Assembly Language Program for finding largest no. from a given array of 8-bit numbers
Experiment 5	Assembly Language program to arrange 8-bit numbers stored in an array in ascending order
Experiment 6	Stepper motor control by 8051 Microcontroller
Experiment 7	Interfacing of 8-bit ADC 0809 with 8051 Microcontroller
Experiment 8	Interfacing of 8-bit DAC 0800 with 8051 Microcontroller and Waveform generation using DAC
Experiment 9	Implementation of Serial Communication by using 8051 serial ports
Experiment 10	Study of AVR Controller.
Experiment 11	Assembly Language Programs using AVR.

NOTE: **Additional Lab experiments/practical's will be performed based on the course contents requirements.**

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER **CREDIT: 1**

BRANCH: INFORMATION TECHNOLOGY

COURSE NO.:PIT -611 (C) (ELECTIVE-I LAB)

COURSE TITLE: PYTHON PROGRAMMING LAB

L	T	P	Marks Practical
0	0	2	50

LABORATORY OUTCOMES	
After Completion of this course the student will be able to: -	
CO1	To learn how to design and program Python applications
CO2	To define the structure and components of a Python program
CO3	Apply how to write functions and pass arguments in Python.
CO4	Design object-oriented programs with Python classes
CO5	Apply the concept of exception handling in Python applications for error handling

List of experiments:

Experiment 1 Write python program to print Hello World

Experiment 2 Write python program to implement if else statement

Experiment 3 Write python program to implement loops

Experiment 4 Write python program to implement the concept of functions

Experiment 5 Write python program in which an function (with single string parameter) is defined and calling that function prints the string parameters given to function

Experiment 6 Write python program to implement the concept of array

Experiment 7 Write python program in which an class is define, then create object of that class and call simple print function define in class

Experiment 8 Write python program to implement exception handling mechanism

Experiment 9 Write python program to implement how to write and read primitive data to and from the file

Experiment 10 Write python program to implement how to write and read object to and from the file

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

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDIT: 1**
BRANCH: INFORMATION TECHNOLOGY
COURSE NO.: PIT-612
COURSE TITLE: WEB DESIGNING & ANDROID LAB

L	T	P	Marks Practical
0	0	2	50

LABORATORY OUTCOMES **After Completion of this course the student will be able to: -**	
CO1	Remember the role of languages like HTML, DHTML, CSS, JavaScript and android
CO2	Analyse a web page and identify its elements and attributes.
CO3	Implement web pages using HTML, Cascading Style Sheets and JavaScript.
CO4	Develop mobile applications using Android

Lab Experiments:

Experiment 1	HTML code for displaying name image and hyperlinks
Experiment 2	HTML code for displaying contents styled with CSS.
Experiment 3	HTML code for accepting a form.
Experiment 4	Program to create frame and table using HTML
Experiment 5	Program to create functions using JavaScript.
Experiment 6	Program of form validation using JavaScript.
Experiment 7	Design a website on your own using HTML, CSS, JavaScript.
Experiment 8	Develop an android application representing a simple calculator
Experiment 9	Develop an android application for working with notification
Experiment 10	Develop an android application for connecting to internet and sending e-mail.
Experiment 11	Develop an android application for working with device camera

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