

## SYLLABUS

### B.Sc. (Computer Science, Statistics, Mathematics) Part – II

Outlines of Tests Syllabi and Courses of Reading.

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

**For Examination of Session 2015-16, 2016-17 & 2017-18.**

### 3rd Semester

| Code    | Title of paper/subject  | Hrs./Week | Max Marks |             |             |     |
|---------|---|-----------|-----------|-------------|-------------|-----|
|         |   |           | Cont.     | Univ. Asmt. | Total Exam. |     |
| CSM 231 | Advanced Calculus   | 4         |           | 30          | 45          | 75  |
| CSM 232 | Differential Equations  | 4         |           | 30          | 45          | 75  |
| CSM 233 | Applied Statistics  | 3         |           | 20          | 30          | 50  |
| CSM 234 | Statistical Inference I   | 3         |           | 20          | 30          | 50  |
| CSM 235 | Statistics Lab-III<br>(Computer Oriented<br>Practicals)                                 | 4         |           | -           | 50          | 50  |
| CSM 236 | Data Structure  | 3         |           | 20          | 30          | 50  |
| CSM 237 | Data Base Management<br>System  | 3         |           | 20          | 30          | 50  |
| CSM 238 | Software Lab III<br>(Practicals based on DBMS<br>using MS Access and Data<br>Structure) | 4         |           | -           | 50          | 50  |
| Total   |   |           |           | 140         | 310         | 450 |

**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 OF 20 MARKS**

### **THEORY PAPERS**

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

### CSM 231: ADVANCED CALCULUS

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

#### 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

The language of sets and functions - countable and uncountable sets. Real numbers - least upper bounds and greatest lower bounds.

**Sequences:-** limit points of a sequence, convergent sequences; bounded and monotone sequences, the limit superior and limit inferior of a sequence. Cauchy sequences and the completeness of  $\mathbb{R}$ .

**Infinite Series of non-negative terms:-** convergence and divergence of series, absolute and conditional convergence. Various tests for convergence of series. Connection between infinite series and decimal expansions, binary expansions of real numbers.

#### Section-B

**Alternating series:-** Leibnitz's theorem, absolute and conditional convergence.

**Series of arbitrary terms:** convergence, divergence and oscillation. Abel's and Dirichlet's tests.

**Calculus of a single variable:** Continuity; attainment of supremum and infimum of a continuous function on a closed bounded interval, uniform continuity. Differentiability of functions. Rolle's theorem and mean value theorems. Higher derivatives, maxima and minima. Taylor's theorem - various forms of remainder, infinite Taylor expansions.

#### TEXT BOOKS

1. T. M. Apostol: Mathematical Analysis. Nasora Publishing House, New-Delhi, 1985.
2. T. M. Apostol: Calculus Nasora Publishing House, New-Delhi
3. S. Dineen: Multivariate Calculus and Geometry, Springer Undergraduate Mathematics Series 3rd ed. 2014
4. R. R. Goldberg: Methods of Real Analysis, 2nd ed., Wiley, 1976
5. T. Tao: Analysis I. Hindustan Book Agency, 2006

#### REFERENCE READINGS

1. Robert G. Bartle, Donald R. Sherbert: Introduction to Real Analysis. 4<sup>th</sup> ed. Wiley 2011
2. H. Royden: Real Analysis. Macmillan, 1968
3. S.C. Malik & S. Arora: Mathematical Analysis New Age Science, 2009

## CSM 232 : DIFFERENTIAL EQUATIONS

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

### 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

Series solutions of differential equations. Power series method. Bessel, Legendre and Hypergeometric equations. Bessel, Legendre and Hypergeometric functions and their properties. Convergence, recurrence and generating relations. Orthogonality of functions. Sturm-Liouville problem. Orthogonality of eigen-functions. Reality of eigen values. Orthogonality of Bessel functions and Legendre polynomials.

