Indira Gandhi University, Meerpur Rewari

Syllabus for B.Tech. – IVth Year
(Semester VII and VIII)
(For Computer Science & Engineering)

Session –w.e.f. 2019-2020

INDIRA GANDHI UNIVERSITY, MEERPUR, REWARI
Scheme of Studies / Examination
Bachelor of Technology (Computer Science & Engineering)
SEMESTER VII

Sl. No.	Course No.	Subject	Teaching Schedule				Examination Schedule (Marks)				Duration of Exam (Hours)
			L	T	P	Total	Marks of Class work	Theory	Practical	Total	
1	CSE-401	Advanced Computer Architecture	3	1	-	4	50	100	-	150	3
2	CSE-403	Software Project Management (CSE,IT)	3	1	-	4	50	100	-	150	3
3	CSE-405	Compiler Design	3	1	-	4	50	100	-	150	3
4	CSE-407	Neural Networks	3	1	-	4	50	100	-	150	3
5	CSE-409	Advanced Java (CSE, IT)	3	1	-	4	50	100	-	150	3
6		Elective	3	1	-	4	50	100	-	150	3
7	CSE-411	Compiler Design Lab	-	-	2	2	25	-	50	75	3
8	CSE-413	Neural Networks Using MATLAB	-	-	2	2	25	-	50	75	3
9	CSE-415	Advanced JAVA Lab (CSE, IT)	-	-	3	3	50	--	100	150	3
10	CSE-417	PRATICAL TRAINING-II	-	-	-	-	-	-	-	-	-
		TOTAL	**18**	**6**	**7**	31	400	600	200	1200	

List of Electives

1.	IT-465	Network Security & Management
2.	CSE-435	Advanced Database Management Systems
3.	IT-467	Computer Software Testing

Note:

1. **Students will be allowed to use non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.**
2. **Student will be permitted to opt for any one elective run by the department. However, the departments will offer only those electives for which they have expertise. The choice of the students for any elective shall not be a binding for the department to offer, if the department does not have expertise.**
3. **Assessment of Practical Training -II, carried out at the end of VI semester, will be based on seminar, viva- voce and project report of the student. According to performance letter grades A, B, C, F are to be awarded. A student who is awarded 'F' grade is required to repeat Practical Training.**

CSE-401   **ADVANCED COMPUTER ARCHITECTURE**

L	T	P
3	1	-

Class Work: 50
Exam: 100
Total: 150
Duration of Exam: 3 Hrs.

NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section A

Architecture And Machines: Some definition and terms, interpretation and microprogramming. The instruction set, Basic data types, Instructions, Addressing and Memory. Virtual to real mapping. Basic Instruction Timing.
Time, Area And Instruction Sets: Time, cost-area, technology state of the Art, The Economics of a processor project: A study, Instruction sets, Professor Evaluation Matrix

Section B

Cache Memory Notion: Basic Notion, Cache Organization, Cache Data, adjusting the data for cache organization, write policies, strategies for line replacement at miss time, Cache Environment, other types of Cache. Split I and D-Caches, on chip caches, Two level Caches, write assembly Cache, Cache references per instruction, technology dependent Cache considerations, virtual to r eal translation, overlapping the Tcycle in V-R Translation, studies. Design summary.

Section C

Memory System Design: The physical memory, models of simple processor memory interaction, processor memor y modeling using queuing theory, open, closed and mixed-queue models, waiting time, performance, and buffer size, review and selection of queuing models, processors with cache.

Section D

Concurrent Processors: Vector Processors, Vector Memory, Multiple Issue Machines, Comparing vector and Multiple Issue processors.
Shared Memory Multiprocessors: Basic issues, partitioning, synchronization and coherency, Type of shared Memory multiprocessors, Memory Coherence in shared Memory Multiprocessors.

Text Book:
    Advance computer architecture by Hwang & Briggs, 1993, TMH.
Reference Books:
    Pipelined and Parallel processor design by Michael J. Fiynn – 1995, Narosa.

