Seva Mandal Education Society's
Smt. Kamlaben Gambhirchand Shah Department of Computer Applications
under
Dr. Bhanuben Mahendra Nanavati College of Home Science (Autonomous)
NAAC Re-Accredited 'A+' Grade with CGPA 3.69 / 4
UGC Status: College with Potential for Excellence
'Best College Award 2016-17' adjudged by S.N.D.T. Women's University
Smt. Parmeshwari Devi Gordhandas Garodia Educational Complex
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APPROVED SYLLABUS UNDER AUTONOMY AND NEW EDUCATION POLICY

PROGRAMME: MASTER OF SCIENCE (COMPUTER SCIENCE)

DEPARTMENT OF COMPUTER APPLICATIONS
SEMESTER – II (2023-24)

SYLLABUS

SN	Courses	Type of Course	Credits	Marks
2.1	Mobile Communication and Wireless Technology	Major (Mandatory)	4	100
2.2	Data Analytics and Mining	Major (Mandatory)	4	100
2.3	Data Analytics and Mining Lab	Major (Mandatory)	2	50
2.4	Advanced Java Lab	Major (Mandatory)	2	50
2.5	Advanced Python Lab	Major (Mandatory)	2	50
2.6A/ 2.6B	Distributed System / Computer Graphics	Major (Elective)	4	100
2.7	Internship	OJT / FP	4	100
		Total	**22**	**550**

2.1 : MAJOR (MANDATORY)

Course Title	**Mobile Communication and Wireless Technology**
Course Credits	4
Theory **Internal –** **External**	4 Credits 50 Marks + 50 Marks
Course Outcomes	After going through the course, learners will be able to
	1. Understand the concept of cellular communications, advantages and its limitations
	2. Compare the various wireless technologies and its applications
	3. Apply the appropriate technology in the applications
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Understand basic concepts of wireless networking
Content Outline	• Introduction to Mobile and wireless communications, • Overview of radio transmission frequencies, Signal Antennas, Signal Propagation, • Multiplexing – SDM,FDM, TDM,CDM, • Modulation – ASK,FSK,PSK, Advanced FSK, Advanced PSK, OFDM, • Spread Spectrum – DSSS,FHSS, • Wireless Transmission Impairments – Free Space Loss, Fading, Multipath Propagation, Atmospheric Absorption, Error Correction – Reed Solomon, BCH, Hamming code, Convolution Code (Encoding and Decoding)
Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Understand the concept and working of wireless and cellular wireless network and generations
Content Outline	• Wireless network, Wireless network Architecture, • Classification of wireless networks – WBAN, WPAN, WLAN, WMAN, WWAN., • IEEE 802.11, IEEE 802.16, • Bluetooth – Standards, Architecture and Services, • Cellular wireless Networks, • Principles of cellular networks – cellular network organization, operation of cellular systems, Handoff., • Generation of cellular networks – 1G, 2G, 2.5G, 3G and 4G.

Module 3 (Credit 1) Practical	
Learning Outcomes	After learning the module, learners will be able to 1. Learn the concept of mobile communication system
Content Outline	● GSM – Architecture, ● Air Interface, ● Multiple Access Scheme, ● Channel Organization, ● Call Setup Procedure, ● Protocol Signaling, Handover, Security, ● GPRS – Architecture, GPRS signaling, ● Mobility management, ● GPRS roaming, network, ● CDMA2000- Introduction, Layering Structure, Channels,Logical Channels, Forward Link and Reverse link physical channels, ● W-CDMA – Physical Layers, Channels, ● UMTS – Network Architecture, Interfaces, ● Network Evolution, Release 5, ● FDD and TDD, ● Time Slots, Protocol Architecture, Bearer Model, Introduction to LTE
Module 4 (Credit 1) Practical	
Learning Outcomes	After learning the module, learners will be able to 1. Working of different layers of mobile network
Content Outline	● Mobile IP – Dynamic Host Configuration Protocol, ● Mobile Ad Hoc Routing Protocols– Multicast routing, ● TCP over Wireless Networks – Indirect TCP – Snooping TCP –Mobile TCP – Fast Retransmit / Fast Recovery Transmission/Timeout Freezing-Selective Retransmission – Transaction Oriented TCP , TCP over 2.5 / 3G wireless Networks, ● WAP Model- Mobile Location based services -WAP Gateway –WAP protocols – WAP user agent profile, Caching model- wireless bearers for WAP - WML – WMLScripts – WTA

