

**PUNJABI UNIVERSITY, PATIALA**

**OUTLINES OF TESTS,  
SYLLABI AND COURSES OF READING  
FOR  
B.Sc. (Computer Science, Statistics, Mathematics) Part -III  
2022-2023**



**PUNJABI UNIVERSITY, PATIALA**  
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## SYLLABUS

B.Sc. (Computer Science, Statistics and Mathematics) Part – III  
Outlines of Text Syllabi and Courses of Reading.

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

**For Examination of Session 2022-2023**

### 5<sup>th</sup> Semester

Code	Core/ Elective	Title of paper /subject	Hrs./ Week	Max. Marks		Total	Total Credits
				Cont. Asmt.	Uni. Exam.		
CSM351	Core	Communication Skills	2	20	30	50	3
CSM352	Core	Abstract Algebra	4	30	45	75	4
CSM353	Core	Discrete Mathematics	4	30	45	75	4
CSM354	Core	Computer Oriented Numerical Methods	3	20	30	50	3
CSM355	Core	Sample Surveys	3	20	30	50	3
CSM356	Core	Statistical Practicals-V	4	-	50	50	2
CSM357	Elective	Computer Networks and Data Communication	3	20	30	50	3
CSM358	Elective	Visual Programming	3	20	30	50	3
CSM359	Elective Core	Computer Practicals- V	4	-	50	50	2
			Total	160	340	500	27

**Note:** The minimum pass marks in each paper is 35% in Continuous Assessment and University Examination separately subject to a minimum of 40% in aggregate.

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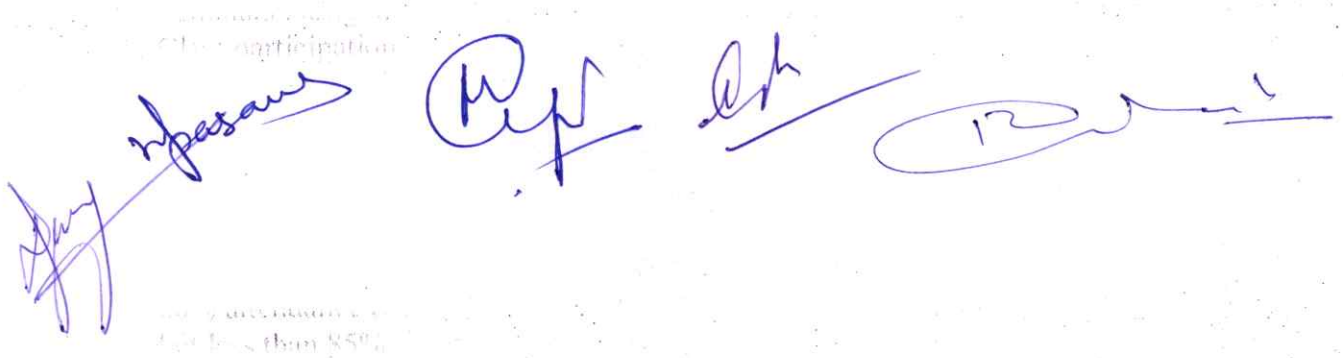
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### BREAK-UP OF CONTINUOUS ASSESSMENT MARKS

#### THEORY PAPERS

- |   |  |
|---|--|
| 1. Two house/midterm tests will be held and their average will be considered for assessment | 50% Marks                                  |
| 2. Seminars/Assignments/Quizes/ Class participation   | 25% Marks                                  |
| 3. Attendance   | 25% Marks                                  |
| Marks will be given according to below criteria:  |  |
| 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 : 30 to be delivered	Max. Marks:	Uni. Examination	- 30	} 50
		Int. Assessment	- 20	
Time Allowed : 3 Hours	Min. Pass Marks	Uni. Examination	- 35%	} 40% Aggregate
		Int. Assessment	- 35%	

**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, Minutes of Meetings (MOM) etc.

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

**RECOMMENDED READINGS**

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

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**CSM352: ABSTRACT ALGEBRA**