Partial differential equations of the first order. Lagrange's solution. Some special types of equations which can be solved easily by methods other than the general method. Charpit's general method of solution.

### SECTION-B

Partial differential equations of second and higher orders. Classification of linear partial differential equations of second order. Homogeneous and non-homogeneous equations with constant coefficients. Partial differential equations reducible to equations with constant coefficients. Monge's methods.

Laplace Transforms – Linearity of the transformation. Existence theorem for Laplace transforms. Laplace transforms of derivatives and integrals. Shifting theorems. Differentiation and integration of transforms. Convolution theorem. Solution of integral equations and systems of differential equations using the Laplace transformation.

### TEXT BOOKS

1. Frank Ayres : Theory & Problems of Differential Equations, Macgraw- Hill Book Co.,1972.
2. Zafar Ahsan, Introduction to Differential Equations(2<sup>nd</sup> edition), PHI.

### REFERENCE READINGS

1. Erwin Kreyszig : Advanced Engg. Mathematics , John Wiley & Sons Inc., New York.99.
2. D. A. Murray : Introductory Course on Differential Equations, Orient Longman(India) 1967.
3. Ian N Sneddon : Elements of Partial Differential Equations, Macgraw- Hill Book Co.,1988.
4. Richard Bronson : Theory & Problems of Differential Equations, Macgraw- Hill Inc. 1973.
5. Jane Cronin : Differential Equations, Marcel Dekkar , 1994.

### CSM 233: APPLIED STATISTICS

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

#### 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

**Time Series:** Definition of time series, components of a time series, measurement of secular trend by method of moving average and fitting of Mathematical curves, measurement of seasonal fluctuations by ratio-to-moving average, ratio to trend and link relative methods, measurement of cyclical fluctuations .( excluding periodogram analysis)

#### SECTION-B

**Index numbers:** definitions, interpretation and applications of index numbers. Problems involved in the construction of index numbers, Laspeyre's, Paasche's, Marshal-Edgeworth formulae for index numbers. Fisher's ideal index numbers, errors in index numbers, criterion of good index numbers, uses of index numbers. Cost of living index numbers and its uses.

**Demand Analysis:** Theory and analysis of consumer's demand: Law of demand, Price elasticity of demand, Estimation of demand curves; Forms of demand functions, Engel's curves, Income elasticity of demand.

#### TEXT BOOKS

1. Goon A. M., Gupta M.K., Das gupta. B. (2008) : Fundamentals of Statistics, Vol. II, World Press, Calcutta .
2. S.C. Gupta and V.K. Kapoor (2014)Fundamentals of Applied Statistics,4<sup>th</sup> Edition, Sultan Chand & Sons

#### REFERENCE READINGS

1. Croxton F.E and Cowden D.J. (1969) : Applied General Statistics, Prentice Hall of India .
2. Mukhopadhyay P. P (2011 ) Applied Statistics, Books and Allied pvt. Ltd.
3. Mukhopadhyay, P. (1999) : Applied Statistics. New Central Book Agency Pvt.Ltd., Calcutta.

## CSM 234 : STATISTICAL INFERENCE - I

|                 |           |            |   |                 |
|-----------------|-----------|------------|---|-----------------|
| No. of Lectures | : 40      | Max. Marks | : Uni. Examination – 30<br>Int. Assessment – 20   | } 50            |
| to be delivered |           |            |   |                 |
| Time Allowed    | : 3 Hours | Min. Pass  | : Uni. Examination – 33%<br>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

**Introduction:** Parametric models, parameters; random sample and its likelihood; statistic and its sampling distribution; problems of inference.

**Data Reduction:** Sufficiency, Factorization Theorem (proof of discrete case only), Illustrations, Concept of Minimal Sufficiency.

**Point Estimation:** Properties of estimators: Unbiasedness and Minimum Variance Unbiased Estimator (MVUE). Consistency of estimators and sufficient conditions for consistency. Relative efficiency of an estimator.

