SYLLABUS

B.Sc. (Computer Science, Statistics and Mathematics) Part – III

Outlines of Tests Syllabi and Courses of Reading.

Note:-Every theory paper will be of three hours duration.

For Examination of Session 2016-17,2017-18&2018-19

V th Semester

Code	Title of paper/subject	Hrs./ Week	Max Marks		Total
			Cont. Asmt.	Univ. Exam.	
CSM 351	Communication Skills	2	20	30	50
CSM 352	Abstract Algebra	4	30	45	75
CSM 353	Discrete Mathematics	4	30	45	75
CSM 354	Computer Oriented Numerical Methods	3	20	30	50
CSM 355	Sample Surveys	3	20	30	50
CSM 356	Statistics Lab-V (Computer Oriented Statistical Practicals)	4	-	50	50
CSM 357	Computer Networks and Data Communication	3	20	30	50
CSM 358	Visual Programming	3	20	30	50
CSM 359	Software Lab V (Practicals based on Visual Programming)	4	-	50	50
	Total		160	340	500

Note: The minimum pass marks in each paper is 33% in Continuous Assessment and University Examination separately subject to a minimum of 40% in aggregate.

BREAK-UP OF CONTINUOUS ASSESSMENT MARKS

THEORY PAPERS

1.	Two tests will be held and their average will be considered for assessment.	50% Marks
2.	Seminars/Assignments/Quizes/ Class participation	25% Marks
3.	Attendance Marks will be given according to below criteria:	25% Marks
	75% attendance & above but less than 80%	60% Marks of allotted marks to attendance
	80% attendance & above but less than 85%	80% Marks of allotted marks to attendance
	85% attendance& above	100% Marks of allotted marks to attendance

CSM-351 : COMMUNICATION SKILLS

No. of Lectures to be delivered	**: 30**	**Max. Marks :**	**Uni. Examination – 30, Int. Assessment – 20 } 50**
Time Allowed	**: 3 Hours**	**Min. Pass Marks**	**: Uni. Examination – 33%, Int. Assessment – 33% } 40% Aggregate**

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having six parts of short-answer type covering the entire syllabus uniformly. All the questions will carry equal marks.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions will carry equal marks.

Section –A

Communication: Process of communication, Types and channels of communications.

Reading Skills: Reading purpose, strategies and methodologies, Reading activities and structure of reading techniques

Section –B

Writing Skills: Elements of effective writing, writing styles, use of homonyms, cloze tests, one word substitutions, abbreviations etc.

Business Corrospondence: Elements & kinds of business letters; office order, purchase order, quotations & tenders etc.

Recommended Books

1. N Sundarajan, Business Communication, Sura College of Competition, Chennai
2. Asha Kaul, Business Communication, Prentice Hall of India, New Delhi
3. Matthukutty M Monippally, Business Communication Strategies, Tata McGraw-Hill Publishing Co., New Delhi
4. M V Rodriques, Effective Business Communication, Concept Publishing Company, New Delhi

CSM-352 :ABSTRACT ALGEBRA

No. of Lectures to be delivered	**: 55**	**Max. Marks :** Uni. Examination – 45, Int.Assessment – 30	**75**
Time Allowed	**: 3 Hours**	**Min. Pass Marks :** Uni. Examination – 33%, Int.Assessment – 33%	**40% Aggregate**

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having eight parts of short-answer type covering the entire syllabus uniformly. All the questions will carry equal marks.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions will carry equal marks.

Use of scientific non-programmable calculator is allowed

SECTION-A

Group Theory : Semigroups and groups , Examples : Integers modulo n under addition and under multiplication, Linear groups and finite Direct product of groups . Homomorphisms, subgroups and cosets, Euler-Fermat theorem , Poincares theorem. Cyclic Groups. Permutation groups, Cayley's thorem . Groups of symmetries. Normal subgroups and Quotient groups Isomorphism theorems, Automorphisms, Conjugacy and conjugate classes.