<b>No. of Lectures : 55</b> <b>to be delivered</b>	<b>Max. Marks:</b>	<b>Uni. Examination</b> - 45	} 75
		<b>Int. Assessment</b> - 30	
<b>Time Allowed : 3 Hours</b>	<b>Min. Pass : Marks</b>	<b>Uni. Examination</b> - 35%	} 40% Aggregate
		<b>Int. Assessment</b> - 35%	

**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 seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 6 marks each whereas section C will carry 21 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 of sections A and B will carry 6 marks each whereas section C will carry 21 marks.

Use of scientific non-programmable calculator is allowed.

**SECTION-A**

**Group Theory:** Semi-groups 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 BOOKS**

1. Bhattacharya, P.B. and Jain, S.K., Nagpaul S.R. :Basic Abstract Algebra Chapters 4, 5, 9, 10 (Section 1 and 2 only) and Chapter 11. (2<sup>nd</sup> Edition) (2003) Cambridge University Press

**RECOMMENDED READINGS**

1. Herstein, I.N: Topics in Algebra.(2<sup>nd</sup> Edition) (2006), Wiley India Pvt. Ltd

*(Handwritten signatures in blue ink)*

**CSM353: DISCRETE MATHEMATICS**

No. of Lectures : 55 to be delivered	Max. Marks:	Uni. Examination	- 45	} 75
		Int. Assessment	- 30	
Time Allowed : 3 Hours	Min. Pass : Marks	Uni. Examination	- 35%	} 40% Aggregate
		Int. Assessment	- 35%	

**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 seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 6 marks each whereas section C will carry 21 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 of sections A and B will carry 6 marks each whereas section C will carry 21 marks.

Use of scientific non-programmable calculator is allowed.

**SECTION-A**

Sets and Propositions-Cardinality, Mathematical Induction, Principle 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. Liu, C.L. & Mohapatra, D., Elements of Discrete mathematics : A Computer Oriented approach( 4th Edition ) (2017), McGraw Hill Education
2. Lipschutz, S., Lipson, M. L. & Patil, V. H. :Discrete Mathematics, Schaum's Outline Series (Revised 3<sup>rd</sup> Edition)(2017) McGraw Hill Education.

**RECOMMENDED READINGS**

1. Kenneth, H.Rosen: Discrete Mathematics and its Applications. (7<sup>th</sup> Edition), 2018 McGraw Hill Education.

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**CSM354: COMPUTER ORIENTED NUMERICAL METHODS**

<b>No. of Lectures : 40</b>	<b>Max. Marks:</b>	<b>Uni. Examination</b> – 30	} 50
		<b>Int. Assessment</b> – 20	
<b>to be delivered</b>			
<b>Time Allowed : 3 Hours</b>	<b>Min. Pass</b> :	<b>Uni. Examination</b> – 35%	} 40% Aggregate
		<b>Int. Assessment</b> – 35%	
	<b>Marks</b>		

**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 seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 4 marks each whereas section C will carry 14 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 of sections A and B will carry 4 marks each whereas section C will carry 14 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, Iteration 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. Rao, S. Balachandra and. Shantha, C.K: 'Numerical Methods with Programs in BASIC, FORTRAN , PASCAL & C++', (2004) University Press (INDIA) Ltd.
2. Bala Guruswamy: 'Computer Oriented Statistical and Numerical Methods'(2009), Laxmi Publications
3. H.C. Saxena: 'Calculus of Finite Differences and Numerical Analysis', (2010) S. Chand and Sons, Delhi, E

**RECOMMENDED READINGS**

1. B.S. Grewal: Numerical Methods in Engineering & Science With Programs In C, C++ & Matlab , ( 11<sup>th</sup> Edition) ( 2013) Khanna Publishers.
2. S.S. Sastri: Introductory Methods of Numerical Analysis, (2012), PHI Ltd.

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Rao, S. Balachandra and Shantha, C.K.

