BE(CSE) SEMESTER- IV with Effect from AY(21-22)

CSE: SEMESTER – IV

S. No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hrs/Wk	CIE	SEE	Duration in Hrs	
Theory Courses										
1	HS 104 EG	Effective Technical Communication in English	3	-	-	3	30	70	3	3
2	HS 105 CM	Finance and Accounting	3	1	-	4	30	70	3	3
3	BS 207 MT	Mathematics – III (Probability & Statistics)	3	-	-	3	30	70	3	3
4	ES 305 EC	Signals and Systems	3	-	-	3	30	70	3	3
5	PC 401 CS	Operating Systems	3	-	-	3	30	70	3	3
6	PC 402 CS	Computer Organization	3	1	-	4	30	70	3	3
7	PC 403 CS	Database Management Systems	3	1	-	4	30	70	3	3
Practical/ Laboratory Courses										
8	PC 451 CS	Computer Organization Lab	-	-	2	2	25	50	3	1
9	PC 452 CS	Operating Systems Lab	-	-	2	2	25	50	3	1
10	PC 453 CS	Database Management Systems Lab	-	-	2	2	25	50	3	1
Total			**21**	**3**	**06**	**30**	**285**	**640**		**24**

ELECTIVE TECHNICAL COMMUNICATION IN ENGLISH

HS 104 EG

Instruction: 3 periods per week *Duration of SEE: 3 hours*

CIE: 30 marks *SEE: 70 marks*

Credits: 3

Objectives:

1.	Features of technical communication
2.	Types of professional correspondence
3.	Techniques of report writing
4.	Basics of manual writing
5.	Aspects of data transfer and presentations

Outcomes:

On successful completion of the course, the students would be able to	
1.	Handle technical communication effectively
2.	Use different types of professional correspondence
3.	Use various techniques of report writing
4.	Acquire adequate skills of manual writing

Enhance their skills of information transfer and presentations

UNIT – I
Definition and Features of Technical communication: Definition and features of technical communication (precision, relevance, format, style, use of visual aids), Differences between general writing and technical writing, Types of technical communication (oral and written)
UNIT – II
Technical Writing-I (Official correspondence): Emails, IOM, Business letters, Business proposals
UNIT – III
Technical writing-II (Reports): Project report, Feasibility report, Progress report, Evaluation report.
UNIT – IV
Technical writing- III (Manuals): Types of manuals, User manual, Product manual, Operations manual.
UNIT – V
Information Transfer and Presentations: Non-verbal (bar diagram, flow chart, pie chart, tree diagram) to verbal (writing), Verbal (written) to non-verbal, Important aspects of oral and visual presentations.

Suggested Readings:

1. Raman, Meenakshi & Sharma, Sangeeta. (2015). Technical communication: Principles and Practice, 3rd Edition, New Delhi
2. Rizvi, Ashraf, M. (2017). Effective Technical Communication (2nd ed.). New Delhi, Tata McGraw Hill Education *Security.*

3. Sharma, R. C., & Mohan, Krishna. (2017). Business Correspondence and Report Writing: A Practical Approach to Business & Technical Communication (4th ed.). New Delhi, Tata McGraw Hill Education.

4. Tyagi, Kavita &Misra, Padma. (2011). Advanced Technical Communication. New Delhi, PHI Learning.

5. Jungk, Dale. (2004). Applied Writing for Technicians. New York, McGraw-Hill Higher Education

FINANCE AND ACCOUNTING

HS 105 CM

Instruction: 3 +1 periods per week *Duration of SEE: 3 hours*

CIE: 30 marks *SEE: 70 marks*

Credits: 3

Objectives:

1.To provide basic understanding of Financial and Accounting aspects of a business unit
2. To provide understanding of the accounting aspects of business
3. To provide understanding of financial statements
4. To provide the understanding of financial system
5. To provide inputs necessary to evaluate the viability of projects
6. To provide the skills necessary to analyse the financial statements

Outcomes:

After successful completion of the course the students will be able to
1. Evaluate the financial performance of the business unit.
2. Take decisions on selection of projects.
3. Take decisions on procurement offinances.
4. Analyse the liquidity, solvency and profitability of the business unit.
5. Evaluate the overall financial functioning of an enterprise.