SECTION- B

Ring theory : Definition and examples, the ring of integers modulo n. Elementary properties of rings. Types of rings, Integral domains division rings and fields. The ring of matrices, the ring of polynomials , ring of endomorphisms of abelian group. Subring and characteristic of ring. Ideals , the Quotient ring of a ring by an ideal, principal ideals examples. Homomorphism, the fundamental theorem and the correspondence theorem . The opposite of a ring. Unique factorization domains, principle ideal domains , Euclidean domains, polynomial rings over UFD , Gauss lemma . The ring R [x] as a UFD.

Text Book

1. Bhattacharya, P.B. and Jain, S.K., Nagpaul S.R.: Basic Abstract Algebra
Chapters 4,5,9,10 (Section 1and 2 only) and Chapter 11 .

Reference Book

1. Herstein, I.N.: Topics in Algebra

CSM 353 : DISCRETE MATHEMATICS

No. of Lectures to be delivered	**: 55**	**Max. Marks :**	**Uni. Examination – 45, Int. Assessment – 30 } 75**
Time Allowed	**: 3 Hours**	**Min. Pass Marks**	**: Uni. Examination – 33%, Int. Assessment – 33% } 40% Aggregate**

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having eight parts of short-answer type covering the entire syllabus uniformly. All the questions will carry equal marks.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions will carry equal marks.

Use of scientific non-programmable calculator is allowed

SECTION-A

Sets and Propositions-Cardinality, Mathematical Induction, Princple of Inclusion and exclusion. Relations and Function- Binary relations. Equivalence relations and Partitions. Partial order relations and Lattices. Chains and Anti chains. Pigeon Hole Principle.
Graphs and Planar Graphs – Basic Terminology. Multigraphs. Weighted Graphs. Paths and Circuits. Shortest paths. Eulerian paths and circuits. Traveling Salesman Problem. Planar Graphs. Discrete numeric functions and Generating functions.

SECTION-B

Recurrence Relations and Recursive Algorithms- Linear Recurrence Relations with Constant Coefficients. Homogeneous Solutions. Particular Solution. Total Solution. Solution by the Methods of Generating Functions.
Boolean Algebras – Lattices and Algebraic Structures. Duality . Distributive and Complemented Lattices. Boolean Lattices and Boolean Algebras. Boolean Functions and Expressions. Propositional Calculus. Design and Implementation of Digital Networks. Switching Circuits.

TEXT BOOKS

1. C.L. Liu, Elements of Discrete mathematics (Second Edition) , McGraw Hill, International Edition, Computer Science Series. 1986.
2. Discrete Mathematics, S Series.

RECOMMENDED READINGS

1. Kenneth, H.Rosen: Discrete Mathematics and its Applications. Mc Graw Hill Fifth Ed. 2003

CSM - 354 : COMPUTER ORIENTED NUMERICAL METHODS

No. of Lectures : 40 **Max. Marks :** Uni. Examination – 30, Int. Assessment – 20 } **50**

to be delivered

Time Allowed : 3 Hours **Min. Pass Marks :** Uni. Examination – 33%, Int. Assessment – 33% } **40% Aggregate**

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having eight parts of short-answer type covering the entire syllabus uniformly. All the questions will carry equal marks.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions will carry equal marks.

Use of scientific non-programmable calculator is allowed

SECTION-A

Floating point representation of numbers, Arithmetic operations with normalised floating point numbers and its consequences, Errors in numbers, Binary representation of numbers. Solution of Transcendental and polynomial equations : Bi-section method, Regula-falsi method, Newton-Raphson method, Secant method.

SECTION - B

Solution to simultaneous linear and algebraic equations : Gauss elimination method, pivoting, ill-conditioned equations, Gauss-Seidal iterative method.

Finite difference and Interpolation : Difference operators, Divided differences, (Definition and properties), relations among operators, Newton-Gregory formulae for forward and backward interpolation, Newton's interpolation formula for divided differences, Lagrange's interpolation formula, truncation error in various interpolation formulae.

TEXT BOOKS

1. S. Balachandra Rao and C.K. Shantha : 'Numerical Methods with Programs in BASIC, FORTRAN & PASCAL' University Press (INDIA) Ltd., Edition, 1992.
2. Bala Guruswamy : 'Computer Oriented Numerical Methods'.
3. H.C. Saxena : 'Calculus of Finite Differences and Numerical Analysis', S. Chand and Sons, Delhi, E

RECOMMENDED READINGS

1. B.S. Grewal : Numerical Methods, Khanna Publishers, 2004
2. S.S. Sastri: Introductory Methods of Numerical Analysis, PHI Ltd.