**CSM355: SAMPLE SURVEYS**

No. of Lectures : 40 to be delivered	Max. Marks:	Uni. Examination	- 30	} 50
		Int. Assessment	- 20	
Time Allowed : 3 Hours	Min. Pass : Marks	Uni. Examination	- 35%	} 40% Aggregate
		Int. Assessment	- 35%	

**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 seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 4 marks each whereas section C will carry 14 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 of sections A and B will carry 4 marks each whereas section C will carry 14 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., & Chaudhary, F. S.: Theory and analysis of sample survey designs.( 2<sup>nd</sup> Edition) (2020) New Age International (P) Ltd
2. Sukhatme, P.V., Sukhatme,B.V., Sukhatme, S. and Asok, C.: Sampling Theory of Surveys with Applications(3rd Edition ) (1984) Iowa State University Press, USA and ISAS, Delhi.
3. Des Raj: Sampling Theory(1967), Tata McGraw Hill, New Delhi
4. Gun, AM.,Gupta, M.K. Dasgupta, B. : An Outline of Statistical Theory, Vol.II (2013), The World press, Kolkata.

**RECOMMENDED READINGS**

1. Cochran, W. G. (2007). Sampling techniques (3rd Edition). John Wiley & Sons (INDIA).

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**CSM356P: STATISTICAL PRACTICALS-V**

**Total Practical Sessions: 25**  
**(Each of two hours)**  
**Time Allowed : 3 Hours**

**Max. Marks: Uni. Examination: 50**

**Min. Pass: 40%**  
**Marks**

**INSTRUCTIONS 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.

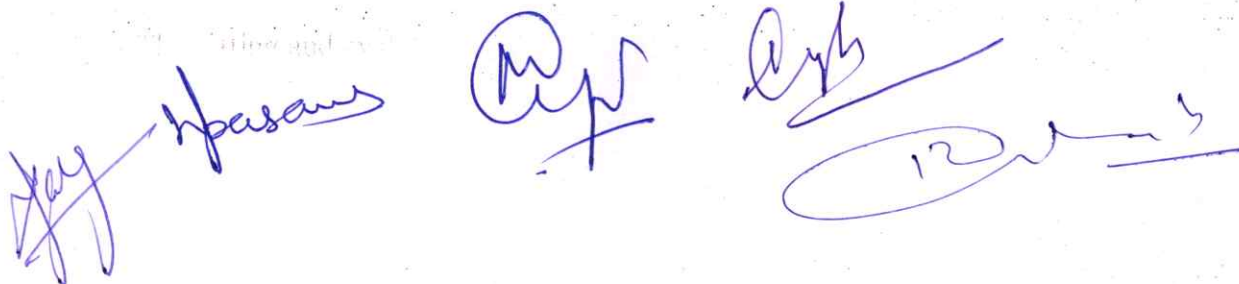
The practical paper will consist of four numerical problems and the candidates will be required to attempt any three numerical problems.

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

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

**Lab Course:**

The questions will be based on the syllabus of the papers CSM354(Computer Oriented Numerical Methods) and CSM355(Sample Surveys).

The image shows three handwritten signatures in blue ink. The first signature on the left is written over a faint 'VIVA-VOICE' stamp and appears to be 'N. Pasam'. The second signature in the middle is a stylized 'N.P.' with a horizontal line underneath. The third signature on the right is a cursive signature with a large loop at the end, possibly 'N. Pasam'.

### CSM357: COMPUTER NETWORKS AND DATA COMMUNICATION

No. of Lectures : 40 to be delivered	Max. Marks:	Uni. Examination	- 30	} 50
		Int. Assessment	- 20	
Time Allowed : 3 Hours	Min. Pass : Marks	Uni. Examination	- 35%	} 40% Aggregate
		Int. Assessment	- 35%	

#### 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 seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 4 marks each whereas section C will carry 14 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 of sections A and B will carry 4 marks each whereas section C will carry 14 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. Tanenbaum, Andrew S. and Wetherall, David J., "Computer Networks", 5<sup>th</sup> Edition (2013), Pearson Education India
2. Stallings William, "Data & Computer Communication", 10th Edition, (2017) Pearson Education India.