UNIT – I
Basics of Accounting: Financial Accounting–Definition- Accounting Cycle – Journal - Ledger and Trial Balance-Cash Book-Bank Reconciliation Statement (including Problems)
UNIT – II
Final Accounts: Trading Account-Concept of Gross Profit- Profit and Loss Account-Concept of Net Profit- Balance Sheet (including problems with minor adjustments)
UNIT – III
Financial System and Markets: Financial System-Components-Role-Considerations of the investors and issuers- Role of Financial Intermediaries. Financial Markets-Players- Regulators and instruments - Money Markets Credit Market- Capital Market (Basics only)
UNIT – IV
Basics of Capital Budgeting techniques: Time Value of money- Compounding- Discounting- Future Value of single and multiple flows- Present Value of single and multiple Flows- Present Value of annuities- Financial Appraisal of Projects– Payback Period, ARR- NPV, Benefit Cost Ratio, IRR (simple ratios).
UNIT – V
Financial statement Analysis: Financial Statement Analysis- Importance-Users-Ratio Analysis-liquidity, solvency, turnover and profitability ratios.

Suggested Readings:

1. Satyanarayana. S.V. and Satish. D., Finance and Accounting for Engineering, PearsonEducation
2. Rajasekharan, Financial Accounting, Pearson Education
3. Sharma. S.K. and Rachan Sareen, Financial Management, Sultan Chand
4. Jonathan Berk, Fundamentals of Corporate Finance, Pearson Education
5. Sharan, Fundamentals of Financial Management, Pearson Education

B.E Mathematics syllabus for affiliated engineering colleges of
Osmania University
(w.e.f: academic year 2019-2020)
For Branches: CSE, IT, EEE & EIE

BS 207MT	**Mathematics-III: Probability and Statistics**	**2L:IT:OP**	**3 credits**

Course objectives :

- To provide the knowledge of probability distributions , tests of significance, correlation and regression.

Course Outcomes :

At the end of the course students will be able to

- apply various probability distributions to solve practical problems, to estimate unknown parameters of populations and apply the tests of hypotheses
- perform a regression analysis and to compute and interpret the coefficient of correlation

Unit-I : Introduction of Probability, Conditional probability, Theorem of Total probability, Baye's Theorem and its applications, Random variables, Types of random variables, Probability mass function and Probability density function, Mathematical expectations.

Unit-II: Discrete probability distributions: Binomial and Poisson distributions, Mean, variance, moment generating function and evaluation of statistical parameters for these distributions, Moments, skewness and Kurtosis.

Unit-III: Continuous probability distributions, Uniform, Exponentian and Normal distributions, Mean, variance, moment generating function and evaluation of statistical parameters for these distributions

Unit-IV: Curve fitting by the method of least squares : fitting of straight lines, second degree parabolas and more general curves, Correlation, regression and Rank correlation. Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations.

Unit-V : Test for single mean, difference of means and correlation coefficients, test for ratio of variances , Chi-square test for goodness of fit and independence of attributes.

Text / References:

1. Advanced Engineering Mathematics, R.K.Jain & Iyengar, Narosa Publications.
2. B.S. Grewal, “Higher Engineering Mathematics”, Khanna Publishers, 2000.
3. Engineering Mathematics, P.Sivaramakrishna Das & C.Vijaya Kumar, Pearson India Education Services Pvt.Ltd.
4. N.P. Bali and M. Goyal, “A text book of Engineering Mathematics”, Laxmi Publications, 2010.
5. Fundamentals of Mathematical Statistics, S.C.Gupta & V.K.Kapoor, S.Chand Pub.
6. P. G. Hoel, S. C. Port and C. J. Stone, “Introduction to Probability Theory”, Universal Book Stall, 2003.
7. W. Feller, “An Introduction to Probability Theory and its Applications”, Vol. 1, Wiley, 1968.

SIGNALS AND SYSTEMS

ES305EC

Instruction: 3 periods per week *Duration of SEE: 3 hours*

CIE: 30 marks *SEE: 70 marks*

Credits: 3

Objectives:

1. To explain signals and systems representations/classifications and also describe the time and frequency domain analysis of continuous time signals with Fourier series, Fourier transforms and Laplace transforms.
2. To understand Sampling theorem, with time and frequency domain analysis of discrete time signals with DTFS, DTFT and Z-Transform.
3. To present the concepts of convolution and correlation integrals and also understand the properties in the context of signals/systems and lay down the foundation for advanced courses.