CSM –355 : SAMPLE SURVEYS

No. of Lectures : 40 to be delivered

Max. Marks : Uni. Examination – 30, Int. Assessment – 20 } **50**

Time Allowed : 3 Hours

Min. Pass Marks : Uni. Examination – 33%, Int. Assessment – 33% } **40% Aggregate**

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having eight parts of short-answer type covering the entire syllabus uniformly. All the questions will carry equal marks.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions will carry equal marks.

Use of scientific non-programmable calculator is allowed

SECTION-A

Concepts of population and sample, need for sampling, census and sample surveys, basic concepts in sampling, Simple random sampling (with and without replacement) : estimation of population mean, population variance and population proportion, Variance of estimators of population mean, population proportion and their estimators.

SECTION-B

Stratified random sampling: proportional, Neyman and optimum allocations, estimate of population mean , variance of the estimate and estimate of its variance, ratio and regression methods of estimation under simple random sampling without replacement, large sample expressions of their variances, comparison with mean per unit estimate.

TEXT BOOKS

1. Singh, D. and Chaudhary , F.S. : Theory and Analysis of Sample Surveys Design, Wiley East. Ist ed., 1986

RECOMMENDED BOOKS

1. Cocharan, W.G.: Sampling Techniques, Wiley East.

CSM-356: STATISTICS LAB-V (Computer Oriented Statistical Practicals)

Total Practical Sessions: 25 (each of two hours) **Max. Marks : Uni. Examination: 50**

Time Allowed : 3 Hours **Min. Pass : 40% Marks**

INSTRUCTION FOR THE PAPER SETTER AND THE CANDIDATES

The setting and evaluation will be done by a board of examiners consisting of Head, External examiner and the teacher(s) involved with the teaching of this paper.

The practical paper will consist of four exercises and the candidates will be required to attempt any three exercises.

The break-up of marks for the University Examination will be as under:

Lab. Record	:	10
Viva-voice	:	10
Exercises	:	30

Lab Course:

The exercises will be based on the syllabus of the papers CSM-354(Computer Oriented Numerical Methods) and CSM-355(Sample Surveys).

CSM - 357: COMPUTER NETWORKS AND DATA COMMUNICATION

No. of Lectures : 40 to be delivered

Max. Marks : Uni. Examination – 30, Int. Assessment – 20 } **50**

Time Allowed : 3 Hours

Min. Pass Marks : Uni. Examination – 33%, Int. Assessment – 33% } **40% Aggregate**

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having eight parts of short-answer type covering the entire syllabus uniformly. All the questions will carry equal marks.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions will carry equal marks.

Use of scientific non-programmable calculator is allowed

SECTION - A

Computer Networks: Uses of Computer Network, Network Hardware, Network Software, Goals and Applications of Computer networks, Structure of Computer Network: Point-to-point structure, Broadcasting structure, Types of Networks, Topologies.

Reference Models: OSI Reference Model, TCP/IP reference Model, Comparison of OSI and TCP Reference Model.

Data Communication: Transmission media, Wireless communication, and the Telephone system, Introduction to cellular radio and communication satellite, Data Rate of Channel, Electromagnetic spectrum.

SECTION - B

Switching : Circuit switching, packet switching, comparison.

ALOHA Protocols : Introduction to Internetworking – Concepts, Repeaters, Routers, Bridges, and Gateways.

Internet Protocol: IP protocol, IP Addresses, Subnets, Internet Control Protocol, Introduction to interior and exterior gateway routing protocol., internet multicasting and mobile IP.

Internet Applications: Domain Name System, Electronic mail, The World Wide Web, Introduction to Multimedia - Audio, Video, Data compression, File Transfer and Remote File Access – Introduction, data transfer and distributed communication, generalised file transfer, interactive and batch transfer, FTP, FTP model, FTP interface, client-server interaction in FTP.

TEXT BOOKS

1. Andrew S. Tanenbaum, “Computer Networks”, Third Edition, PHI Publications, 1997.
2. Stallings William, “Data & Computer Communication”, 6th Edition, PHI Publications.