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. Internal 50 + External 50
2. Unit Test of 25 marks on Module 2 (Internal)
3. Module 1, 3 and 4 - 25 Marks (Internal)
4. Final Exam of 50 Marks Theory on all Module (External)

TEXT BOOKS:

1) Saha Misra (2010), *Wireless Communications and Networks, 3G and Beyond*, Second Edition, McGraw Hill Education
2) Vijay K. Garg, *Wireless Network Evolution 2G to 3G*, (2011), Pearson Publications.

REFERENCE BOOKS:

1) Yi Bang Lin, ImrichChlamtac, *Wireless and Mobile Network Architectures*, Wiley India.

2) Dr. Sunilkumar S. Manvi, Mahabaleshwar S. Kakkasageri, *Wireless and Mobile Networks, Concepts and Protocols*, Wiley India
3) K. Fazel, S. Kaiser, (2010), *Multi-Carrier and Spread Spectrum Systems - From OFDM and MC-CDMA to LTE and WiMAX*, Second Edition, Wiley publications
4) Yi-Bing Lin, Ai-Chun Pang, (2012), Wireless and Mobile All-IP Networks, Wiley Publications
5) Yi-Bing Lin, Ai-Chun Pang, (2012), Wireless and Mobile All-IP Networks, Wiley Publications

2.2 : MAJOR (MANDATORY)

Course Title	**DATA ANALYTICS AND MINING**
Course Credits	4
Theory **Internal – External**	4 Credits 50 Marks + 50 Marks
Course Outcomes	After going through the course, learners will be able to
	● Apply data mining concepts for data analysis and report generation ● Develop industry level data mining skills using software tools ● Make use of relevant theories, concepts and techniques to solve real-world business problems
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Understand the concept of data analytics
Content Outline	**Data Analytics** Introduction, Data Summarization and visualization, Linear, Non-linear regression, model selection
Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Understand the background on data objects and statistical concepts. It introduces techniques for preprocessing data before mining.
Content Outline	**Data Mining and Data Preprocessing** What is data mining?, Knowledge discovery- KDD process, related technologies - Machine Learning, DBMS, OLAP, Statistics, Data Mining Goals, stages of the Data Mining Process, Data Mining Techniques, Knowledge Representation Methods. Data cleaning, Data transformation, Data reduction, Discretization and generating concept hierarchies. introduction to data warehousing, OLAP, and data generalization. Data Cube Computation and Multidimensional Data Analysis

Module 3 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to 1. Apply supervised learning method as classification and Prediction
Content Outline	**Classification and Prediction** Decision tree, Bayesian classification, rule-based classification, neural networks, support vector machines, associative classification, k-nearest-neighbor classifier, case-based reasoning.
Module 4 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to 1. Use unsupervised learning method as clustering and association rule mining To gain detailed insights of outlier detection
Content Outline	**Clustering and Association Rule Mining** Partitioning, hierarchical, density-based, grid-based, and model-based methods data clustering. Mining Frequent Patterns, Associations, and Correlations Outlier Detection: Detection of anomalies, such as the statistical, proximity-based, clustering-based, and classification-based methods.