**Interval Estimation:** Concepts of Confidence Interval and Confidence Coefficient. Confidence Intervals for the Parameters of univariate normal, two independent normal.

#### Section-B

**Methods of Estimation:** Method of Moments, Method of maximum likelihood. Statement of properties of MLE.

**Testing of Hypotheses:** Statistical Hypotheses- Simple and Composite. Statistical tests, Critical region, Errors of Type I and Type II, Size and Power of a test. Definition of Most Powerful (MP), Uniformly Most Powerful (UMP), Unbiased and Uniformly Most Powerful Unbiased (UMPU) tests. Neyman Pearson Lemma and its application in testing hypotheses regarding binomial, Poisson, normal and exponential distributions.

### TEXT BOOKS

1. Bhattacharya G.K and Johnson R.A.(1977): Statistical Concepts and Methods. John Wiley and Sons.
2. Dudewicz E.J and Mishra S.N.(1988): Modern Mathematical Statistics, International Student Edition, John Wiley and Sons.
3. Freund J.E.(2000): Mathematical Statistics, Prentice - Hall of India.
4. Goon A.M., Gupta M.K. and Dasgupta B.(1980): An outline of Statistical Theory, Vol.2, The World Press Publishers Private Limited, Calcutta.

### REFERENCE READINGS

1. Hogg R.V and Craig A.T.(1978): Introduction to Mathematical Statistics, Fourth edition, Collier Macmillan Publishers.
2. Mood A.M., Graybill F.A and Boes D.C.(1974): Introduction to the Theory of Statistics, Third Edition, McGraw Hill.

**CSM-235: STATISTICS LAB-III (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-voce   | : | 10 |
| Exercises   | : | 30 |

**Lab Course:**

The exercises will be based on the syllabus of the papers CSM-233(Applied Statistics) and CSM – 234 (Statistical Inference- I)

## CSM 236 : DATA STRUCTURES

|                               |                     |                               |                 |
|-------------------------------|---------------------|-------------------------------|-----------------|
| <b>No. of Lectures</b> : 40   | <b>Max. Marks</b> : | <b>Uni. Examination</b> – 30  | } 50            |
| <b>to be delivered</b>        |                     | <b>Int. Assessment</b> – 20   |                 |
| <b>Time Allowed</b> : 3 Hours | <b>Min. Pass</b> :  | <b>Uni. Examination</b> – 33% | } 40% Aggregate |
|                               | <b>Marks</b>        | <b>Int. Assessment</b> – 33%  |                 |

### 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

Review of basic mathematical concepts and notations.

Data structures and data structure operations, ADT Concept, algorithmic complexity and time space trade off.

Introduction to basic data structures such as arrays, linked-lists, stacks and queues, Linked and sequential representation, Basic operations such as insertion, deletion, searching.

Linked list, representation of linked list, doubly linked-list, circular linked list.

Implementation of stacks, postfix to infix conversion and evaluation of expressions using stacks, Queue, Dequeues and their applications.

#### SECTION B

Tree : definitions and basic concepts, linked tree representation, representations in contiguous storage, binary trees, binary search tree : traversal searching, insertion in BST, heap and heap sort algorithm.

Graphs and their application, sequential and linked representation of graph, operations on graph, traversing a graph, Dijkstra's algorithm for shortest distance, DFS and BFS.

Searching and sorting : linear and binary search, hash search, insertion, selection merge, radix, bubble, quick sort. Memory management: Allocation, garbage collection, fragmentation & compaction.

### TEXT BOOKS

1. Seymour Lipschutz "Theory & Practice of Data Structures", McGraw Hill, 1988.

### REFERENCE READINGS

1. Thomas Naps and Bhagat Singh, Introduction to Data Structures with Pascal., West Publishing.1986
2. Tenenbaum, Y. Lanhghsam and A. J. Augenstein, "Data Structures Using C and C++", Prentice Hall of India, 1990.
3. E. Horowitz and S. Sahni, "Data Structures with Pascal", Galgotia, 3<sup>rd</sup> Edition, 1991.
4. Ah. A.V. Hopcraft J.E. and Ullman, J.D. "The Design and Analysis of Computer Algorithms", Addison Wesley.



