

Syllabus

for

B.Sc. Part II
(Mathematics, Computer Applications, Management)
(Sessions 2011-12, 2012-13, 2013-14)



Department of Mathematics
Punjabi University Patiala

B.Sc. (Mathematics, Computer Applications, Management) Part-II
Outlines of Tests, Syllabi and Courses of Reading

Note: Every theory paper will be of 3 hour duration for examination

Session 2011-12, 2012-13 and 2013-14

SEMESTER-III

Code	Title of Paper/Subject	Hrs/Week	Max Cont. Asmt.	Marks Univ Exam	Total
MCM-301	Business Psychology	4	50	50	100
MCM-302	Advanced Calculus	4	50	50	100
MCM-303	Algebra-I	4	50	50	100
MCM-304	Marketing Management	4	50	50	100
MCM-305	Management Information System	4	50	50	100
MCM-306	Operating System	4	50	50	100
MCM-307	Object Oriented Programming with "C++"	4	50	50	100
MCM-308	Software Lab-III (C++)	4	50	50	100
	Total		400	400	800

SEMESTER-IV

Code	Title of Paper/Subject	Hrs/Week	Max Cont. Asmt.	Marks Univ Exam	Total
MCM-401	Environmental Studies (Qualifying paper)	4	50	50	100
MCM-402	Analysis	4	50	50	100

MCM-403	Algebra-II	4	50	50	100
MCM-404	Business Research Methodology	4	50	50	100
MCM-405	Business Environment	4	50	50	100
MCM-406	Software Engineering	4	50	50	100
MCM-407	Computer Graphics	4	50	50	100
MCM-408	Software Lab-IV	4	50	50	100
	Total		350	350	700

Note: The minimum pass marks in each paper is 35% in continuous assessment and university examination separately subject to minimum of 40% marks in aggregate.

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Break up of Continuous Assessment of 50 marks

Theory Papers

S. No.		
1.	Two tests will be held and their average will be considered for assessment	50% marks
2.	Seminars/Assignments/Quizzes/Class participation	30%
3.	Attendance	20%
	Marks will be given according to below criteria:	
	75% attendance and above But less than 80%	60% marks of allotted marks to attendance
	80% attendance and above But less than 85%	80% marks of allotted marks to attendance
	85% attendance and above	100% marks of allotted marks to attendance

Practical Papers

S. No.		
1.	Two tests will be held and their average will be considered for assessment	50% marks
2.	Viva, Lab records and class participation	30%
3.	Attendance	20%
	Marks will be given according to below criteria:	
	75% attendance and above But less than 80%	60% marks of allotted marks to attendance
	80% attendance and above But less than 85%	80% marks of allotted marks to attendance
	85% attendance and above	100% marks of allotted marks to attendance

SYLLABUS

B.Sc. (Mathematics, Computer Applications, Management) Part-II

Semester-III

Code	Course Title	Marks
MCM-301	Business Psychology	100
MCM-302	Advanced Calculus	100
MCM-303	Algebra-I	100
MCM-304	Marketing Management	100
MCM-305	Management Information System	100
MCM-306	Operating System	100
MCM-307	Object Oriented Programming with "C++"	100
MCM-308	Software Lab-III (C++)	100

MCM-301 – Business Psychology

Maximum Marks: 100(50+50)

External: 50

Teaching hours: 55

Instructions for paper-setters

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% marks each. Section E will have 10-20 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

Instructions for candidates

Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.

Time allowed: 3 Hrs.

Internal: 50

Minimum Pass Marks: 35%

SECTION-A

- Organizational Behavior & Industrial Psychology: Nature & Scope.
- Information Technology in Organization
- Perception & Learning: understanding and adapting to Work environment.
- Work related attitudes, and job satisfaction.

SECTION-B

- Communication: Nature, types, Barriers.
- Decision making: Process and factors involved
- Managing emotions at workplace: Emotional intelligence, Conflict Management, Stress Management, Burnout.

SECTION-C

- Leadership: Theories and effectiveness.
- Group process and work teams.
- Effective teams.
- Influence, power & politics in organizations.

