Computer Science & Engineering Department
Kamla Nehru Institute of Technology
Sultanpur (UP) 228118

M.Tech Part time (Comp. Sc.)

SEMESTER-I

Sr. No.	Course Code	Subjects	Periods			Evaluation Scheme				Subject Total
			L	T		Sessional			ESE	
						CT	TA	Total	Total	
1.	PCS 11	Fundamentals of Computer Science	3	1		~~20~~ 30	~~20~~ 30	50	100	150
2.	PCS 12	Advance Data Networks	3	1		~~20~~ 30	~~30~~ 20	50	100	150
3.	PCS 13	Computer Organization & Architecture	3	1	2	~~20~~ 30	~~20~~ 20	50	100	150
		TOTAL	9	3				150	300	450

SEMESTER-II

Sr. No.	Course Code	Subjects	Periods			Evaluation Scheme				Subject Total
			L	T		Sessional			ESE	
						CT	TA	Total	Total	
1	PCS 21	Data Modeling	3	1	2	~~20~~ 30	~~20~~ 30	50	100	150
2	PCS22	Advanced Concepts in Database Systems	3	1		~~20~~ 30	30 ~~30~~	50	100	150
3	PCS23	Advance Algorithm	3	1		~~20~~ 30	30 ~~30~~	50	100	150
		Total	9	3				150	300	450

PCS 11: Fundamentals of Computer Science

L	T	P
3	1	0

Syllabus
Data Structure and Algorithms- List , Stack, Queue, Tree, Hash Table, Files structure, Sorting ,Searching, and merging Algorithms. Implementation in JAVA Operating System – Process Management, Scheduling Algorithm, Process Synchronization , Inter Process Communication, Deadlock, Paging and Segmentation, Virtual Memory, I/O Management, Case study in Windows NT, Linux and Android.

Books and References:	
1:	Charles Crowley, *Operating systems- a design oriented approach*, Tata Megraw-hill edition
2:	Silberschatz and Galvin, *Operating system concepts*, Addison Wesley
3:	Tanenbaum Andrew S, *Modern Operating system* , Englewood Cliffs, NJ: Prentice Hall
4.	Aho, Hopcroft and Ullman, "Data Structures and Algorithms", Addison Wesley.

PCS 12: Advance Data Networks

L	T	P
3	1	0

Syllabus
Overview of computer networks, TCP/IP suite of protocols. LANS, MANs, and wireless LANs. (For example, FDDI, DQDB, HIPPI, Gigabit Ethernet, Wireless Ethernet, etc.) Concept of Error Correction & Error detection Codes , Flow & Error Control Mechanisim, Concept of Routing in IP based Networks ,Concept of Process to Process Delivery .Concept of Congestion Control & QoS .Mobile IP, MANETs , Routing in MANETs

Books and References:	
1:	Larry L. Peterson and Bruce S. Davie, Computer Networks- A Systems Approach.
2:	W. R. Stevens, TCP/IP Illustrated, Volume 1: The Protocols, Addison Wesley.
3.	G. R. Wright, TCP/IP Illustrated, Volume 2: The Implementation, Addison Wesley, 1995.
4.	W. Stallings, Data Communications, PHI Pub.
5.	Srinivasan Keshav, An Engineering Approach to Computer Networking, , Pearson Pub.

PCS 13: Computer Organization and Architecture

L	T	P
3	1	2

Syllabus
Computer Arithmetic, Instruction Set Principles , Instruction Cycle, Memory references instructions, Control unit design, Micro programmed Control Memory, address Sequencing, Peripheral Devices, Input–Output Interface, synchronous data transfer, Priority interrupt, Direct Memory access, I/O performance Measures, Memory Hierarchy, Main Memory Design, Auxiliary Memory, Cache Memory and its performance metrics, Virtual Memory, Evolution of computer Architecture, System attributes to performance , Advance Processor Technology, SIMD ,MIMD model of Parallel processing, Pipelining.