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. Unit Test of 25 marks Module 1 and 2 (Internal)
2. Module 3 and 4 - 25 Marks Class test / Assignments (Internal)
3. Final Exam of 50 Marks Theory on Module 1 - 4 (External)

TEXT BOOK:

1. Shashi Shekhar and Sanjay Chawla, (2003), *Spatial Databases: A Tour*, Prentice Hall (ISBN 013-017480-7)
2. Avi Silberschatz, Henry F. Korth, S. Sudarshan, *Database System Concepts*, 5th edition, (2010), McGraw-Hill

REFERENCE BOOKS:

1. Stefano Ceri and Giuseppo Pelagatti, (1984), *Distributed Database; Principles & Systems*, McGraw-Hill International Editions
2. Raghu Ramakrishnan and Johannes Gehrke, (2002), *Database Management Systems*, 3rd edition, McGraw-Hill.
3. Elmasri and Navathe, (2003), *Fundamentals of Database Systems*, 6thEdition, Addison. Wesley.
4. Shio Kumar Singh, (2011), *Database Systems: Concepts, Design and Applications*, 2nd edition, Pearson Publishing
5. Multi-dimensional aggregation for temporal data. M. Böhlen, J. Gamper, and C.S. Jensen. In Proc. of EDBT-2006, pp. 257-275, (2006).
6. R.H. Güting and M. Schneider (2005), *Moving objects databases*, Morgan Kaufmann Publishers, Inc.
7. Paulraj Ponniah, (2010), Data Warehousing fundamentals, JohnWiley

2.3 : MAJOR (MANDATORY)

Course Title	**DATA ANALYTICS AND MINING LAB**
Course Credits	2
Practical **Internal – External**	2 Credits 25 Marks + 25 Marks
Course Outcomes	After going through the course, learners will be able to
	● Demonstrate the concept of data preprocessing ● Implement classification and Prediction ● Implement clustering and association rule mining ● Gain detailed insights of outlier detection
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Elaborate the concept of data preprocessing 2. Implement classification and prediction
Content Outline	**Data Preprocessing** Data cleaning, data transformation, Data reduction, Discretization and generating concept hierarchies, Installing Weka 3 Data Mining System, experiments with Weka - filters, discretization **Data Mining (Supervised Learning) Using Weka/R Miner** Classification Prediction
Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. To implement clustering and association rule mining 2. To gain detailed insights of outlier detection
Content Outline	**Data Mining (Unsupervised Learning) using Weka/R Miner** Clustering Association Rule Mining **Outlier Detection** Detection of anomalies, such as the statistical, proximity-based, clustering-based, and classification-based methods
Softwares used: Advanced Excel, XLMiner,Weka, IBM SPSS Statistics	

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. Internal Assessment
   Lab Manuals, Practical Test and Online Test – 25 marks
2. External Assessment – final Practical - Exam 25 marks

TEXT BOOK:

1. S.C.Gupta, V.K.Kapoor, *Fundamental of Mathematical Statistics*

2. Efraim Turban, Ramesh Sharda, Dursun Delen, David King, (2013), *Business Intelligence* (2nd Edition), Pearson

REFERENCE BOOKS:

1. Swain Scheps, (2008), *Business Intelligence for Dummies,* Wiley Publications
2. Inmon, (1993), *Building the Data Warehouse,* Wiley
3. Dunham, Margaret H, (2006), *Data Mining: Introductory and Advanced Topics*, Prentice Hall
4. Witten, Ian and Eibe Frank, (2011), *Data Mining: Practical Machine Learning Tools and Techniques*, Second Edition, Morgan Kaufmann
5. MacLennan Jamie, Tang ZhaoHui and Crivat Bogdan, (2009), *Data Mining with Microsoft SQL Server 2008*, Wiley India Edition

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2.4 : MAJOR (MANDATORY)

Course Title	**Advanced JAVA Lab**
Course Credits	2
Practical **Internal – External**	2 Credits 25 Marks + 25 Marks
Course Outcomes	After going through the course, learners will be able to
	1. Prepare students to excel and succeed in industry / technical profession through global, rigorous education.
	2. Excellence through application development.
	3. Provide students with a solid foundation on Tools, Technology and Framework
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	To implement database connectivity in Java Application
Content Outline	**JDBC** All data base operation using Access /oracle/MySQL as backend.
Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	To demonstrate the use of Servlets
Content Outline	**Servlets** A Simple Servlet Generating Plain text/ HTML, program based on cross page posting and post back posting (client request and server response)