## CSM 237 : DATABASE MANAGEMENT SYSTEM

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

Traditional file processing system : Characteristics, limitations, Database : Definition, composition.

Database Management system : Definition, Characteristics, advantages over traditional file processing system, User of database, DBA and its responsibilities, Database schema, instance.

DBMS architecture, data independence, mapping between different levels.

Database languages : DDL, DML, DCL.

Database Keys : Super, candidate, primary, unique, foreign.

Entity relationship model : concepts, mapping cardinalities, entity relationship diagram, weak entity sets, strong entity set, aggregation, generalization, converting ER diagrams to tables.

Overview of Network and Hierarchical model.

Relational Data model : concepts, constraints. Relational algebra : Basic operations, additional operations.

### SECTION B

Database design : Functional dependency, decomposition, problems arising out of bad database design, normalization, multi-valued dependency. Database protection, database integrity, database concurrency : Problems arising out of concurrency, methods of handling concurrency. Data recovery, database security : Authentication, authorization, methods of implementing security.

**MS-ACCESS** : Introduction to MS-ACCESS, working with databases and tables, queries in Access, Applying integrity constraints, Introduction to forms, sorting and filtering, controls, Reports and Macro : creating reports, using Macros.

### TEXT BOOK:

1. C.J. Date, "An Introduction to Data Base Systems", 7th Ed., Addison Wesley,
2. C. J. Date, "An Introduction to Data Base Systems" 3rd Edition, Narosa Publishers, 1997. (Reprint).
3. Vipin Desai, "An Introduction to DBMS" 11<sup>th</sup> edition, West Group, 1990
4. Elmasri R. and Navathe B. S., "DBMS", 6<sup>th</sup> edition, Pearson, 2010

### REFERENCE READINGS

1. Jeffrey D. Ullman, "Principles of Database Systems", 2nd Edition., Galgotia Publications, 1984.
2. D. Kroenke., "Database Processing", Galgotia Publications, 1987.
3. Henry F. Korth, "Database System Concepts", McGraw Hill. Inc., 1997.
4. Naveen Prakash, "Introduction to Database Management", TMH, 1993.

**CSM 238 : SOFTWARE LAB-III (PRACTICALS BASED ON DBMS USING MS  
ACCESS and DATA STRUCTURE)**

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

**Time Allowed : 3 Hours**

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

**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-voce                                      | : | 10 |
| Development of programmes<br>& their execution | : | 30 |

**Lab Course:**

The exercises will be based on the syllabus of the papers CSM 236 (Data Structure using C++) and CSM 237 (Data Base Management System).

## Syllabus

### 4 th Semester For Examination of Session 2015-16, 2016-17 & 2017-18.

| Code    | Title of paper/subject                                 | Week | Hrs./<br>Cont. | Max Marks      |       | Total |
|---------|--|------|----------------|----------------|-------|-------|
|         |  |      |                | Univ.<br>Asmt. | Exam. |       |
| CSM 241 | Real Analysis  |      | 4              | 30             | 45    | 75    |
| CSM 242 | Topics in Analysis                                     |      | 4              | 30             | 45    | 75    |
| CSM 243 | Industrial Statistics                                  |      | 3              | 20             | 30    | 50    |
| CSM 244 | Statistical Inference II                               |      | 3              | 20             | 30    | 50    |
| CSM 245 | Statistics Lab-IV<br>(Computer Oriented<br>Practicals) |      | 4              | -              | 50    | 50    |
| CSM 246 | Operating Systems                                      |      | 3              | 20             | 30    | 50    |
| CSM 247 | ASP.NET  |      | 3              | 20             | 30    | 50    |
| CSM 248 | Software Lab IV  |      | 4              | -              | 50    | 50    |
|         |  |      | Total          | 140            | 310   | 450   |