REFERENCE READINGS

1. D.E. Corner, “Computer Networks and Internets’, Second Edition, Addison-Wesley Publication, 2000.
2. D. Bertsellas and R. Gallager, “Data Networks”, 2nd Edition, Prentice Hall, 1992.

CSM 358 : VISUAL PROGRAMMING

No. of Lectures to be delivered : 40

Max. Marks : Uni. Examination – 30, Int. Assessment – 20 } **50**

Time Allowed : 3 Hours

Min. Pass Marks : Uni. Examination – 33%, Int. Assessment – 33% } **40% Aggregate**

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having eight parts of short-answer type covering the entire syllabus uniformly. All the questions will carry equal marks.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions will carry equal marks. Use of scientific non-programmable calculator is allowed

SECTION-A

Introduction to Visual Basic: The Visual Basic Program Development Process; The Visual Basic Environment; Opening a Visual Basic Project; Saving a Visual Basic Project; Running a Visual Basic Project.

Visual Basic Fundamentals: Numeric Constants; String Constants; Variables; Data Types and Data Declarations; Operators and Expressions; Hierarchy of Operations; String Expressions; Library functions, Branching and Looping Statements, Relational Operators and Logical Expressions; Logical Operators; Branching with if-then block; Branching with if- then- else blocks; Selection: Select- case; Looping with for–next; Looping with do-loop; Looping with while-end.

Visual Basic Control Fundamentals: Visual Basic Control Tools; Control tool Categories; Working with controls; Naming Forms and Controls; Assigning Property Values to Forms and Controls; Executing Commands (Event Procedures and Command Buttons); Display Output Data (Labels and Text Boxes); Entering Input Data (Text Boxes); Selecting Multiple Features(Check Boxes); Selecting Exclusive Alternatives (Option Button and Frames); Assigning Properties Collectively (The With Block); Generating Error Messages (The MsgBox Function); Creating Times Events; Scrollbars;

Menus and Dialog Boxes: Building Drop-down Menus; accessing a Menu from the Keyboard; Menu Enhancements; Submenus; Pop-up Menus; Dialog Boxes; Input Boxes;
Executing and Debugging a New Project: Syntax Errors; Logical Errors; Selecting Break Points; Defining Watch Values; Stepping Through a Program; User-Induced Errors; Error Handlers.

SECTION-B

Procedures : Modules and Procedures; Sub Procedures ; Event Procedures ; Function Procedures ; Scope; Optional Arguments.

Arrays: Array Characteristics; Array declarations; Processing Array elements; Passing Arrays to Procedures; Dynamic Array-Related Functions; Control Arrays;

Using Class Modules **:** Object Oriented Principles; Creating Class Modules; Using Class Modules Adding Properties and Events and Methods.

Using COM Components : Introduction to ActiveX Components and Component Object Model; Benefits of COM; Clients and Servers; Types of ActiveX Components available in Visual Basic; Creating user defined ActiveX Components; Managing Components; The Visual Component Manager; Registering and UnRegistering Components.

ActiveX Controls: Creating an ActiveX Control; Benefits of ActiveX Control; Adding Properties; Methods and Events to the Control; Managing and Distribution of the Control; Built-in ActiveX Controls.

Introduction to data controls like ADO, RDO, ADODC.

TEXT BOOKS

1. SAMS Teach yourself Visual Basic 6 in 21 days: Tec media Publication by Gerg Perry.
2. Visual Basic Complete Reference.

CSM-359 : SOFTWARE LAB V

Total Practical Sessions: 25 (each of two hours) | **Max. Marks : Uni. Examination: 50**

Time Allowed : 3 Hours | **Min. Pass : 40% Marks**

INSTRUCTION FOR THE PAPER SETTER AND THE CANDIDATES

The setting and evaluation will be done by a board of examiners consisting of Head, External examiner and the teacher(s) involved with the teaching of this paper.

The practical paper will consist of four exercises and the candidates will be required to attempt any three exercises.

The break-up of marks for the University Examination will be as under:

Lab. Record	:	10
Viva-voice	:	10
Development of programmes & their execution	:	30

Lab Course:

The exercises will be based on the syllabus of the papers CSM-358(Visual Programming).