CSE-403   SOFTWARE PROJECT MANAGEMENT

L   T   P
3   1   -

Class Work: 50
Exam: 100
Total: 150
Duration of Exam: 3 Hrs.

NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section A

Introduction to Software Project Management (SPM): Definition of a Software Project (SP), SP Vs. other types of projects activities covered by SPM, categorizing SPs, project as a system, management control, requirement specification, information and control in organization.
Stepwise Project planning: Introduction, selecting a project, identifying project scope and objectives, identifying project infrastructure, analyzing project characteristics, identifying project products and activities, estimate efforts each activity, identifying activity risk, allocate resources, review/ publicize plan.

Section B

Project Eva lua tion   & Estimation: Cost b enefit analysis, cash flow forecasting, co s t benefit evaluation techniques, risk evaluation. Selection of an appropriate project report; Choosing technologies, choice of process model, structured methods, rapid application development, water fall-, V-process-, spiral-models. Prototyping, delivery. Albrecht function point analysis.
Activity planning & Risk Management: Objectives of activity planning, project schedule, projects and activities, sequencing and scheduling activities, network planning model, representation of l
agged activities, adding the time dimension, backward and forward pass, identifying critical path, activity throat, shortening project , precedence networks.
Risk Management: Introduction, the nature of risk, managing risk, risk identification, risk analysis, reducing the risks, evaluating risks to the schedule, calculating the z values..

Section C

Resource allocation &Monitoring the control: Introduction, the nature of resources, identifying resource requirements, scheduling resources creating critical paths, counting the cost, being specific, publishing the resource schedule, cost schedules, the scheduling sequence.
Monitoring the control: Introduction, creating the frame work, collecting the data, visualizing progress, cost monitoring, earned value, prioritizing monitoring, getting the project back to target, change control.
Managing contracts and people: Introduction, types of contract, stages in contract, placement, typical terms of a contract, contract management, acceptance, Managing people and organizing terms: Introduction, understanding behavior, organizational behavior: a back ground, selecting the right person for the job, instruction in the best methods, motivation, working in groups, becoming a team, decision making, leadership, organizational structures, conclusion, further exercises..

Section D

Software quality: Introduction, the place of software quality in project planning, the importance of software qualit y, defining software quality, ISO 9126, Practical software quality measures, product versus process quality management, external standards, techniques to help enhance software quality.
Study of Any Software Project Management software: viz Project 2000 or equivalent

Text Book:
        1. Software Project Management (2nd Edition), by Bob Hughes and Mike Cotterell, 1999, TMH

Reference Books:
1. Software Engineering – A Practitioner's approach, Roger S. Pressman (5th edi), 2001, MGH
2. Software Project Management, Walker Royce, 1998, Addison Wesley.
3. Project Management 2/c. Maylor
4. Managing Global software Projects, Ramesh, 2001, TMH.
5. Software Project Management, Bharat Bhusan Agarwal, Shivangi Dhall, University Science Press

CSE-405   **COMPILER DESIGN**

L	T	P
3	1	-

Class Work: 50
Exam: 100
Total: 150
Duration of Exam: 3 Hrs.

NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section A

Introduction To Compilers: Compilers and translators need of translators, structure of compiler :its different phases, Compiler construction tools.

Lexical Analysis: Role of lexical analyzer, design of lexical analyzer, regular expressions , Specification and recognition of tokens, input buffering, A language specifying lexical analyzer. Finite automata, conversion from regular expression to finite automata, and vice versa, minimizing number of states of DFA, Implementation of lexical analyzer.

Section B

Syntax Analysis: Role of parsers, context free grammars, definition of parsing.

Parsing Technique: Shift- reduce parsing, operator precedence parsing, top down par sing, predictive parsing.

Section

C LR parsers, SLR, LALR and Canonical LR parser.

Syntax Directed Translations: Syntax directed definition, construction of syntax trees, syntax directed translation scheme, implementation of syntax directed translation, three address code, quadruples and triples.