Module 3 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	To demonstrate the use of Java Server Pages
Content Outline	**JSP** Sample program to demonstrate JSP syntax and semantics, program based on directive and error object, program based on cookies and Sessions
Module 4 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	To implement MVC architecture
Content Outline	**Introduction to Framework: Struts** Basic Configuration for struts, Program based on Action validation and control in struts, Program based on integration of JSP and Servlets with struts

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. Internal Assessment
   Lab Manuals, Practical Test and Online Test – 25 marks
2. External Assessment – final Practical 25 marks

TEXT BOOKS:

1) Herbert schildt, *The complete reference JAVA2*, (2014)Tata McGraw Hill
2) Sharanam Shah and vaishali shah, *Core Java for beginners, (2010)* SPD

REFERENCE BOOKS:

1) Sharanam Shah and vaishali shah, *Struts 2 for beginners*, (2016)SPD
2) Dreamtech, *Advance Java-Savalia,Core, Java 6 Programming Black Book*, Wiley (2005)
3) Marty Hall and Larry Brown, *Core Servlets and Java Server Pages*: Vol I: Core Technologies 2/e , Pearson (2010)
4) Sharnam Shah and Vaishali Shah, *Java EE 6 for Server Programming for professionals*, (20180) SPD

2.5 : MAJOR (MANDATORY)

Course Title	**ADVANCED PYTHON LAB**
Course Credits	2
Practical **Internal - External**	2 Credits 25 Marks + 25 Marks

Course Outcomes	After going through the course, learners will be able to
	1. Improve Problem solving and programming capability 2. learn data analytics through python programming
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. describe various libraries required for data analytics 2. Elaborate statistical analysis using Python
Content Outline	**Operations using Libraries for data analytics** Anaconda, Numpy, Scipy, Pandas, Matplotlib, Seaborn, Scikit-learn, Jupyter Notebook: Create Documentation, Code mode, Markdown mode **Practical on Statistics using python** Mean, Median, Mode, Z-scores, Bias -variance dichotomy, Sampling and t-tests, Sample vs Population statistics, Random Variables, Probability distribution function, Expected value, Binomial Distributions, Normal Distributions, Central limit Theorem, Hypothesis testing, Z-Stats vs T-stats, Type 1 type 2 error, Chi Square test, ANOVA test and F-stats
Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Understanding the NumPy and Scipy library to efficiently work with arrays, matrices, and perform mathematical operations 2. Choose different chart types based on data type and requirement 3. Set the Tick, Text, Legend, and Annotate elements of a plot 4. Plot data in 2D and 3D
Content Outline	**Practical on Numpy, Scipy** NUMPY: Creating NumPy arrays, Indexing and slicing in NumPy, Downloading and parsing data, creating multidimensional arrays, NumPy Data types, Array tributes, Indexing and Slicing, creating array, views copies, Manipulating array shapes I/O, SCIPY: Introduction to SciPy, Create function, modules of SciPy **Practical on Matplotlib** MATPLOTLIB: Scatter plot, Bar charts, histogram, Stack charts, Legend title Style, Figures and subplots, plotting function in pandas, Labelling and arranging figures, Save plots

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. Internal Assessment
   Lab Manuals, Practical Test and Online Test – 25 marks
2. External Assessment – final Practical - Exam 25 marks

TEXT BOOK:

1) Martin C. Brown, *Complete Reference: Python.*, McGraw Hill

REFERENCE BOOKS:

1) Allen Downey, Jeff Elkner and Chris Meyers, (2017), How To Think Like A Computer Scientist: Learning With Python,DreamTech
2) Wesley J Chun, (2018), Core Python Programming, Prentice Hall

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2.6A : MAJOR (ELECTIVE)