Outcomes:

1. Define and differentiate types of signals and systems in continuous and discrete time
2. Apply the properties of Fourier transform for continuous time signals
3. Relate Laplace transforms to solve differential equations and to determine the response of the Continuous Time Linear Time Invariant Systems to known inputs
4. Apply Z-transforms for discrete time signals to solve Difference equations
5. Obtain Linear Convolution and Correlation of discrete time signals with graphical representation

UNIT – I
Some useful operations on signals: Time shifting, Time scaling, Time inversion. Signal models: Impulse function, Unit step function, Exponential function, Even and odd signals. Systems: Linear and Non-linear systems, Constant parameter and time varying parameter systems, Static and dynamic systems, Causal and Non-causal systems, Lumped Parameter and distributed parameter systems, Continuous-time and discrete- time systems, Analog and digital systems.
UNIT – II
Fourier series: Signals and Vectors, Signal Comparison: correlation, Signal representation by orthogonal signal set, Trigonometric Fourier Series, Exponential Fourier Series, LTI system response to periodic inputs.
UNIT – III
Continuous-Time Signal Analysis: Fourier Transform: Aperiodic signal representation by Fourier integral, Fourier Transform of some useful functions, Properties of Fourier Transform, Signal transmission through LTI Systems, ideal and practical filters, Signal energy. Laplace transform: Definition, some properties of Laplace transform, solution of differential equations using Laplace transform.
UNIT – IV
Discrete-time signals and systems: Introduction, some useful discrete-time signal models, Sampling continuous-time sinusoids and aliasing, Useful signal operations, examples of discrete-time systems. Fourier analysis of discrete-time signals, periodic signal representation of discrete-time Fourier series, aperiodic signal representation by Fourier integral.

UNIT – V
Discrete-time signal analysis: Z-Transform, some properties of Z-Transform, Solution to Linear difference equations using Z-Transform, System realization. Relation between Laplace transform and Z-Transform. DTFT: Definition, Properties of DTFT, comparison of continuous-time signal analysis with discrete-time signal analysis.

Suggested Readings:

1. B. P. Lathi, Linear Systems and Signals, Oxford University Press, 2nd Edition,2009
2. Alan V O P Penheim, A. S. Wlisky, Signals and Systems, 2nd Edition, PrenticeHall
3. Rodger E. Ziemer, William H Trenter, D. Ronald Fannin, Signals and Systems, 4th Edition, Pearson 1998.
4. Douglas K. Linder, Introduction to Signals and Systems, McGraw Hill,1999
5. P. Ramakrishna Rao, Signals and Systems,TMH

OPERATING SYSTEMS

PC 401 CS

Instruction: 3 periods per week *Duration of SEE: 3 hours*

CIE: 30 marks *SEE: 70 marks*

Credits: 3

Objectives:

1. To learn the fundamentals of Operating Systems.
2. To learn the mechanisms of OS to handle processes and threads and their communication.
3. To learn the mechanisms involved in memory management in contemporary OS.
4. To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection.
5. To know the components and management aspects of concurrency management.

Outcomes:

Student will be able to	
1.	Identify System calls and evaluate process scheduling criteria of OS.
2.	Develop procedures for process synchronization of an OS.
3.	Demonstrate the concepts of memory management and of disk management.
4.	Solve issues related to file system interface and implementation, I/O systems.
5.	Describe System model for deadlock, Methods for handling deadlocks.

UNIT – I
Introduction: Concept of Operating Systems, Generations of Operating systems, Types of Operating Systems, OS Services, System Calls, Structure of an OS - Layered, Monolithic, Microkernel Operating Systems, Concept of Virtual Machine.
UNIT – II
Processes: Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching **Thread:** Definition, Various states, Benefits of threads, Types of threads, Concept of multithreads, **Process Scheduling:** Foundation and Scheduling objectives, Types of Schedulers, Scheduling Criteria, Scheduling algorithms, multiprocessor scheduling.
UNIT – III
Process Synchronization: Inter-process Communication: Critical Section, Race Conditions, Mutual Exclusion, Peterson‘s Solution, classical problems of synchronization: The Bounded buffer problem, Producer\Consumer Problem, reader‘s & writer problem, Dinning philosopher‘s problem. Semaphores, Event Counters, Monitors, Message Passing, **Deadlocks:** Definition, Necessary and sufficient conditions for Deadlock, Methods for Handling: Deadlocks: Deadlock prevention, Deadlock Avoidance: Banker‘s algorithm, Deadlock detection and Recovery.
UNIT – IV
Memory Management: Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation, fragmentation, and Compaction; Paging: Principle of operation – Page allocation – Hardware support for paging, structure of page table, Protection and sharing, Disadvantages of paging.