Section D

Symbol Table & Error Detection And Recovery: Symbol tables, its contents and data structure for symbol tables; trees, arrays, linkedlists, hash tables. Errors, lexical   phase error, syntactic phase error, semantic error.

Code Optimization & Code Generation: Code generation, forms of objects code, machine dependent code, optimization, register allocation for temporary and user defined variables.

Text Books:
1. Compilers Principle, Techniques & Tools - Alfread V. AHO, Ravi Sethi & J.D. Ullman; 1998 Addison Wesley.

Reference Books:
1. Theory and practice of compiler writing, Tremblay & Sorenson, 1985, Mc. Graw Hill.
2. System software by Dhamdere, 1986, MGH.
3. Principles of compiler Design, Narosa P ublication
4. Elements compiler Design, Dr. M. Joseph, University Science Press

CSE-407 **Neural Networks**

L	T	P	
3	1	-	

Class Work:50
Exam: 100
Total: 150
Duration of Exam: 3 Hrs.

NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section A
Overview of biological neurons: Structure of biological neurons relevant to ANNs.
Fundamental concepts of Artificial Neural Networks: Models of ANNs; Feedforward & feedback networks; learning rules; Hebbian learning rule, perception learning rule, delta learning rule, Widrow-Hoff learning rule, correction learning rule, Winner –lake all elarning rule, etc.

Section B
Single layer Perception Classifier: Classification model, Features & Decision regions; training & classification using discrete perceptron, algorithm, single layer continuous perceptron networks for linearly seperable classifications.
Multi-layer Feed forward Networks: linearly non-seperable pattern classification, Delta learning rule for multi-perceptron layer, Generalized delta learning rule, Error back-propagation training, learning factors, Examples.

Section C
Single layer feed back Networks: Basic Concepts, Hopfield networks, Training & Examples.

Associative memories: Linear Association, Basic Concepts of recurrent Auto associative memory: rentrieval algorithm, storage algorithm; By directional associative memory, Architecture, Association encoding & decoding, Stability.

Section D
Self organizing networks: UN supervised learning of clusters, winner-take-all learning, recall mode, Initialisation of weights, seperability limitations

Text Books:

1. Introduction to artificial Neural systems by Jacek M. Zurada, 1994, Jaico Publ. House.

2. "Neural Networks :A Comprehensive formulation", Simon Haykin, 1998, AW

3. "Neural Networks", Kosko, 1992, PHI.

4. "Neural Network Fundamentals" – N.K. Bose , P. Liang, 2002, T.M.H

5. Neural Network , T.N. Shankar, University Science Press

6. Neuro Fuzzy Systems, Lamba, V.K., University Science Press

CSE-409   **ADVANCED JAVA**

L T P   Class Work   : 50
3 1 0   Exam.   : 100
                                                         Total   : 150
                                                         Duration of Exam.   : 3 hrs.

NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section A

CORE JAVA

Introduction to Java, Data types, variables, operators, Arrays, Control Statements, Classes & Methods, Inheritance, Exception Handling, Multithreading, Collections, I/O streams, AVVT & Applet Programming.

NETWORKING

Connecting to a Server, Implementing Servers, Sending E-Mail, Making URL Connections, Advanced Socket Programming

Section B

DATABASE NETWORKING

The Design of JDBC. The Structured Query Language, JDBC Installation, Basic JDBC Programming Concepts, Query Execution, Scrollable and Updatable Result Sets, Metadata, Row Sets, Transactions, Advanced Connection Management, Introduction of LDAP

DISTRIBUTED OBJECTS

The Roles of Client and Server, Remote Method Invocations, Setup for Remote Method Invocation, Parameter Passing in Remote Methods Server Object Activation, Java IDL and CCRA, Remote Method Calls with SOAP

Section C

SWING

Lists, Trees, Tables, Styled Text Components, Progress Indicators, Component Organizers