SYLLABUS

B.Sc. (Computer Science, Statistics and Mathematics) Part – III

Outlines of Tests Syllabi and Courses of Reading.

Note:-Every theory paper will be of three hours duration.

For Examination of Session 2016-17,2017-18&2018-19

VIth Semester

Code	Title of paper/subject	Hrs./ Week	Max Marks Cont. Asmt.	Univ. Exam.	Total
CSM 361	Communication Skills	2	20	Theory 20, Practical 10 } 30	50
CSM 362	Mechanics	4	30	45	75
CSM 363	Linear Algebra	4	30	45	75
CSM 364	Linear Programming	3	20	30	50
CSM 365	Design and Analysis Of Experiments	3	20	30	50
CSM 366	Statistics Lab-VI (Computer Oriented Statistical Practicals)	4	-	50	50
CSM 367	Oracle	3	20	30	50
CSM 368	Software Engineering	3	20	30	50
CSM 369	Software Lab VI (Practicals based on Oracle)	4	-	50	50
	Total		160	340	500

Note: The minimum pass marks in each paper is 33% in Continuous Assessment and University Examination separately subject to a minimum of 40% in aggregate.

BREAK-UP OF CONTINUOUS ASSESSMENT MARKS

THEORY PAPERS

1.	Two tests will be held and their average will be considered for assessment.	50% Marks
2.	Seminars/Assignments/Quizzes/ Class participation	25% Marks
3.	Attendance Marks will be given according to below criteria:	25% Marks
	75% attendance & above but less than 80%	60% Marks of allotted marks to attendance
	80% attendance & above but less than 85%	80% Marks of allotted marks to attendance
	85% attendance& above	100% Marks of allotted marks to attendance

CSM-361 : COMMUNICATION SKILLS (Theory)

No. of Lectures : 30 to be delivered

Max. Marks : Uni. Examination - 20, Int. Assessment - 20, Practical - 10 } 50

Time Allowed : 2.5 hrs.

Min. Pass : Uni. Examination – 33%, Int.Assessment – 33% } 40% Aggregate Marks

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of two sections A and B. Each of sections A and B will have four questions from the respective sections of the syllabus. All the questions will carry equal marks.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt four questions in all, selecting two questions from each section A and B.

Section –A

Listening Skills: Process of listening, barriers to listening, note taking & note making and feedback skills. Recognizing and articulating speech sounds, mock dialogue/conversation. Participating in a group discussion. Holding a mock meeting.

Section –B

Speaking Skills: Speech mechanism, articulation of sounds, phonetic transcription, components of effective talk, oral presentation, group discussion, conducting meetings etc. Types and use of audio visual aids in presentation. Preparation for participating in a mock interview for a job etc. Developing skills for conducting a meeting; attending telephonic calls.

Recommended Books

5. N Sundarajan, Business Communication, Sura College of Competition, Chennai
6. Asha Kaul, Business Communication, Prentice Hall of India, New Delhi
7. Matthukutty M Monippally, Business Communication Strategies, Tata McGraw-Hill Publishing Co., New Delhi
8. M V Rodriques, Effective Business Communication, Concept Publishing Company, New Delhi

CSM-361(A) : COMMUNICATION SKILLS (Practical)

Time Allowed : 1 hr. **Max. marks: 10**

Practical Examination will be conducted by the Examiner from the following topics:

Topics:

Recognizing and articulating speech sounds, mock dialogue/conversation.

Making an oral presentation, class seminars, paper reading.

Participating in a group discussion.

Holding a mock meeting.

Preparation for participating in a mock interview for a job etc.

Developing skills for conducting a meeting; attending telephonic calls.

CSM-362 : MECHANICS

No. of Lectures : 55 **Max. Marks :** Uni. Examination – 45, Int. Assessment – 30 } **75**

to be delivered

Time Allowed : 3 Hours **Min. Pass :** Uni. Examination – 33%, Int. Assessment – 33% } **40% Aggregate**

Marks

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having eight parts of short-answer type covering the entire syllabus uniformly. All the questions will carry equal marks.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions will carry equal marks.