Virtual Memory: Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault, Working Set, Dirty page/Dirty bit – Demand paging, Page Replacement algorithms, Trashing.
UNIT – V
I/O Hardware: I/O devices, Device controllers, Direct memory access Principles of I/O Software: Goals of Interrupt handlers, Device drivers, Device independent I/O software, **File Management:** Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods, Free-space management, directory implementation, efficiency, and performance. **Secondary-Storage Structure:** Disk structure, Disk scheduling algorithms, Disk Management, RAID structure.

Suggested Readings:

1. Avi Silberschatz, Peter Galvin, Greg Gagne, *Operating System Concepts Essentials*, 9th Edition, Wiley Asia Student Edition, 2017.
2. William Stallings, *Operating Systems: Internals and Design Principles*, 5th Edition, Prentice Hall of India, 2016.
3. Maurice Bach, *Design of the Unix Operating Systems*, 8th Edition, Prentice-Hall of India, 2009.
4. Daniel P. Bovet, Marco Cesati, *Understanding the Linux Kernel*, 3rd Edition, , O'Reilly and Associates.

COMPUTER ORGANIZATION

PC 402 CS

Instruction: 3+1 periods per week *Duration of SEE: 3 hours*

CIE: 30 marks *SEE: 70 marks*

Credits: 3

Objectives:

1. To provide in depth knowledge to the students about the design and organization of a digital computer, operation of various functional units, instruction set design and factors that influence the performance of a computer.
2. To enable the students with the understanding of basic computer architecture with instruction set and programming of 8085 in particular.
3. To learn the functionality and interfacing of various peripheral devices.

Outcomes:

After the completion of the course, the student will be able to:
1. To understand the architecture of modern computer, Bus structures.
2. Analyze the Different memories and evaluate the mapping techniques.
3. Discuss the architecture, the instruction set and addressing modes of 8085 processor.
4. Analyze Stacks, Subroutine, Interrupts of 8085, different PPI techniques, the uses of interfaces 8259, RS 232C, USART (8251), and DMA controller. Design the applications of interfacing circuit's 8254/8253timer, A/D and D/A converter, Keyboard/Display controller.

UNIT – I
Basic Structure of Computers: Computer Types, Functional Units, Basic Operational Concepts, Bus Structures, Performance, Multiprocessors and Multicomputers, Historical perspective. Input/output Organization: Accessing I/O devices, Interrupts, Processor examples, Direct memory access, parallel interface and serial interface.
UNIT – II
The Memory System: Basic concepts, Semiconductor RAM memories, Read-Only memories, Speed, Size and Cost, Cache memories, Performance considerations, Virtual Memories, Memory management requirements, Secondary Storage.
UNIT – III
8085 Architecture: Introduction to microprocessors and microcontrollers, 8085 Processor Architecture, Internal operations, Instructions and timings. Programming the 8085 - Introduction to 8085 instructions, Addressing modes and Programming techniques with Additional instructions.
UNIT – IV
Stacks and subroutines, interfacing peripherals - Basic interfacing concepts, interfacing output displays, Interfacing input keyboards. Interrupts - 8085 Interrupts, Programmable Interrupt Controller (8259A). Direct Memory Access (DMA) - DMA Controller (Intel 8257), Interfacing 8085 with Digital to Analog and Analog to Digital converters.

UNIT – V
Programmable peripheral interface (Intel 8255A), Programmable communication interface (Intel 8251), Programmable. Interval timer (Intel 8253 and 8254), Programmable Keyboard /Display controller (Intel 8279). Serial and parallel bus standards RS 232 C, IEEE 488.