**Note: 1. The minimum pass marks in each paper is 33% in Continuous Assessment and University Examination separately subject to a minimum of 40% in aggregate.**

**2. In addition to above mentioned subjects, there will be a course of Environmental Studies and Road Safety Awareness as a qualifying subject**

## **BREAK-UP OF CONTINUOUS ASSESSMENT OF 20 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 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-241: REAL ANALYSIS

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

### 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

Riemann integral, Integrability of continuous and monotonic functions, The fundamental theorem of integral calculus, Mean value theorems of integral calculus.

Improper integrals and their convergence, Comparison tests, Able's and Dirichlet's tests, Frullani's integral, Integral as a function of a parameter, Continuity, derivability and integrability of an integral of a function of a parameter.

### SECTION-B

Limit and continuity of functions of two variables, Partial derivation and differentiability of real-valued functions of two variables. Schwarz's and Young's theorems, Statements of inverse function theorem, implicit function theorem and their applications. Euler's theorem on homogeneous functions, Taylor's theorem , Jacobians, maxima, minima and saddle points of functions of two variables. Lagrange's multiplier method.

Fourier series: Fourier expansion of piecewise monotonic functions.

### TEXT BOOKS

1. S.C. Malik: Mathematical Analysis, New Age Science(2009).
2. Shanti Narayan : A Course of Mathematical Analysis , S. Chand & Co.,New Delhi (9<sup>th</sup> edition),1968.

### REFERENCE READINGS

1. T. M. Apostol : Mathematical Analysis, Narosa Publishing House, New Delhi,1985.
2. D. Somasundaram & B. Choudhary : A First Course in Mathematical Analysis, Narosa Publishing House, New Delhi, 1997.
3. P. K. Jain & S. K. Kaushik : An Introduction to Real Analysis, S. Chand & Co.,New Delhi,2000.

## CSM-242: TOPICS IN ANALYSIS

|   |                     |                               |                 |
|---|---------------------|-------------------------------|-----------------|
| <b>No. of Lectures</b> : 55<br><b>to be delivered</b> | <b>Max. Marks</b> : | <b>Uni. Examination</b> – 45  | } 75            |
|   |                     | <b>Int. Assessment</b> – 30   |                 |
| <b>Time Allowed</b> : 3 Hours                         | <b>Min. Pass</b> :  | <b>Uni. Examination</b> – 33% | } 40% Aggregate |
|   |                     | <b>Int. Assessment</b> – 33%  |                 |
| <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 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

Beta and Gamma functions, Double and triple integrals, Change of order of integration in double integrals.

**Vector Analysis:** Product of two vectors, Scalar and vector product of three vectors, Vector differentiation. Gradient, divergence and curl. Vector integration. Statements (without proof) of Gauss, Green and Stokes theorems and their applications.

### SECTION-B

Sequences and series of functions, pointwise and uniform convergence, Cauchy's criterion for uniform convergence, Weierstrass M-test, Abel's and Dirichlet's tests for uniform convergence, uniform convergence and continuity, uniform convergence and Riemann integration, uniform convergence and differentiation, Weierstrass approximation theorem. Power series, uniqueness theorem for power series.

### Complex analysis:

Complex numbers as ordered pairs. Geometric representation of complex numbers, Stereographic projection.

Continuity and differentiability of complex functions. Analytic functions. Cauchy'-Riemann Equations. Harmonic functions.

Analytic functions as conformal mapping. Examples of mapping by elementary functions. Mobius Transformations. Fixed points. Crossratio. Inverse points.

### TEXT BOOKS

1. S.C. Malik: Mathematical Analysis, New Age Science, 2009.
2. Shanti Narayan, Theory of Functions of a Complex Variable, S. Chand & Co., New Delhi (2<sup>nd</sup> edition) 2005
3. Murray R. Spiegel, Vector Analysis, Schaum publishing Company, New York.
4. Kasana, H.S., Complex Variables, PHI (2<sup>nd</sup> edition) 2005.