Books and References:	
1:	Kai Hwang, Advanced Computer Architecture, McGraw-Hill.
2:	Hwang and Briggs, Computer Architecture and Parallel Processing, McGraw Hill
3:	.Hamacher V C, et al: Computer Organization – 4 Edition (McGraw Hill)

CSE: Data Modeling

PCS-21

L	T	P
3	1	2

Syllabus
Data Modeling and Techniques: The motivation for Data Modeling, Data Models, Conceptual DM, Logical DM, Pysical DM, E-R diagram, ER Diagram S/W (Smart Draw), Data Modeling tools (Erwin). **Simulation Basics:** Systems, System Modeling, Types of models, Types of simulation models, Principles used in modeling, When to simulate, Application areas of simulation, Advantages, Disadvantages and pitfalls of simulation. **Simulation Methods:** Discreate-event simulation, Time-advance mechanisms, Components and organization of a Discreate-Event Simulation model, Continuous Simulation, Monte-Carlo simulation, Parallel and Distributed Simulation, Steps in simulation study. **Queuing Models:** Queuing systems, Component of a queuing System, Notation for queuing systems, Measures of performance for queuing Systems, Single server queuing system, Arrival and Departure routine, Flow chart for arrival and departure routine, Event graphs of queuing model, Determining the events and variables. **Probability Concepts in Simulation:** Stochastic variables, Discrete probability functions, Continuous probability functions, Random number generation methods, Poisson arrival patterns, Exponential distribution, Normal distribution. **Simulation Software:** Comparison of simulation packages with programming languages, classification of simulation software, Desirable simulation software features, General, Object and Application oriented simulation packages, Basic introduction to ARENA, EXTEND,GPSS, SIMSCRIPT.

Books and References:

1:	Averill M. Law and W. David Kelton "Simulation Modeling and Analysis", Tata McGraw-Hill Publication.
2:	Geoffery Gordon "System Simulation", Prentice-Hall of India
3:	Narsingh Deo, System Simulation with Digital Computation, Prentice-Hall of India
4.	Jerry Banks, John S. Carson, Barry L. Nelson and David M. Nicol "Discrete –Event System Simulation", Prentice-Hall of India

PCS-22 Advanced Database Design

L	T	P
3	1	0

Syllabus
Database System Concepts and Architecture; ER and EER Data Models; Normalization Techniques; Relational algebra, SQL, Query optimization, Advanced Transaction Processing, Deadlock and Concurrency Control; Object Oriented Databases: Parallel and Distributed Databases, Backup and Recovery Concepts, Emerging Database Technologies:

Books and References:	
1:	Ramez Elmasri, Shamkant Navathe: Fundamentals of Database Systems, Fifth Edition, Pearson Education, 2007.
2:	Raghu Ramakrishnan, Johannes Gehrke : Database Management Systems, Tata McGraw-Hill.
3.	Alexis Leon, Mathews Leon, "Database Management Systems
4.	C.J. Date : An Introduction to Database Systems, Eighth Edition, Pearson Education.
5.	Abraham Silberschatz, Henry F. Korth, S.Sudarshan: Database System Concepts, Tata McGraw-Hill.

PCS-23: Advance Algorithm

L	T	P
3	1	0

Syllabus
Algorithm Fundamentals: Fundamental Concepts, Algorithm Analysis , Growth of Functions, Master's Theorem.
Analysis of sorting Algorithms: Merge sort, Quick sort, Heap sort
Advance Data Structure: Red-Black Trees, B Trees.
Parallel Algorithm: Performance Measures of Parallel Algorithms, Parallel Merging/Sorting Algorithms on CREW/EREW.
Advance Design and Analysis Techniques: Dynamic Programming, Greedy Algorithms, Branch and Bound, Back Tracking.
Graph Algorithm: Overview of DFS, BFS.
NP Complete Problem.