Suggested Readings:

1. Carl Hamacher, Zvonko Vranesic, SafwatZaky, Computer Organization, 5th Edition, McGraw Hill, 2002.
2. Ramesh S Gaonkar, Microprocessor Architecture, Programming, and Applications with the 8085, 5/E Prentice Hall,2002.
3. Pal Chouduri, Computer Organization and Design, Prentice Hall of India,1994.
4. M. M. Mano, Computer System Architecture, 3rd Edition, PrenticeHall.

Database Management Systems

PC403CS

Instruction: 3+1 periods per week *Duration of SEE: 3 hours*

CIE: 30 marks *SEE: 70 marks*

Credits: 3

Objectives:

1. To get familiar with fundamental concepts of database management which includes database design, database languages, and database-system implementation.
2. To get familiar with data storage techniques and indexing.
3. To impart knowledge in transaction Management, concurrency control techniques and recovery techniques.
4. To master the basics of SQL and construct queries using SQL.
5. To become familiar with database storage structures and access techniques

Outcomes:

1. DeveloptheknowledgeoffundamentalconceptsofdatabasemanagementandDesigningadatabase using ER modeling approach.
2. Implement storage of data, indexing, and hashing.
3. Apply the knowledge about transaction management, concurrency control and recovery of database systems.
4. Ability to design entity relationship model and convert entity relationship diagrams into RDBMS and formulate SQL queries on the data

Apply normalization for the development of application software

UNIT – I
Introduction to Database: File System Organization: Sequential - Pointer - Indexed – Direct. Purpose of Database System - Database Characteristics - Users of Database System - Advantages of DBMS Approach - Schemas and Instances - Three Schema Architecture and Data Independence - The Database System Environment - Relational Algebra
UNIT – II
Logical Database Design: Relational DBMS - Codd's Rule - Entity-Relationship model - Extended ER Normalization - Functional Dependencies - Anomaly - 1NF to 5NF - Domain Key Normal Form – Denormalization.
UNIT – III
Indexing: Types of Single Level Ordered Indexes - Multilevel Indexes - Dynamic Multilevel Indexes. **Transaction Processing and Concurrency Control**: Transaction Concepts - ACID Properties - Transaction States - Concurrency Control Problems - Serializability - Recoverability - Pessimistic and Optimistic Concurrency Control Schemes.

UNIT – IV

Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints– Querying relational data – Logical data base Design – Introduction to views – Destroying /altering Tables and Views.

Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus

UNIT – V

Form of Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries Set – Comparison Operators – Aggregative Operators – NULL values – Comparison using Null values – Logical connectivity's – AND, OR and NOT – Impact on SQL Constructs – Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL Triggers and Active Data bases.

Advanced Topics: Overview: Parallel Database - Multimedia Database - Mobile Database - Web Database - Multidimensional Database. Data Warehouse - OLTP Vs OLAP - NoSQL Database.

Suggested Readings:

1. Abraham Silberchatz, Henry F Korth and Sudarshan S, "Database System Concepts", Tata McGraw- Hill, New Delhi,2010.
2. RamezElmasri and Shamkant B Navathe, "Fundamentals of Database Systems", Addison Wesley, USA,2010.
3. Raghu Ramakrishnan and Johannes Gehrke, "Database Management Systems", Tata McGraw-Hill, New Delhi,2008.
4. Gupta G K, "Database Management System", Tata McGraw-Hill, New Delhi,2011.
5. Atul Kahate, "Introduction to Database Management Systems", Pearson Education, New Delhi,2009

Practical / Laboratory Courses

Computer Organization Lab

PC 451 CS

Instruction: 2 periods per week *Duration of SEE: 3 hours*

CIE: 25 marks *SEE: 50 marks*

Credits: 1

Objectives:

The objectives of the course are to impart knowledge of:
1. To become familiar with the architecture and Instruction set of Intel 8085microprocessor.
2. To provide practical hands on experience with Assembly Language Programming.
3. Tofamiliarizethestudentswithinterfacingofvariousperipheraldeviceswith8085microprocessors.

Outcomes:

After the completion of the course, the student will be able to:
1. Interpret the principles of Assembly Language Programming, instruction set in developing microprocessor based applications.
2. Develop Applications such as: 8-bit Addition, Multiplication, Division, array operations, swapping, negative and positive numbers.
3. Analyse the interfaces like serial ports, digital-to-analog Converters and analog-to-digital converters etc.
4. Build interfaces of Input-output and other units like stepper motor with8085. Analyse the function of traffic light controller.