## CSM - 243 : INDUSTRIAL STATISTICS

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

### 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

Statistical quality control, chance and assignable causes, process and product control, the technique of control charts for process control, three sigma and specification limits. Schewhart control charts for mean, S.D. and range, control charts for number defectives and fraction defective, control chart for number of defects.

Advantages of process control, sampling inspection by attribute, the concept of producer's and consumer's risks, AOQ, AOQL, ASN and OC functions and curves, single and double sampling plans.

### SECTION - B

Inventory problem, introduction, definition, inventory costs, inventory variables. Classification of inventory problems, concept of Economic Ordering Quantity (EOQ), EOQ problems without/with shortages, Uniform/Constant demand, finite/infinite replenishment of inventory. EOQ problems with price breaks.

### TEXT BOOKS

1. Goon, A.M., Gupta, M.K. and Dasgupta, B. : Fundamentals of Statistics, Vol. II, World Press, 6th Ed. (revised and enlarged), 2008
2. Kanti Swarup, P.K. Gupta and Manmohan : Operations Research, Sultan Chand and Sons, New Delhi, Edition - 1996
3. S.C. Gupta and V.K. Kapoor Fundamentals of Applied Statistics, 4<sup>th</sup> Edition, Sultan Chand & Sons, 2014

## CSM - 244 : STATISTICAL INFERENCE – II

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

**Sampling distributions:** Chi-square, t and F. Distribution of the sample mean and variance of independent random observations from a normal population.

Tests about the mean and variance of a univariate normal distribution, comparison of two univariate normal distributions through their means and variances. Testing the significance of the correlation coefficient and the regression coefficients in the case of simple regression.

#### Section – B

**Exact tests and confidence intervals;** Tests relating to Binomial and Poisson distributions. A test for independence of two attributes.

**Large sample tests:** Use of CLT for deriving large sample tests for binomial proportion, difference of two binomial proportions, mean of a population and difference of means of two independent populations. Related confidence intervals. Pearsonian Chi-square tests for independence of attributes, homogeneity of populations and goodness of fit.

Fisher's Z-transformation of the sample correlation, test regarding the population correlation coefficient based on Z-transformation and confidence limits for the coefficient based on it.

### TEXT BOOKS

1. Goon, A.M., Gupta, M.K. and Dasgupta, B.(2008) : Fundamentals and Statistics, Vol. 1, World Press Pvt. Ltd., Calcutta
2. Goon A.M., Gupta M.K. and Dasgupta B.(1980): An outline of Statistical Theory, Vol.2, The World Press Publishers Private Limited, Calcutta.
3. Freund J.E.(2000): Mathematical Statistics, Prentice - Hall of India.

### REFERENCE BOOKS

1. Bhattacharya G.K and Johnson R.A.(1977): Statistical Concepts and Methods. John Wiley and Sons.
2. Dudewicz E.J and Mishra S.N.(1988): Modern Mathematical Statistics, International Student Edition, John Wiley and Sons.
3. Hogg, R.V., Craig, A.T and McKean J. Introduction to Mathematical Statistics, 7th ed. Pearson
4. Mood A.M., Graybill F.A and Boes D.C.(1974): Introduction to the Theory of Statistics, Third Edition, McGraw Hill.



## **CSM-245: STATISTICS LAB-IV (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-voce   | : | 10 |
| Exercises   | : | 30 |

#### **Lab Course:**

The exercises will be based on the syllabus of the papers CSM-243 (Industrial Statistics) and CSM-244 (Statistical Inference II).

## CSM - 246 : OPERATING SYSTEMS

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

### 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 operating System, its need and Operating system services, Definition, Early systems, Simple batch systems, Multiprogrammed batched systems, Time sharing systems, Personal computer systems and Real time systems. Process Management.