AWT

The Rendering Pipeline, Shapes, Areas, Strokes, Paint, Coordinate Transformations, Clipping, Transparency and Composition, Rendering Hints, Readers and Writers for Images, Image Manipulation, Printing. The Clipboard, Drag and Drop

Section D

JAVABEANS COMPONENTS

Beans, The Bean-Writing Process, Using Beans to Build an Application, Naming Patterns for Bean Components and Events Bean Property Tubes Beaninfo Classes Property Editors Cuatomizes

SECURITY

Class Loaders, Bytecode Verification, Security Managers and Permissions, Digital Signatures, Code Signing, Encryption

TEXT & REFERENCE BOOK:

1. Core Java^{TM} 2, Volume II-Advanced Features, 7th Edition by Cay Horetmann, Gary Cornelll Pearson Publisher, 2004
2. Professional Java Programming by Brett Spell, WROX Publication
3. Advanced Java 2 Platform, How to Program, 2nd Edition, Harvey. M. Dietal, Prentice Hall
4. Advanced Java, Gajendra Gupta , Firewall Media

CSE-411   **COMPILER DESIGN LAB**

L	T	P		Class Work:	25
-	-	2		Exam:	50
				Total:	75

Duration of Exam: 3Hrs.

1. Practice of LEX/YACC of compiler writing.

2. Write a program to check whether a string belong to the grammar or not.

3. Write a program to generate a parse tree.

4. Write a program to find leading terminals.

5. Write a program to find trailing terminals.

6. Write a program to compute FIRST of non-terminal.

7. Write a program to compute FOLLOW of non-terminal.

8. Write a program to check whether a grammar is left Recursion and remove left Recursion.

9. Write a program to remove left factoring.

10. Write a program to check whether a grammar is operator precedent.

11. To show all the operations of a stack.

12. To show various operations i.e. red, write and modify in a text file.

Note : At least 10 programs are required to be developed in the semester.

CSE-413   **Neural Network Using Matlab.**

L   T   P   Class Work: 25
-      -   2   Exam: 50
                                                             Total: 75
                                                             Duration of Exam: 3 Hrs.

To study some basic neuron models and learning algorithms by using Matlab's neural

network toolbox. The following demonstrations
- Simple neuron and transfer functions
- Neuron with vector input
- Decision boundaries
- Perceptron learning rule
- Classification with a 2-input perceptron (note - there's an error in the text here:it says there are 5
- input vectors, but really there are

  only 4) Linearly non-separable

  vectors

Try to understand the following things:
1. How the weights and bias values affect the output of a neuron.
2. How the choice of activation function (or transfer function) affects the output of a neuron.

   Experiment with the following functions: identity (purelin), binary threshold (hardlim,

   hardlims) and sigmoid (logsig, tansig).
3. How the weights and bias values are able to represent a decision boundary in the feature space.
4. How this decision boundary changes during training with the perceptron learning rule.
5. How the perceptron learning rule works for linearly separable problems.
6. How the perceptron learning rule works for non-linearly separable problems.

CSE-- 415   **ADVANCED JAVA LAB.**

L	T	P
-	-	3

Class Work: 50
Exam: 50
Total: 100
Duration of exam: 3 hrs.

Development of programs relating to :

- **JDBC**

- **Servlets**

- **Beans**

- **RMI**

- **JSP**

IT-465   **NETWORK SECURITY &MANAGEMENT**

L	T	P		Class Work:50
3	1	-		Exam: 100

Total: 150
Duration of Exam: 3 Hrs.

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Section A
Introduction: Codes and Ciphers – Some Classifical systems – Stiatistical theory of cipher systems- Complexity theory of crypto systems – Stream ciphers, Block ciphers.
Stream Ciphers: Rotor based system – shift register based systems – Design considerations for stream ciphers – Cryptanals ysis of stream ciphers – Combined eneryption and encoding. Block Ciphers – DES and variant, modes of use of DES.