Use of scientific non-programmable calculator is allowed

SECTION-A

Conditions of equilibrium of Coplanar forces in three dimensions, Work, energy and power, Forces in three dimensions. Poinsot's central axis theorem. Null lines and planes. Stable and unstable equilibrium.

SECTION-B

Velocities and accelerations along radial and transverse directions and along tangential and normal directions.

Simple harmonic motion. Elastic strings. Curvilinear motion.

Elliptic orbits, Central orbits. Kepler's laws of motion.

Motion of a particle in three dimensions. Velocities and Accelerations in cylinderical and spherical coordinates.

TEXT BOOK

1. S.L. Loney, Statics, Mcmillan and Company, London
2. Surge and Griffith, Mechanics.
3. F. Chorlton, Tectbook of Dynamics.

CSM-363 : LINEAR ALGEBRA

No. of Lectures : 55 **Max. Marks :** Uni. Examination – 45, Int. Assessment – 30 **75**

to be delivered

Time Allowed : 3 Hours **Min. Pass :** Uni. Examination – 33%, Int. Assessment – 33% **40% Aggregate**

Marks

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having eight parts of short-answer type covering the entire syllabus uniformly. All the questions will carry equal marks.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions will carry equal marks.

Use of scientific non-programmable calculator is allowed

SECTION-A

Spaces : Vector spaces, Examples, Linear Dependence, Linear Combinations, Bases, Dimension, Isomorphism, Calculus of subspaces, Dimension of a subspace, dual Bases, Reflexivity , Annihilators, Direct Sum, Dimension of a direct sum, Dual of a direct sum, Quotient spaces, Bilinear Forms.

SECTION-B

Transformations : Linear Transformations, Products and Polynomials of Transformations , Inverses , Matrices of Transformations, Invariance, Reducibility, Projections and their combinations, Projections and Invariance , Adjoints , Adjoints of projections , Change of Bases, Similarity, Range and Null space , Rand and Nullity, Eigenvalues, Multiplicity, Triangular form .

TEXT BOOK

1. Lipschutz S.: Theory and Problems of Linear Algebra, Outline Series.
2. Halmos, P.R. : Finite Dimensional Vector Spaces
   Sections 1-23, 32-50 and 54 to 56 only .

RECOMMENDED READING

1. Kenneth Hoffman and Ray Kunze, : Linear Algebra

CSM-364: LINEAR PROGRAMMING

No. of Lectures : 40 **Max. Marks :** Uni. Examination – 30, Int. Assessment – 20 **50**

to be delivered

Time Allowed : 3 Hours **Min. Pass :** Uni. Examination – 33%, Int. Assessment – 33% **40% Aggregate Marks**

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having eight parts of short-answer type covering the entire syllabus uniformly. All the questions will carry equal marks.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions will carry equal marks.

Use of scientific non-programmable calculator is allowed

Section-A

Linear programming problems (LPPs); Examples, Mathematical formulation, Graphical solution, Solution by Simplex method, artificial variables, Big-M method and two phase simplex method.

Duality in linear programming; Concept, Mathematical formulation, fundamental properties of duality, duality and simplex method and dual simplex method.

Section -B

Sensitivity Analysis : Discrete changes in the cost vector, requirement vector and Co-efficient matrix. Transportation problem ; initial basic feasible solution and Optimal solutions using MODI method (for balanced cases only), Assignment problem; solution of balanced and unbalanced assignment problems, maximization case in assignment problem.

TEXT BOOKS

1. Kanti Swarup, P.K. Gupta and Manmohan : ‘Operations Research’, Sultan Chand and Sons, New Delhi, Ed. 1996.

RECOMMENDED READING

1. Kasana, H.S. and Kumar K.D. : Introductory Operations Research, SIE 2003

CSM – 365: DESIGN AND ANALYSIS OF EXPERIMENTS

No. of Lectures : 40 **Max. Marks :** Uni. Examination – 30, Int. Assessment – 20 **50**

to be delivered

Time Allowed : 3 Hours **Min. Pass :** Uni. Examination – 33%, Int. Assessment – 33% **40% Aggregate Marks**

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having eight parts of short-answer type covering the entire syllabus uniformly. All the questions will carry equal marks.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions will carry equal marks.