CPU Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms : FCFS, SJF, Round Robin & Queue Algorithms. Deadlocks: Deadlock characterisation, Methods for handling deadlocks, Banker's Algorithm.

### SECTION-B

Memory Management: Logical versus Physical address space, Swapping, Contiguous allocation, Paging, Segmentation.

Virtual Memory: Demand paging, Performance of demand paging, Page replacement, Page replacement algorithms, Thrashing.

File management: File system Structure, Allocation methods: Contiguous allocation, Linked allocation, Indexed allocation, Free space management: Bit vector, Linked list, Grouping, Counting.

Device Management: Disk structure, Disk scheduling: FCFS, SSTF, SCAN, C-SCAN, LOOK, Selecting disk scheduling algorithm.

### TEXT BOOKS

1. Abraham Silberschatz, Peter B. Galvin, "Operating System Concepts", Wiley 9th. Ed., 2012.
2. Ekta Walia: "Operating Systems", Khanna Book Publishers.

### REFERENCE READINGS

- 1 Brinch Hansen, "Operating System Principles", Prentice-Hall, 1984.
3. N. Haberman, "Introduction to Operating System Design", Galgotia Publication, 1986.
4. Brich Hansen, "The Architecture of Concurrent Programs", PHI, 1978.

## CSM – 247 : ASP.NET

No. of Lectures : 40 Max. Marks : 

|                         |      |   |    |
|-------------------------|------|---|----|
| <b>Uni. Examination</b> | – 30 | } | 50 |
| <b>Int.Assessment</b>   | – 20 |   |    |

  
to be delivered

Time Allowed : 3 Hours Min. Pass : 

|                         |       |   |               |
|-------------------------|-------|---|---------------|
| <b>Uni. Examination</b> | – 33% | } | 40% Aggregate |
| <b>Int.Assessment</b>   | – 33% |   |               |

  
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

Introduction of Microsoft ASP.NET, . Net Framework, An overview of NET including the Common Language Interface, the Common Type System, the Common Language Runtime, and NET Framework and class libraries Language and platform neutrality.

An introduction to Web Forms. The ASP.NET execution model.

ASP NET Web Application User Interface : Creating an ASP.NET Web application user interface. Implementing event handles by using code-behind files, Explain user input by using validation controls, Create and use user controls, Server-side controls, events.

Managing State: The Various Means to Manage State, Request object, Application object, Cache object, Session object, Server-side state management, Using session for server-side and client-side state management.

XML Web Services: Need of XML Web services, Understanding the Web Service Model, Creating an ASP, NET Web Service, Creating & Consuming Web Services with Visual Studio. NET Creating Web Services, Discovering Web Services, Instantiating and Invoking Web Services, Creating Web reference proxy for an XML Web Service. Consuming web services in both Windows Forms and Web apps.

#### Section B

Master Page ,Creating a User Interface Using Controls, Validating Data, Navigating Between Forms Implementing Navigation for the User Interface : Round Trip and Post back, State Management for user navigation Navigation between Pages.

Storing and Retrieving Data with ADO.NET: ADO, NET Overview, Connecting to Data, Executing SQL with Commands, Accessing Data with ADO,NET; Fast Data Access with Data Readers, Data Set Basics, Filling DataSets with DataAdaters, Using Data sent on Web Forms. Processing Transactions Data Binding : Bind Data to the UI, Transform and Filter Data.

Security : Authentication and Authorizing Users, Windows Authentication, Using Forms Authentication

Text Book:

1. Matthew MacDonald: ASP.NET: The Complete Reference, Osborne.

References:

1. Jesse Liberty, Dan Hurwitz: Programming ASP.NET.OReilly.
2. Stephen Walther: ASP.NET 3.5 Unleashed, SAMS.
3. Infosys Campus Connect Foundation Program Volume: 1-3, Education & Research Department, Infosys Technologies Ltd. Bangalore.