Section B
Public key systems – Knapsack systems – RSK – Diffie Hellman Exchange – Authentication and Digital signatures, Elliptic curve based systems.
System Identification and clustering: Cryptology of speech signals – narrow band and wide band systems – Analogue & Digital Systems of speech encryption.

Section C
Security: Hash function – Authentication: Protocols – Digital Signature standards. Electronics Mail Security – PGP (Pretty Good Privacy) MIME, data Compression technique. IP Securit y: Architecture, Authentication Leader, Encapsulating security Payload – Key Management. Web security: Secure Socket Layer & Transport Layer security, Secure electronics transactions. Firewalls Design principle, established systems.

Section D
Telecommunication Network Architecture, TMN management layers, Management information Model, Management servicing and functions, Structure of management information and TMN information model, SNMP v1, SNMP2 & SNMP3, RMON1 & 2, Broadband Network Management (ATM, HFC, DSL), ASN

Text Books:
1. Cryprotography and Network Security: Principal & Practices, 2nd Edition by Upper Saddle River, PHI
2. Network Management Principles & Practices by Subramanian, Mani (AWL) SNMP, Stalling, Willian (AWL)

Reference Books:
1. SNMP: A Guide to Network Management (MGH)
2. Telecom Network Management by H.H. Wang (MGH) d Network Management by U. Dlack (MGH)

CSE-435   **ADVANCED DATABASE MANAGEMENT SYSTEMS**

L   T   P   Class Work:50
3   1   -   Exam: 100
                                                                 Total: 150
                                                                 Duration of Exam: 3 Hrs.

NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Unit I
Data Models: EER model and relationship to the OO model, Object Oriented Databases, Overview of concepts, object identity, object structure, type constructors, encapsulation of operations, methods and persistence, type hierarchies and inheritance, complex objects, overview of Object model of ODMG, object Relational databases, Databases design for an ORDBMS, Nested relational Model, storage and access method.
Query Optimisation: Query Execution Algorithms, Heuristics in Query Execution, Cost Estimation in Query Execution, Semantic Query Optimisation.

Unit II
Database Transactions and Recovery Procedures: Transaction Processing Concepts, Transaction and System Concepts, Desirable Properties of a Transaction, Schedules and Recoverability, Serializability of Schedules, Transaction Support in SQL, Recovery Techniques, Database Backup, Concurrency control, locking techniques for Concurrency Control, Concurrency Control Techniques, Granularity of Data Items.
Client Server Computing: Client Server Concepts, 2-Tier and 3-Tier Client Server Systems, Client/Server Architecture and the Internet, Client /Database Server Models, Technology Components of Client Server Systems, Application Development in Client Server Systems.

Unit III
Distributed and Parallel Databases: Reliability and Commit protocols, Fragmentation and Distribution, View Integration, Distributed database design, Distributed algorithms for data management, Heterogeneous and Federated Database Systems. Parallel database Architectures and their merits and demerits.
Deductive and Web Databases: Recursive Queries, Prolog/Datalog Notation, Basic inference Mechanism for Logic Programs, Deductive Database Systems, Deductive Object Oriented Database Systems; Web or Internet Databases: Introduction, uses, Building blocks of Web, tools, advantages and disadvantages.

Unit IV
Emerging Databases: Multimedia database: Definition, need of Multimedia databases, MDBMS, Multimedia database components and structure, Multimedia database queries and applications; Mobile database: definition, their need, Characteristics, architecture, uses and limitations of mobile databases; Digital libraries: Introduction, Objectives, types, components, myths, services, advantages, limitations, and comparison with traditional libraries; Spatial databases: Basic concepts, need, types and relationships, architecture, queries, indexing techniques, advantages and disadvantages of spatial databases; Temporal database: basic concepts, characteristics, components, merits and demerits,

Text Book:
1.   Fundamentals of Database Systems (3 edition), Elmasri R. and Navathe S.B., 2000, Addison Wesley, Low Priced Edition.
   Reference Book:
1.   Database System Concepts by A. Silbershatz, H.F. Korth and S. Sudarshan, 3rd edition, 1997, McGraw-Hill, International Edition.