#### REFERENCE READINGS

1. D.E. Corner, "Computer Networks and Internets", 6<sup>th</sup> Edition, (2014), Pearson Education India
2. D. Bertsekas and R. Gallager, "Data Networks", 2nd Edition, (1992). Prentice Hall.

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**CSM358: VISUAL PROGRAMMING**

No. of Lectures : 40 to be delivered	Max. Marks:	Uni. Examination	- 30	} 50
		Int. Assessment	- 20	
Time Allowed : 3 Hours	Min. Pass : Marks	Uni. Examination	- 35%	} 40% Aggregate
		Int. Assessment	- 35%	

**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 seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 4 marks each whereas section C will carry 14 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 of sections A and B will carry 4 marks each whereas section C will carry 14 marks.

Use of scientific non-programmable calculator is allowed.

**SECTION-A**

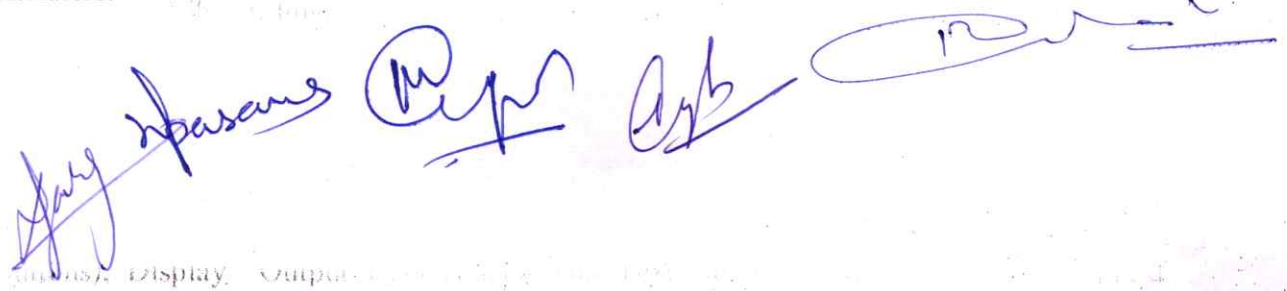
Introduction to Visual Programming, Types of Visual Programming, Visual Programming Components.

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 Msg Box 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 Un-Registering 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, and ADODC.

**TEXT BOOKS**

1. Perry Greg.: SAMS teach yourself Visual Basic 6 in 21 days (1998) Tec media Publication
2. JERKE and NOEL: Visual Basic Complete Reference.(1999), McGraw Hill

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**SYLLABUS**

B.Sc. (Computer Science, Statistics and Mathematics) Part – III  
 Outlines of Text Syllabi and Courses of Reading.

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

**For Examination of Session 2022-23.**

**6<sup>th</sup> Semester**

Code	Core/ Elective	Title of paper /subject	Hrs./ Week	Max. Marks		Total	Total Credits
				Cont. Asmt.	Uni. Exam.		
CSM361	Core	Communication Skills	2	20	30	50	2
CSM362	Core	Mechanics	4	30	45	75	4
CSM363	Core	Linear Algebra	4	30	45	75	4
CSM364	Core	Linear Programming	3	20	30	50	3
CSM365	Core	Design and Analysis of Experiments	3	20	30	50	3
CSM366	Core	Statistical Practicals-VI	4	-	50	50	2
CSM367	Elective	Problem Solving and Programming in Python	3	20	30	50	3
CSM368	Elective	Software Engineering	3	20	30	50	3
CSM369	Elective	Computer Practicals- VI	4	-	50	50	2
			Total	160	340	500	26

**Note: The minimum pass marks in each paper is 35% in Continuous Assessment and University Examination separately subject to a minimum of 40% in aggregate.**