## **CSM-248 : SOFTWARE LAB-IV + PROJECT**

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

**Time Allowed : 3 Hours**

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

**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-voce                                      | : | 10 |
| Development of programmes<br>& their execution | : | 21 |
| Project  | : | 9  |

#### **Lab Course:**

The exercises will be based on the syllabus of the papers CSM – 247(ASP.NET)

**All UG Courses - II Years (4th Semester)**  
**Environmental and Road Safety Awareness**  
**Session : 2015-16, 2016-17 & 2017-18**

Time Allowed: 3 hours

Total Marks: 100

Total lectures: 50

Pass marks: 35

**Theory Paper: 70 marks+ Internal Assessment 30 marks**

**Instructions:**

- a) The paper has been introduced from the session 2013-14.
- b) The paper will be taught in the Second year/fourth Semester of all the U.G. Courses (B.A., B.Com., B.Sc., Law, Engineering, Commerce, Agriculture etc.) except L.L.B. three year course and will be a qualifying paper only. The marks of this paper will not be counted towards final score of the under graduate degree.
- c) This will cover only preliminary and basics of the subject and the paper will be set accordingly.
- d) The question paper will consist of three sections A, B and C. Section A and B will have four questions in each section from the respective sections of the syllabus and will carry 10 marks each. Section C will consist of 15 short-answer type questions which will cover the entire syllabus uniformly and will carry 30 marks in all.
- e) Candidates are required to attempt two questions from each section A and B and the entire section C.

**Section – A**

**Unit 1:** The multidisciplinary nature of environmental studies. Definition, scope and importance

- Concept of Biosphere – Lithosphere, Hydrosphere, Atmosphere.
- Need for public awareness (6 lectures)

**Unit – 2:** Natural Resources – Renewable and non-renewable resources.

- Natural resources and associated problems.

- a) Forest resources: use and over exploitation, deforestation and its impact.
- b) Water resources: use and overutilization of surface and ground water and its impact.
- c) Mineral resources: use and effects on environment on over exploitation.
- d) Food resources: Effects modern agriculture, fertilizer-pesticide problem, water logging and salinity.
- e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy resources.
- f) Role of an individual in conservation of natural resources for sustainable development. (7 lectures)

### **Unit 3: Ecosystems**

- Ecosystem and its components: Definition, structure and function; producer, consumer and decomposer.
- Types of Ecosystem (Introduction only)
- Food Chains, food web and ecological pyramids (6 lectures)

### **Unit – 4: Biodiversity and conservation**

- Introduction – Definition: genetic, species and ecosystem diversity, value of biodiversity.
- Hot spots of biodiversity
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India.
- Conservation of Biodiversity. (6 lectures)

### **Section – B**

### **Units 5: Environmental Pollution**

- Definition, causes, effects and control measures of
  - a) Air pollution
  - b) Water pollution

- c) Soil pollution
- d) Marine pollution
- e) Noise pollution
- f) Thermal pollution
- g) Nuclear hazard

- Role of an individual in prevention of pollution.
- Solid waste management: vermin-composting.
- Disaster management : Floods, earthquake, cyclone and landslides

(7 lectures)

#### **Unit 6:** Social Issues and the Environment

- Urban problems related to energy.
- Water conservation rain water harvesting, water shed management.
- Resettlement and rehabilitation of people: its problems and concerns.
- Climate changes, global warming, acid rain, ozone layer depletion.
- Consumerism and waste products.
- Population explosion – Family welfare programme (6 lectures)

#### **Unit 7:** Introduction to Environmental Protection Laws in India

- Environmental Protection Act.
- Air (Prevention and control of pollution) Act.
- Water (Prevention and Control of pollution) Act.
- Wild life Protection Act.
- Forest Conservation Act.
- Issues involved in the enforcement of environmental legislation.

(6 lectures)

#### **Unit 8:** Road safety Awareness

- Concept and significance of Road safety.
- Traffic signs.

- Traffic rules.
- Traffic Offences and penalties.
- How to obtain license.

Role of first aid in Road Safety