SECTION-D

- Employee selection: Principles & Techniques.
- Performance Appraisal.
- Working conditions.
- Workplace hazards.

REFERENCES

1. Schultz, D.S Schultz, S.E, 2004.
2. Hersey, P., Blanchard, K.H & Johnson, D.E., 2001: Management of Organizational Behavior. Pearson Educations & Soughi, S.
3. Robbins, S.P. and Soughi, S., 2006: Organizational Behavior, Pearson Education.
4. Greenberg, J. & Barou, R.A., 2003: Behaviour in Organizations.
5. Blum, M.L. and Naylor, J.C., 1984: Industrial Psychology. Delhi: CBS publishers.
6. Ghosh, P.K. and Ghorpade, M.B., 1993: Industrial Psychology. Bombay: Himalaya Publishing House.
7. Pareek, U., 2004: Understanding Organizational Behaviour , Oxford University Press.

MCM-302 – Advanced Calculus

Maximum Marks: 100(50+50)

External: 50

Teaching hours: 55

Time allowed: 3 Hrs.

Internal: 50

Minimum Pass Marks: 35%

Instructions for paper-setters

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% marks each. Section E will have 10-20 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

Instructions for candidates

Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.

SECTION-A

Definition of a sequence, Bounded and Monotonic sequences, Convergent sequence, Subsequences, Cauchy's Convergence Criterion, Theorems on limits of sequences. Cauchy sequences. Definition of a series, series of non- negative terms

SECTION-B

Comparison tests. Cauchy's integral test. Ratio tests. Raabe's, Logarithmic, De Morgan and Bertrand's tests. Integral test. Leibnitz's theorem. Alternating series. Absolute and conditional convergence. Series of arbitrary terms. Abel's and Dirichlet's tests. Power series, Summation by parts. Addition and Multiplication of series, Rearrangements.

SECTION-C

Limit, Continuity, Sequential Continuity and Properties of continuous functions. Uniform continuity, Differentiability, Chain rule of differentiability. Mean value theorems. Darboux's intermediate value theorem. Taylor theorem with various forms of remainders, Taylor and Maclaurin series expansions.

SECTION-D

Limit and Continuity of Functions of two variables. Partial differentiation. Partial derivation and differentiability of real-valued functions of two variables. Schwarz's & Young's theorems. Statement of inverse function theorem and implicit theorem. Euler's theorem on homogenous functions. Taylor's theorem for functions two variables. Lagrange' multiplier method.

REFERENCES

1. Walter Rudin, *Mathematical Analysis*, Tata McGraw Hill, 1976.
2. T.M. Apostol, *Mathematical Analysis*, Norosa Publishing House, New Delhi, 1985.
3. Shanti Narayan, *Course of Mathematical Analysis*, S. Chand & Co., New Delhi, 1979.

MCM-303 – Algebra-I

Maximum Marks: 100(50+50)

Time allowed: 3 Hrs.

External: 50

Internal: 50

Teaching hours: 55

Minimum Pass Marks: 35%

Instructions for paper-setters

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% marks each. Section E will have 10-20 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

Instructions for candidates

Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.

Section A

Semigroups and Groups, Examples: Integers modulo n under addition and multiplication, Permutations under usual composition, symmetries of geometric figure, S_3 , Linear Groups, Direct Product of Groups, Klein four group and the Quaternion Group.

Homomorphisms, Kernel, Subgroups and Cosets, Subgroup generated by a subset, order of an element, index of a subgroup, Lagrange's Theorem, Euler-Fermat, Poincare's Theorem, Wilson's Theorem.

Section B

Cyclic Groups, Permutation Groups, Cycles, transpositions, Cayley's Theorem, Groups of Symmetries; the dihedral group D_n , the symmetries of a rectangle. Generators and Relations. Normal Subgroups, Quotient groups, Normalizer, the derived subgroup.

Section C

Isomorphism Theorems, The Correspondence Theorem, Automorphisms, Inner automorphisms. Conjugacy and G -sets; group action on a set, G -sets and their examples, Cayley's Theorem, Orbits, Conjugate Classes, Orbit decomposition, Class decomposition..