Use of scientific non-programmable calculator is allowed

SECTION-A

Linear models, the fixed effect models, the distribution of minimum error sum of squares, and the conditional error sum of squares, tests of general linear-hypotheses.

Analysis of one way classified data under the fixed effects model. Analysis of the two way classified data with one observation per cell and multiple but equal observations in cells under the fixed effect model. Terminology in experimental designs, basic principles of design-randomization, replication and local control,

SECTION - B

Completely randomized design, randomized block design and Latin square design and their advantages and disadvantages

Concept of factorial experiments, the concept of main effects and interactions in 2^2 and 2^3 factorial experiments and the sum of squares due to them. Yate's method of computing the sum of squares due to the main effects and interactions in 2^2 and 2^3 factorial designs.

TEXT BOOKS

1. Goon, A.M., Gupta, M.K. and Dasgupta, B. : *Fundamentals of Statistics*, Vol. II, World Press, 6th ed. (revised and enlarged), 1986).

RECOMMENDED READING

1. Gupta, S.C. and Kapoor, V.K**.:** Fundamentals of Applied Statistics, Sultan Chand and Sons, 2003

CSM-366: STATISTICS LAB-VI (Computer Oriented Statistical Practicals)

Total Practical Sessions: 25 **Max. Marks : Uni. Examination: 50**
(each of two hours)
Time Allowed : 3 Hours **Min. Pass : 40%**
Marks

INSTRUCTION FOR THE PAPER SETTER AND THE CANDIDATES

The setting and evaluation will be done by a board of examiners consisting of Head, External examiner and the teacher(s) involved with the teaching of this paper.

The practical paper will consist of four exercises and the candidates will be required to attempt any three exercises.

The break-up of marks for the University Examination will be as under:

Lab. Record	:	10
Viva-voice	:	10
Exercises	:	30

Lab Course:

The exercises will be based on the syllabus of the papers CSM-364 (Linear programming) and CSM-365 (Design and analysis of experiments)

CSM-367: ORACLE

No. of Lectures : 40 **Max. Marks :** Uni. Examination – 30, Int. Assessment – 20 **50**

to be delivered

Time Allowed : 3 Hours **Min. Pass :** Uni. Examination – 33%, Int. Assessment – 33% **40% Aggregate Marks**

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having eight parts of short-answer type covering the entire syllabus uniformly. All the questions will carry equal marks.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions will carry equal marks.

Use of scientific non-programmable calculator is allowed

SECTION - A

Interactive SQL : SQL commands; Data Definition Language Commands; Data Manipulation Language Commands; The Data types a cell can hold; insertion of data into the table; Viewing of data into the tables; Deletion operations; Updating of contents of the table; Modifying the structure of the table; Renaming the table; Destroying tables; Data Constraints; Types of data constraints; Column Level Constraints; Table Level Constraints; Null value Concepts; The UNIQUE Constraint; The PRIMARY constraints; The FOREIGN key constraint; The CHECK Constraint; Viewing the User Constraints

Viewing The Data: Computations on Table Data; Arithmetic Operators; Logical Operators; Comparison Operators; Range Searching; Pattern Searching; ORACLE FUNCTIONS; Number Functions; Group Functions; Scalar Functions; Data Conversion Functions; Manipulating Dates in SQL; Character Functions;

Sub Queries and Joins: Joins; Equi Joins; Non Equi Joins; Self Joins; Outer Joins; Sub Queries; Correlated Queries; Using Set Operators:- Union , Intersect ; Minus;

Views and Indexes: Definition and Advantages Views; Creating and Alternating Views; Using Views; Indexed Views; Partitioned Views; Definition and Advantages of Indexes; Composite Index and Unique Indexes; Accessing Data with and without Indexes; Creating Indexes and Statistics.

SECTION – B

Introduction to PL/SQL : Advantage of PL/SQL; The Generic PL/SQL Block; The Declaration Section; The Begin Section; The End Section; The Character Set; Literals; PL/SQL Data types; Variables; Constants; Logical Comparison; Conditional Control in PL/SQL; Iterative Control;

Advanced **PL/SQL:** Types of Cursors; Implicit Cursor; Explicit Cursor; Explicit Cursor attributes; Cursor for Loop; Parameterized Cursor; Error Handling in PL/SQL; Internal Exceptions; User Defined Exceptions.