Books and References:	
1:	Coreman, Rivest, Lisserson, "Algorithm", PHI.
2:	Basse, "Computer Algorithms: Introduction to Design & Analysis",Addision Wesley.
3.	Horowitz, Sahani, and Rajasekaran " Fundamental of Computer Algorithms", Universities Press

SEMESTER-III

Sr. No.	Course Code	Subjects	Periods		Evaluation Scheme				Subject Total
			L	T	Sessional			ESE	
					CT	TA	Total	Total	
1	PCS 01y	Elective-I	3	1	20 30	30 20	50	100	150
2	PCS 02y	Elective II	3	1	20 30	30 20	50	100	150
		Total	6	2			100	200	300

SEMESTER-IV

Sr. No.	Course Code	Subjects	Periods		Evaluation Scheme				Subject Total
			L	T	Sessional			ESE	
					CT	TA	Total	Total	
1	PCS 03y	Elective-III	3	1	20 30	30 20	50	100	150
2	PCS 04y	Elective-IV	3	1	20 30	30 20	50	100	150
		Total	6	2			100	200	300

SEMESTER- V

Sr. No.	Course Code	Subjects	Periods		Evaluation Scheme				Subject Total
			L	T	Sessional			ESE	
					CT	TA	Total	Total	
1	PCS 51	Professional Aspects in Software Engineering	2	-	50	-	50	-	50
2	PCS 52	Seminar	-	-	-	-	50	-	50
3	PCS 53	Dissertation	-	-	-	-	100	-	100
		Total	2				200		200

SEMESTER-VI

Sr. No.	Course Code	Subjects	Periods		Evaluation Scheme				Subject Total
			L	T	Sessional			ESE	
					CT	TA	Total	Total	
1	PCS 61	Dissertation	-	-	-	-	100	200	300
		Total					100	200	300

CSE: Data Modeling

PCS-21

L	T	P
3	1	2

Syllabus
Data Modeling and Techniques: The motivation for Data Modeling, Data Models, Conceptual DM, Logical DM, Pysical DM, E-R diagram, ER Diagram S/W (Smart Draw), Data Modeling tools (Erwin). **Simulation Basics:** Systems, System Modeling, Types of models, Types of simulation models, Principles used in modeling, When to simulate, Application areas of simulation, Advantages, Disadvantages and pitfalls of simulation. **Simulation Methods:** Discreate-event simulation, Time-advance mechanisms, Components and organization of a Discreate-Event Simulation model, Continuous Simulation, Monte-Carlo simulation, Parallel and Distributed Simulation, Steps in simulation study. **Queuing Models:** Queuing systems, Component of a queuing System, Notation for queuing systems, Measures of performance for queuing Systems, Single server queuing system, Arrival and Departure routine, Flow chart for arrival and departure routine, Event graphs of queuing model, Determining the events and variables. **Probability Concepts in Simulation:** Stochastic variables, Discrete probability functions, Continuous probability functions, Random number generation methods, Poisson arrival patterns, Exponential distribution, Normal distribution. **Simulation Software:** Comparison of simulation packages with programming languages, classification of simulation software, Desirable simulation software features, General, Object and Application oriented simulation packages, Basic introduction to ARENA, EXTEND,GPSS, SIMSCRIPT.

Books and References:	
1:	Averill M. Law and W. David Kelton "Simulation Modeling and Analysis", Tata McGraw-Hill Publication.
2:	Geoffery Gordon "System Simulation", Prentice-Hall of India
3:	Narsingh Deo, System Simulation with Digital Computation, Prentice-Hall of India
4.	Jerry Banks, John S. Carson, Barry L. Nelson and David M. Nicol "Discrete –Event System Simulation", Prentice-Hall of India

PCS-22 Advanced Database Design

L	T	P
3	1	0

Syllabus
Database System Concepts and Architecture; ER and EER Data Models; Normalization Techniques; Relational algebra, SQL, Query optimization, Advanced Transaction Processing, Deadlock and Concurrency Control; Object Oriented Databases: Parallel and Distributed Databases, Backup and Recovery Concepts, Emerging Database Technologies:

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3.	Alexis Leon, Mathews Leon, "Database Management Systems
4.	C.J. Date : An Introduction to Database Systems, Eighth Edition, Pearson Education.
5.	Abraham Silberschatz, Henry F. Korth, S.Sudarshan: Database System Concepts, Tata McGraw-Hill.