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**BREAK-UP OF CONTINUOUS ASSESSMENT MARKS**

**THEORY PAPERS**

- |   |  |
|---|--|
| 2. Two house/midterm tests will be held and their average will be considered for assessment | 50% Marks                                  |
| 2. Seminars/Assignments/Quizes/ Class participation   | 25% Marks                                  |
| 3. Attendance   | 25% Marks                                  |
| Marks will be given according to below criteria:  |  |
| 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 |

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85% attendance

65

### CSM-361: COMMUNICATION SKILLS (Theory)

No. of Lectures : 30 to be delivered	Max. Marks:	Uni. Examination - 20	} 50
		Int. Assessment - 20	
		Practical - 10	
Time Allowed : 2.5 hrs.	Min. Pass : Marks	Uni. Examination - 35%	} 40% Aggregate
		Int. Assessment - 35%	

#### 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.

Time Allowed : 2.5 hrs.

#### 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 READINGS

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

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**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.

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

Participating in a group discussion.

### CSM362: MECHANICS

No. of Lectures : 55 to be delivered	Max. Marks:	Uni. Examination	- 45	} 75
		Int. Assessment	- 30	
Time Allowed : 3 Hours	Min. Pass : Marks	Uni. Examination	- 35%	} 40% Aggregate
		Int. Assessment	- 35%	

#### 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 seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 6 marks each whereas section C will carry 21 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 of sections A and B will carry 6 marks each whereas section C will carry 21 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. Poinot's central axis theorem. Null lines and planes. CSMle and unCSMle 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 cylindrical and spherical coordinates.

#### TEXT BOOK

1. S.L. Loney, The Elements of Statics and Dynamics Part I (Statics), 6<sup>th</sup> edition(2016) Arihant Publications
2. Sygne John L.and Griffith, Principles of Mechanics. 3rd edition (1959), McGraw-Hill Inc.,US;
3. Chorlton, F. : Tectbook of Dynamics, 2<sup>nd</sup> edition (2002),CBS Publishers and Distributers Pvt. Ltd. N. Delhi.

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### CSM363: LINEAR ALGEBRA

No. of Lectures : 55 to be delivered	Max. Marks:	Uni. Examination	- 45	} 75
		Int. Assessment	- 30	
Time Allowed : 3 Hours	Min. Pass : Marks	Uni. Examination	- 35%	} 40% Aggregate
		Int. Assessment	- 35%	

#### 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 seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 6 marks each whereas section C will carry 21 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 of sections A and B will carry 6 marks each whereas section C will carry 21 marks.

Use of scientific non-programmable calculator is allowed.

#### SECTION-A

Vector Spaces and Their Elementary Properties, Subspaces and Their Examples, Sum and Direct Sum of Subspaces, Linear Dependence and Independence, Linear Combinations, Spanning Sets, Bases and Dimension for a Vector Space, Dimensions of Sum and Direct Sum of Subspaces, Quotient spaces.

Linear Transformations, Algebra of Linear Transformations, Polynomials of Linear Transformations, Products of Linear Transformations. The Null Space and the Range Space of a Linear Transformation, Rank and Nullity, Singular and non-singular Linear Transformations, Isomorphic Vector Spaces.

#### SECTION-B

Dual Space and Dual Basis, Reflexivity, Annihilator, Double Annihilator, Reducibility, Projections and their combinations, Projections and Invariance, Adjoints, Adjoints of projections.

The Matrix of a Linear Transformation, Matrix for the Composition and the Inverse. Similarity Transformation, Change of Bases, Eigen values and Eigen vectors, Multiplicity, Triangular form.

Vector Spaces and Their Elementary Properties, Subspaces

#### TEXT BOOK

1. Lipschutz, S., & Lipson, M. : Schaum's Outline of Linear Algebra, Schaum's Outline Series. 3<sup>rd</sup> edition (2017) McGraw Hill Education India
2. Halmos, P. R.: Finite-dimensional Vector Spaces ,2<sup>nd</sup> edition (2017), Dover Publications.