Database Objects: Sequences, Creating Sequences; Referencing Sequences; altering a Sequence; Dropping a Sequence, Stored Procedures and Functions:- Advantages of using a Procedure or Function; Procedure Versus Function; Creating stored Procedures and Functions; Parameters to Procedures and Functions; Deleting a stored Procedure or Function; Packages:- Components of a Package; Package Objects; Private and Public; Package state; Package Dependency; Triggers:- Use of Database Triggers; Database Triggers v/s Procedures; Database Triggers v/s Integrity Constraints;

RAISE_APPLICATION_ERROR PROCEDURE; Types of Triggers:- Row Triggers, Statement Triggers; Before v/s After Triggers; Deleting a Trigger.

Object Types and Varrying Arrays: User Defined Data Types, Creating a Type, Varrying Array, Creating and Using Varrying array, Nested Tables.

TEXT BOOKS:

1. SAMS Teach yourself SQL in 21 days: Techmedia Publication
2. PL/SQL The Programming Language of ORACLE, Ivan Byross(BPP Publication)
3. Oracle : PL/SQL Handbook, Palinsky (Pearson Publication)

CSM - 368 : SOFTWARE ENGINEERING

No. of Lectures : 40 **Max. Marks :** Uni. Examination – 30, Int. Assessment – 20 } **50**

to be delivered

Time Allowed : 3 Hours **Min. Pass :** Uni. Examination – 33%, Int. Assessment – 33% } **40% Aggregate Marks**

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having eight parts of short-answer type covering the entire syllabus uniformly. All the questions will carry equal marks.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions will carry equal marks.

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SECTION A

Introduction to Software Engineering : Origin, Definition and goals of Software Engineering. Comparison with traditional Engineering Disciplines.

Software development process, Process Models : Waterfall, Spiral, Prototype. Error distribution, Effort distribution, Role of metrics and measurements.

Software Project Planning : Planning activities, Team structure (Democratic, Chief-programmer, Hierarchical). Software Requirement Specification : Role, characteristics and components of SRS. Problem Analysis : Structuring Information, DFD and Data Dictionary.

SECTION B

Software Design : Design Objectives and principles, Design concepts – Abstraction, Information hiding, Concurrency, Modularity. Coupling-Cohesion criteria. Structured design methodology. Design specification, Metrics

Coding , Structured coding techniques : Data Encapsulation, Go to statement, Recursion, Single Entry Single Exit criteria. Structured programming.

Testing , Testing fundamentals : Error, Fault, Failure and Reliability, Levels of testing, Test case and Test criteria, Top-down and bottom-up approach, Test case execution and analysis, Test report.

TEXT BOOK :

1. P. Jalota, “An Integrated Approach to Software Engineering”, (Narosa Publishing House, 1992.)

REFERENCES READINGS:

1. R.E. Fairley, "Software Engineering Concepts", McGraw-Hill, 1985.
2. Ian Sommerville, “ Software Engineering “, Pearson Education, 2001
3. Boris Beizer, “Software Testing Techniques”, Second Edition, Van nostrand Reinhold, 1990.
4.. Roger. S. Pressman, “Software Engineering - A Practitioner’s Approach”, Fifth Edition, McGraw Hill, 2001

CSM-369 : SOFTWARE LAB-VI

Total Practical Sessions: 25 (each of two hours) | **Max. Marks : Uni. Examination: 50**

Time Allowed : 3 Hours | **Min. Pass : 40% Marks**

INSTRUCTION FOR THE PAPER SETTER AND THE CANDIDATES

The setting and evaluation will be done by a board of examiners consisting of Head, External examiner and the teacher(s) involved with the teaching of this paper.

The practical paper will consist of four exercises and the candidates will be required to attempt any three exercises.

The break-up of marks for the University Examination will be as under:

Lab. Record	:	10
Viva-voice	:	10
Development of programmes & their execution	:	30

Lab Course:

The exercises will be based on the syllabus of the papers CSM – 367 (Oracle).