PCS-23: Advance Algorithm

L	T	P
3	1	0

Syllabus
Algorithm Fundamentals: Fundamental Concepts, Algorithm Analysis , Growth of Functions, Master's Theorem. **Analysis of sorting Algorithms:** Merge sort, Quick sort, Heap sort **Advance Data Structure:** Red-Black Trees, B Trees. **Parallel Algorithm:** Performance Measures of Parallel Algorithms, Parallel Merging/Sorting Algorithms on CREW/EREW. **Advance Design and Analysis Techniques:** Dynamic Programming, Greedy Algorithms, Branch and Bound, Back Tracking. **Graph Algorithm:** Overview of DFS, BFS. **NP Complete Problem.**

Books and References:	
1:	Coreman, Rivest, Lisserson, "Algorithm", PHI.
2:	Basse, "Computer Algorithms: Introduction to Design & Analysis",Addision Wesley.
3.	Horowitz, Sahani, and Rajasekaran " Fundamental of Computer Algorithms", Universities Press

PCS-51: Professional Aspects in Software Engineering

L	T	P
2	0	0

Syllabus
Intellectual Property: Confidential Information, Copyright, Infringement of Copyright, Acts permitted in Relation to Copyright Works,Licensing and Assignment of Copyright, Moral Rights, Designs, Trademarks, The tort of passing off, Domain Names, Patents. **Software Licenses:** Copyright, Contract, Patent, Free Software and Open Source Software, MIT License, BSD License, GNU General Public License, GNU Lesser General Public License, Q Public License, Proprietary License, Sun Community License, **Software Contracts:** Basics of Software Contracts, Extent of liability, Contract for the supply of custom-built software at a fixed price, other types of software service Contract, Liability for defective software. **Software Crime Prevention:** Computing and criminal Activity, Reforms of Criminal Law, Categories of Misuse, Computer Fraud, Obtaining Unauthorized Access to Computer, Unauthorized Alteration or Destruction of Information, Denying Access to an Authorized user, Unauthorized Removal of Information Stored in a Computer. **Data Protection Regulations:** Data Protection and Privacy, The impact of the Internet, Factors Influencing the Regulation of Data Processing, Convergence of Data Protection Practice, Defamation and the protection of Reputation.

Books and References:	
1:	Andrew M. St. Laurent, "Open Source and Free Software Licensing", O'Reilly Publications
2:	Frank Bott, et. al, "Professional Issues in Software Engineering", Taylor & Francis

List of Electives

Elective	Subject Code (Y)	Subject Name	Prerequisite
Elective 1 PCS-01Y	(1)	Advance Artificial Inteligence	
	(2)	Engineering Object Oriented System	
	(3)	Distributed Computing	
	(4)	Image Processing	
	(5)	Cloud Compting	
	(6)	Data Warehousing& Mining	
	(7)	Complexity Theory	
	(8)	Information Theory	
Elective 2 PCS-02Y	(1)	Artificial Neural Network and Fuzzy logic	
	(2)	Advance Software Engineering	
	(3)	Parallel Processing	
	(4)	Biometric System	
	(5)	Wireless adhoc Network	
	(6)	Dedicated System design	
	(7)	Cryptography and Stenography	
	(8)	Embeded System	
Elective 3 PCS-03Y	(1)	Natural Language Processing	PCS-011
	(2)	Engineering and Testing Structured System	PCS-022
	(3)	Real Time System	
	(4)	Pattern Recognition	PCS-021
	(5)	Mobile Computing	
	(6)	Big Data System	
	(7)	Randomized Algorithm	
	(8)	Network security and Cyber law	
Elective 4 PCS-04Y	(1)	Knowledge Base System	
	(2)	Software Quality Management	
	(3)	Fault Tolerance System	PCS-013
	(4)	Forenscic Science and Application	
	(5)	Network Programming	
	(6)	Distributed DBMS	
	(7)	Approximation algorithm	
	(8)	Reliability	