#### RECOMMENDED READING

1. Hoffman, K., & Kunze, R: Linear algebra ,2<sup>nd</sup> edition (2015), PHI Learning Pvt. Ltd.

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**CSM364: LINEAR PROGRAMMING**

<b>No. of Lectures : 40</b> to be delivered	<b>Max. Marks:</b>	<b>Uni. Examination</b> - 30	} 50
		<b>Int. Assessment</b> - 20	
<b>Time Allowed : 3 Hours</b>	<b>Min. Pass Marks</b>	<b>Uni. Examination</b> - 35%	} 40% Aggregate
		<b>Int. Assessment</b> - 35%	

**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 seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 4 marks each whereas section C will carry 14 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 of sections A and B will carry 4 marks each whereas section C will carry 14 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. Swarup, Kanti, Gupta, P. K. and Man Mohan, : Operations Research, 12th Edition (2004) Sultan Chand & Sons.

**RECOMMENDED READING**

1. Kasana, H.S. and Kumar K.D.: Introductory Operations Research, 4<sup>th</sup> edition (2004) Springer
2. Taha, H. A.: Operations research: An introduction, 10<sup>th</sup> Edition (2017). Pearson Education India
3. Gass Saul I. :Linear Programming: Methods and Applications, 5<sup>th</sup> Edition (2011), Dover Publications, New York.

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**CSM366: STATISTICAL PRACTICALS-VI**

**Total Practical Sessions: 25**  
**(Each of two hours)**  
**Time Allowed : 3 Hours**

**Max. Marks: Uni. Examination: 50**

**Min. Pass: 40%**  
**Marks**

**INSTRUCTIONS 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.

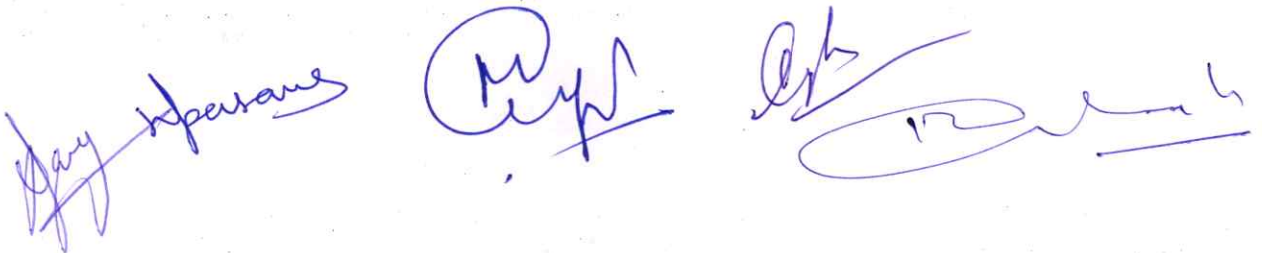
The practical paper will consist of four numerical problems and the candidates will be required to attempt any three numerical problems.

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

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

**Lab Course:**

The questions will be based on the syllabus of the papers CSM364 (Linear programming) and CSM365 (Design and analysis of experiments)









**CSM369: COMPUTER PRACTICALS-VI**

**Total Practical Sessions: 25**  
**(Each of two hours)**

**Max. Marks: Uni. Examination: 50**

**Time Allowed : 3 Hours**

**Min. Pass: 40%**  
**Marks**

**INSTRUCTIONS 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 programs & their execution	:	30

**Lab Course:**

The exercises will be based on the syllabus of the paper CSM367 (Problem Solving and Programming in Python)

The block contains four handwritten signatures in blue ink. From left to right: 1. A signature that appears to be 'npasane' written in a cursive style. 2. A signature that looks like 'A. N.' with a large circular flourish. 3. A signature that looks like 'A. N.' with a horizontal line underneath. 4. A signature that looks like 'A. N.' with a large circular flourish and a horizontal line underneath.