Course Title	**DISTRIBUTED SYSTEMS**
Course Credits	4
Theory **Internal – External**	4 Credits 50 Marks + 50 Marks
Course Outcomes	After going through the course, learners will be able to
	• Identify the core concepts of distributed systems: the way in which several machines orchestrate to correctly solve problems in an efficient, reliable and scalable way.
	• Examine how existing systems have applied the concepts of distributed systems in designing large systems, and will additionally apply these concepts to develop sample systems
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	2. Introduce concepts related to distributed computing systems
Content Outline	**Characterization of Distributed Systems** Introduction, Examples of distributed Systems, Resource sharing and the Web Challenges. Architectural models, Fundamental Models. Theoretical Foundation for Distributed System: Limitation of Distributed system, absence of global clock, shared memory, Logical clocks, Lamport's & vectors logical clocks. Concepts in Message Passing Systems: causal order, total order, total causal order, Techniques for Message Ordering, Causal ordering of messages, global state, termination detection.
Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Learn solutions to the problem of mutual exclusion, which is important for correctness in distributed systems with shared resources

Content Outline	**Distributed Mutual Exclusion** Classification of distributed mutual exclusion, requirement of mutual exclusion theorem, Token based and nontoken-based algorithms, performance metric for distributed mutual exclusion algorithms. Distributed Deadlock Detection: system model, resource Vs communication deadlocks, deadlock prevention, avoidance, detection & resolution, centralized dead lock detection, distributed dead lock detection, path pushing algorithms, edge chasing algorithms.
Module 3 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. introduce the concept of Agreement protocol and the abstraction & use of file systems
Content Outline	**Agreement Protocols** Introduction, System models, classification of Agreement Problem, Byzantine agreement problem, Consensus problem, Interactive consistency Problem, Solution to Byzantine Agreement problem, Application of Agreement problem, Atomic Commit in Distributed Database system. Distributed Resource Management: Issues in distributed File Systems, Mechanism for building distributed file systems, Design issues in Distributed Shared Memory, Algorithm for Implementation of Distributed Shared Memory.
Module 4 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. learn about the Failure Recovery in Distributed Systems and Fault Tolerance concepts
	2. Understand the transactions and concurrency Control mechanisms in Distributed systems
Content Outline	**Failure Recovery in Distributed Systems** Concepts in Backward and Forward recovery, Recovery in Concurrent systems, Obtaining consistent Checkpoints, Recovery in Distributed Database Systems. Fault Tolerance: Issues in Fault Tolerance, Commit Protocols, Voting protocols, Dynamic voting protocols. **Transactions and Concurrency Control** Transactions, Nested transactions, Locks, Optimistic Concurrency control, Timestamp ordering, Comparison of methods for concurrency control. Distributed Transactions: Flat and nested distributed transactions, Atomic Commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery. Replication: System model and group communication, Fault - tolerant services, highly available services, Transactions with replicated data.

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. Unit Test of 25 marks Module 1 and 2 (Internal)
2. Module 3 and 4 - 25 Marks Class test / Assignments (Internal)
3. Final Exam of 50 Marks Theory on Module 1 - 4 (External)

TEXT BOOKS:

1) Singhal & Shivaratri, (2006), *Advanced Concept in Operating Systems*, McGraw Hill
2) Ramakrishna,Gehrke, (2007) *Database Management Systems*, Mc Grawhill

REFERENCE BOOKS:

1) Coulouris, Dollimore, Kindberg, (2005), Distributed System: Concepts and Design, Pearson Education
2) Tenanuanbaum, Steen, (2001), Distributed Systems, PHI
3) Gerald Tel, Distributed Algorithms, Cambridge University Press

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2.6A : MAJOR (ELECTIVE)

Course Title	**Computer Graphics**
Course Credits	4
Theory **Internal - External**	4 Credits 50 Marks + 50 Marks
Course Outcomes	After going through the course, learners will be able to
	• Demonstrate the algorithms to implement output primitives of Computer Graphics
	• Apply and analyse 2D and 3D techniques
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Describe the basic understanding of concepts of Computer Graphics
	2. Illustrate the importance and the essentials of various display devices in computer graphics
Content Outline	**Introduction to Computer Graphics** • Elements of Computer Graphics • Graphics display systems
Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Elaborate on primitive algorithms to generate outputs