IT-467   **COMPUTER SOFTWARE TESTING**

L   T   P   Class Work: 50
3   1   -   Exam: 100
                                                          Total: 150
                                                          Duration of Exam: 3 Hrs.

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Section A

Fundamentals and Testing types: First, second and later cycles of testing. Objectives and limits of testing. Overview of S/W development stages, Planning and Design stages and testing during these stages. Glass box code, Regression and Black box testing, Software errors, Categories of software error.
Reporting and analyzing bugs: Problem reports, Content and Characteristics of Problem Report, analysis and Tactics for analyzing a reproducible bug. Making a bug reproducible

Section B

Problem Tracking System: Objective of Problem Tracking System, tasks of the system, Problem tracking overview, users of the tracking system, mechanics of the database
Test Case Design: Characteristics of a good test, equivalence classes and boundary values, visible state transitions, Race conditions and other time dependencies, load testing. Error guessing, Function equivalence testing, Regression Testing, General issues in configuration testing, printer testing

Section C

Localization and User Manuals testing: Translated text expands, Character sets, Keyboards, Text filters, Loading, saving, importing, and exporting high and low ASCII, Operating system Language, Hot keys, Error message identifiers, Hyphenation rules, Spelling rules, Sorting Rules, Uppercase and Lowercase conversion, Printers, Sizes of paper, CPU's and video, Rodents, Data formats and setup options, Rulers and measurements, Culture-bound Graphics and output, European product compatibility, Memory availability, automated testing, Testing User Manuals, Effective documentation, documentation tester's objective, How testing documentation contributes to software reliability

Section D

Testing Tools and Test Planning: Fundamental tools, Automated acceptance and regression tests, standards, Translucent box testing Overall objective of the test plan: product or tool? Detailed objective , type of test, strategy for developing components of test planning documents, components of test planning documents, documenting test materials
S/W Development tradeoffs and models, Quality-related costs, The development time line, Product design, alpha, Pre-beta, Beta, User Interface freeze, Pre-final, Final integrity testing, Project post-mortems, Legal consequences of defective software, Managing and role of a testing group, independent test agencies

Text Book:

1. Testing Computer Software, by Cem Kaner, Jack Falk,Hung Quoc Nguyen, 1999, Pub: Wiley, (Second Edition).

INDIRA GANDHI UNIVERSITY, MEERPUR, REWARI
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. 4ᵗʰ YEAR COMPUTER SC & ENGINEERING,
SEMESTER- VIII
EFFECTIVE FROM THE SESSION 2019-20

		Subject	Internal Marks	External Marks	Total Marks
1.	**CSE- 402**	Industrial Training/Institutional Project Work	150	150	300

Note:
The students are required to undergo Industrial Training or Institutional Project Work of duration not less than 4 months in a reputed organization or concerned institute. The students who wish to undergo industrial training, the industry chosen for undergoing the training should be at least a private limited company. The students shall submit and present the mid-term progress report at the Institute. The presentation will be attended by a committee. Alternately, the teacher may visit the Industry to get the feedback of the students.

The final viva-voce of the Industrial Training or Institutional Project Work will be conducted by an external examiner and one internal examiner appointed by the Institute. External examiner will be from the panel of examiners submitted by the concerned institute approved by the Board of Studies in Engg. & Technology. Assessment of Industrial Training or Institutional Project Work will be based on seminar, viva-voce, report and certificate of Industrial Training or Institutional Project Work obtained by the student from the industry or Institute.

The internal marks distributions for the students who have undergone Industrial Training consist of 50 marks from the industry concern and 100 marks by the committee members consisting of faculty members of concerned department of the parent institute.

The teachers engaged for Institutional Project work shall have a workload of 2 hours per group (at least 4 students) per week.