List of Programs:

1.	Tutorials on 8085Programming.
2.	Interfacing and programming of 8255. (E.g. traffic light controller).
3.	Interfacing and programming of 8254.
4.	Interfacing and programming of 8279.
5.	A/D and D/A converter interface.
6.	Stepper motor interface.
7.	Display interface

Note: Adequate number of programs covering all the instructions of 8085 instruction set should be done on the 8085 microprocessor trainer kit.

OPERATING SYSMTES LAB

PC 452 CS

Instruction: 3 periods per week *Duration of SEE: 3 hours*

CIE: 25 marks *SEE: 50 marks*

Credits: 1

Objectives:

1.	Learn different types of CPU scheduling algorithms.
2.	Demonstrate the usage of semaphores for solving synchronization problem.
3.	Understand memory management techniques and different types of fragmentation.
4.	That occur in them and various page replacement policies.
5.	Understand Banker‘s algorithm used for deadlock avoidance.
6.	Learn various disk scheduling algorithms.

Outcomes:

Student will be able to
• Evaluate the performance of different types of CPU scheduling algorithms.
• Implement producer-consumer problem, reader-writers problem, Dining philosopher’s problem.
• Simulate Banker’s algorithm for deadlock avoidance.
• Implement paging replacement and disk scheduling techniques.
• Use different system calls for writing application programs.

I. CASE STUDY
Perform a case study by installing and exploring various types of operating systems on a physical or logical (virtual) machine.
II. List of Experiments (preferred programming language is C)
1. Write a C programs to implement UNIX system calls and file management 2. Write C programs to demonstrate various process related concepts. 3. Write C programs to demonstrate various thread related concepts. 4. Write C programs to simulate CPU scheduling algorithms: FCFS, SJF, Round Robin 5. Write C programs to simulate Intra & Inter-Process Communication (IPC) techniques: Pipes, Messages Queues, Shared Memory. 6. Write C programs to simulate solutions to Classical Process Synchronization Problems: Dining Philosophers, Producer-Consumer, Readers-Writers 7. Write a C program to simulate Bankers Algorithm for Deadlock Avoidance. 8. Write C programs to simulate Page Replacement Algorithms: FIFO, LRU 9. Write C programs to simulate implementation of Disk Scheduling Algorithms: FCFS, SSTF.

Software Required:

StarUML/Umbrello, NetBeans/Eclipse IDE, XAMPP/MEAN stack, JUnit, JMeter, Selenium, Bugzilla

Database Management Systems Lab

PC 453 CS

Instruction: 2 periods per week *Duration of SEE: 3 hours*
CIE: 25 marks *SEE: 50 marks*
Credits: 1

Objectives:

The objectives of the course are to impart knowledge of:
1. To practice various DDL commands in SQL
2. To write simple and Complex queries in SQL
3. To familiarize PL/SQL

Outcomes:

After the completion of the course, the student will be able to:
10. Design and implement a database schema for a given problem
11. Develop the query statements with the help of structured query language.
12. Populate and query a database using SQL and PL/SQL
13. Develop multi-user database application

Design GUI using forms and implement database connectivity:

List of Programs
1. Creation of database (exercising the commands for creation)
2. Simple condition query creation using SQL Plus
3. Complex condition query creation using SQL Plus
4. Usage of Triggers and Stored Procedures.
5. Creation of Forms for student Information, library information, Pay roll etc.
6. Writing PL/SQL procedures for data validation
7. Generation using SQL reports
8. Creating Password and Security features for applications.
9. Usage of File locking table locking, facilities in applications.
10. Creation of small full pledged database application spreading over to 3sessions.

Suggested Readings:

1. Nilesh Shah, Database System Using Oracle, PHI,2007.
2. Rick F Vander Lans, Introduction to SQL, Fourth edition, PearsonEducation,2007.
3. Benjamin Rosenzweig, Elena Silvestrova, Oracle PL/SQL by Example, Third edition, Pearson Education, 2004.
4. Albert Lulushi, Oracle Forms Developer's Handbook, Pearson Education,2006.