	2. Apply concepts of output primitives of Computer Graphics
Content Outline	**Output primitives and its algorithms** • Points and Lines, Line Drawing algorithms: DDA line drawing algorithm, Brenham's drawing algorithm, • Circle and Ellipse generating algorithms: Mid-point Circle algorithm, Mid-point Ellipse algorithm, • Parametric Cubic Curves: Bezier curves. • Fill area algorithms: Scan line polygon fill algorithm, Inside-Outside Tests, Boundary fill algorithms, Flood fill algorithms
Module 3 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Demonstrate and design various Clipping Algorithms required for displaying graphics
	2. Identify and apply various transformations
Content Outline	**2D Geometric Transformations & Clipping** • Basic transformations, Matrix representation and Homogeneous Coordinates, • Composite transformation, shear & reflection. • Transformation between coordinated systems, Window to Viewport coordinate transformation, • Clipping operations – Point clipping Line clipping: Cohen – Sutherland line clipping, • Midpoint subdivision, Polygon Clipping: Sutherland – Hodgeman polygon clipping ,Weiler – Atherton polygon clipping
Module 4 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Represent 3D objects using various representation methods
	2. Understand and use different projection techniques
Content Outline	**Basic 3D concepts and Fractals** • 3D object representation methods: B-REP, sweep representations, CSG, Basic transformations, Reflection, shear, • Projections – Parallel and Perspective Halft one and Dithering technique. • Fractals and self-similarity: Koch Curves/snowflake, Sirpenski Triangle

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. Unit Test of 25 marks Module 1 and 2 (Internal)

2. Module 3 and 4 - 25 Marks Class test / Assignments (Internal)
3. Final Exam of 50 Marks Theory on Module 1 - 4 (External)

TEXT BOOK:

1) David F. Rogers, James Alan Adams, (1990), *Mathematical elements for computer graphics*, McGraw-Hill

REFERENCE BOOKS:

1) Donald Hearn and M Pauline Baker, *Computer Graphics* C Version Pearson Education.
2) Rafael C. Gonzalez and Richard E. Woods, *Digital Image Processing* (3rd Edition), Pearson Education.

2.7 : ON JOB TRAINING (OJT) / FIELD PROJECTS (FP)

COURSE TITLE : INTERNSHIP

Course Title	**INTERNSHIP**
Course Credits	4
Theory **Internal – External**	4 Credits 50 Marks + 50 Marks
Course Outcomes	After going through the course, learners will be able to
	• Apply project management concepts and techniques to an IT project. • Identify issues that could lead to IT project success or failure. • Understand the responsibilities of IT project managers. • Apply project management concepts through working in a group as team leader or active team member on an IT project. • Understand the different project contexts and suggest an appropriate management strategy. • Practice the role of professional ethics in successful software development.

Guidelines for On the Job Training (OJT)

1. Students must submit a detailed internship proposal for approval.
2. Clearly outline the objectives, scope, and expected learning outcomes.

3. Ensure that the internship is directly related to the IT program.
4. The internship topic should justify its relevance to the MSC CS program.
5. Interns should focus on making genuine and original contributions. Prohibit the use of unauthorized materials or solutions.
6. Any breach of ethical standards will be addressed seriously.
7. Internship may be undertaken individually.
8. Internship should be of minimum 120 hours and should be completed before the term end
9. Each student should have a designated supervisor or mentor at the college.
10. Maintain a comprehensive log of internship activities. Include details of tasks performed, challenges faced, and solutions implemented.
11. Interns must prepare a presentation summarizing their internship experience. A detailed report outlining the tasks, achievements, and lessons learned is required.
12. Emphasize the importance of adhering to company policies and procedures.
13. Interns should maintain a high level of professionalism. Dress appropriately, adhere to work hours, and demonstrate effective communication.
14. Conduct a post-internship evaluation session to gather feedback from interns and evaluate them.