(PCS-046) : Distributed Databases

Syllabus
Distributed Databases: Introduction to Distributed Database Systems, Distributed Database System Architecture; Top-Down Approach, Distributed Database Design Issues, Fragmentation, Allocation, Database Integration, Bottom-up approach, Schema Matching, Schema Integration, Schema Mapping; Data and Access Control, View Management, Data Security; Query processing problem, Objectives of Query processing,Compluexity ofRelational Algebra Operations, Characterization of Query Processors, Layers of Query Processing; Query Decomposition, Normalization, Analysis, Elimination of Redundance and Rewriting; Localization of Distributed Data, Reduction for primary Horizontal, Vertical, derived Fragmentation; Distributed Query Execution, Query Optimization, Join Ordering, Static& Dynamic Approach, Semi-joins, Hybrid Approach;Taxonomy of Concurrency control Mechanisms, Lock-Based Concurrency Control, Timestamp-Based Concurrency Control, Optimistic Concurrency Control, Deadlock Management; Heterogeneity issues Advanced Transaction Models, Distributed systems 2PC& 3PC protocols, Replication protocols, Replication and Failures. Hot Spares; Parallel Databases: Introduction to Parallel Databases, Parallel Database System Architectures, Parallel Data Placement, Full Partitioning; Parallel Query Processing, Query Parallelism; Parallel Query Optimization, Search Space, Cost Model, Search Strategy; Load Balancing.

Books and References:

1. M T Ozsu, Patrick Valduriez, Principles of Distributed Database Systems, Prentice Hall, 1999.
2. S. Ceri and G. Pelaggati, Distributed Database System Principles and Systems, MGH, 1985.

RCS-025 Wireless Ad Hoc Networks

Introduction to wireless LANs - IEEE 802.11 WLAN – Architecture and Services, Physical Layer, Other IEEE 802.11standards, HIPERLAN, WiMax standard.

Issues in Ad Hoc Wireless Networks, Medium Access scheme, security, Energy Management, Deployment considerations, MAC Protocols -Introduction to MAC, Issues in Designing a MAC Protocol for Ad Hoc Wireless Networks, Other MAC protocols-Power Control MAC protocol for Ad Hoc Networks.

Characteristics of MANETs, Ad Hoc networks and routing protocols, Table-driven and source-initiated On Demand routing protocols, Hybrid protocols, Wireless Sensor networks- Classification, MAC and Routing protocols.

Power Efficient Routing and Scheduling in MANETs, Power Control in Ad Hoc Networks, Security issues in Ad Hoc Networks, Vehicular Ad Hoc Networks.

TEXT BOOKS:

1. William Stallings, "Wireless Communications and networks" Pearson / Prentice Hall of India, 2nd Ed., 2007.
2. Dharma Prakash Agrawal & Qing-An Zeng, "Introduction to Wireless and Mobile Systems", Thomson India Edition, 2nd Ed., 2007.
3. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education, 2003.

REFERENCES:

1. Vijay. K. Garg, "Wireless Communication and Networking", Morgan Kaufmann Publishers, 2007.
2. Kaveth Pahlavan, Prashant Krishnamurthy, "Principles of Wireless Networks",Pearson Education Asia, 2002.
3. Ad Hoc Wireless Networks: Architectures And Protocols By Murthy Pub: Pearson Education.
4. C.K.Toh, "AdHoc Mobile Wireless Networks", First Edition, Pearson Education, 2002.