EVALUATION:

Evaluation	**Details**		**Marks**
Internal	1. Project work and Deliverables		50 Marks
	1.1 Project Goals and Objectives	10 Marks	
	1.2 Quality of Deliverables	10 marks	
	1.3 Originality and Innovation	10 Marks	
	2. Professionalism and Communication		
	2.1 Professional Conduct	5 Marks	
	2.2 Communication Skills	5 Marks	
	3. Learning and Development		
	3.1 Application of Academic Knowledge	5 Marks	
	3.2 Demonstration of Learning	5 Marks	
External	Evaluation by Industry Experts		50 Marks
	Total Marks		**100 Marks**

COURSE: FIELD PROJECT (FP)

Guidelines:

- Approval of the project proposal is mandatory to continue and submit the project work.
- Project must adhere to IT program/field only. Research and development projects must focus on problems of practical and theoretical interest.
- The topic selected should justify as a MSc.CS project.
- The project should be genuine and original in nature and should not be copied from anywhere else.
- If found copied, the project report will be forwarded to the Exam Cell of the College as an Unfair means case for necessary action.
- Project work must be carried out by a group of a maximum of four students and a minimum of Two.

Project Proposal

A proposal as per the format given should be prepared once the topic is selected. It should be a minimum of 3 pages and need not be sent separately. The format for the same is

1. Title of Project
2. Objectives
3. Problem Identification & need of automation
4. Development tools and Technology to be used in Project.
5. Methodology and Procedure of work.
6. Conclusion

No Objection Certificate:

If the project is carried out in a company or organization, then a certificate for 'No Objection' of the same needs to be presented. It should mention that the organization has no objection to publishing the findings of the project study. The certificate should contain the name of the authority with signature and company stamp on the company's letterhead and duly signed by the authorized signatory.

Project Report

Table of Contents/Index with page numbering

- Introduction/Objectives
- Identification of Need
- Preliminary Investigation
- System Analysis
- Feasibility Study

- Project Planning
- Project Scheduling (PERT Chart and Gantt Chart both)
- Software requirement specifications (SRS)
- Software Engineering Paradigm applied
- Data models (like DFD), Control Flow diagrams, State Diagrams/Sequence diagrams, Entity Relationship Model, Class Diagrams/CRC Models/Collaboration Diagrams/Use-case Diagrams/Activity Diagrams depending upon your project requirements
- System Design
- Data integrity and constraints
- Database design, Procedural Design/Object-Oriented Design
- User Interface Design
- Coding
- SQL commands for (i) database creation (along with constraints), (ii) data insertion in tables and (iii) access rights for different users.
- Complete Project Coding
- Comments and Description of Coding segments
- Standardization of the coding
- Code Efficiency
- Error handling
- Parameters calling/passing
- Validation checks
- Testing
- Testing techniques and Testing strategies used
- Testing Plan used
- Test reports for Unit Test Cases and System Test Cases
- Debugging and Code improvement
- System Security measures (Implementation of security for the project developed)
- Database/data security
- Creation of User profiles and access rights
- Cost Estimation of the Project along with Cost Estimation Model
- Reports (sample layouts should be placed)
- Future scope and further enhancement of the Project
- Bibliography (MLA Style Sheet)
- Appendices (if any)

- Glossary.
- Should attach a copy of the CD containing the executable file(s) of the complete project.

Term Work:

The student has to submit a weekly progress report to the internal guide who will keep track on the progress of the project and also maintain an attendance report. This progress report can be used for awarding term work marks. The distribution of marks for term work will be as follows

1. Weekly Attendance on Project Day
2. Project work contribution as per objective
3. Project Report (Hard Bound)
4. Term End Presentation (Internal)

The final certification and acceptance of teamwork ensure satisfactory performance on the above aspects.

Oral & Practical:

Oral &Practical examination of the Project should be conducted by Internal and External examiners at College Level. Students have to give a presentation and demonstration on the Project.

EVALUATION:

Evaluation	**Details**		**Marks**
Internal	Synopsis	5 Marks	**50 Marks**
	DFD Submission	5 Marks	
	Database Design	5 marks	
	20 percent of Coding submission	10 Marks	
	60 percent of Coding submission	10 marks	
	Report Generation in Project	10 Marks	
	Project Report/Document Submission	5 Marks	
External	**Evaluation by Industry Experts**		**50 Marks**
	Total Marks		**100 Marks**

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