Section D

Permutation groups, Cyclic Decomposition, Cycle structure in S_n , Alternating group A_n . Even and Odd permutations, Normality of A_n in S_n , Direct Products of Groups.

TEXT BOOK:

Basic Abstract Algebra, *Bhattacharya, Jain and Nagpaul*. Chapters 4, 5, Chapter 6; (Theorem 2.1 only) Chapter 7..

MCM-304 – Marketing Management

Maximum Marks: 100(50+50)

External: 50

Teaching hours: 55

Instructions for paper-setters

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% marks each. Section E will have 10-20 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

Instructions for candidates

Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.

Time allowed: 3 Hrs.

Internal: 50

Minimum Pass Marks: 35%

Section-A

Introduction to Marketing: Meaning, Nature and Scope of Marketing; Marketing Philosophies; Marketing Management Process; Concept of Marketing Mix; Market Analysis: Understanding Marketing Environment; Consumer and Organisation Buyer Behaviour; Market Measurement; Market Segmentation, Targeting and Positioning.

Section-B

Product Planning and Pricing: Product Concept; Types of Products; Major Product Decisions; Brand Management; Product Life Cycle, New Product Development Process; Pricing Decisions; Determinants of Price; Pricing Process, Policies and Strategies.

Section-C

Promotion and Distribution decisions: Communication Process; Promotion Tools-Advertising, Personal Selling, Publicity and Sales Promotion; Distribution Channel Decisions-Types and Functions of Intermediaries, Selection and Management of Intermediaries.

Section-D

Marketing Organization and Control: Emerging Trends and Issues in Marketing – Consumerism, Rural Marketing, Social Marketing; Direct and Online Marketing; Green Marketing.

TEXT BOOKS:

1. Philip Kotler. (2003). Marketing Management: Analysis, Planning, Implementation and Control, Prentice Hall of India.
2. Michael, J. E., Bruce, J. W. and William, J. S. (13th Edition, 2004). Marketing Management. Tata McGraw Hill, New Delhi.

REFERENCES BOOKS:

1. Louis E. Boone and David L. Kurtz (2001). Contemporary Marketing. Harcourt Collye Publishers.

2. Douglas, J. Darymple & Leonard J. Parsons (2002). Marketing Management: Text and Cases, Seventh Edition, John Wiley and Sons.
3. Pride, William, M., and O.C. Ferrell (2005). Marketing: Concepts and Strategies. Biztantra, New Delhi.
4. Kotler and Armstrong (2004). Principles of Marketing Management. PHI, 2004.

MCM-305 – Management Information System

Maximum Marks: 100(50+50)

External: 50

Teaching hours: 55

Instructions for paper-setters

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% marks each. Section E will have 10-20 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

Instructions for candidates

Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.

Time allowed: 3 Hrs.

Internal: 50

Minimum Pass Marks: 35%

SECTION A

Framework of Management Information Systems: Importance's of MIS, Concepts of Management, information, system, Definition of MIS, information technology and MIS, nature and scope of MIS, MIS characteristics and functions. Structure and classification of MIS: structure of MIS, MIS classification, Brief introduction of functional information system, financial information system, marketing information system, production/ Manufacturing information system, human resources information system.

SECTION B

Decision making and MIS: decision making, Simon's model of decision making, types of decisions, purpose of decision making, level of programmability, knowledge of outcomes. Information and system concepts: types of information: strategic information, Tactical information, Operational information. Information quality, dimensions of information, System: Kinds of Systems, System related concepts, elements of systems, Human as an information processing system.

SECTION C

System development stages: System investigation, system analysis, system design, construction and testing, implementation, maintenance. System development approaches (a brief introduction): waterfall model, prototyping, iterative enhancement model, spiral model. System analysis: introduction, requirement definition.

SECTION D

System Design: objectives, conceptual design, design methods, detailed system design. Implementation and evaluation of MIS: implementation process, Hardware and software selection, Evaluation MIS, System maintenance. Information system Planning: Information system Planning, planning terminology, the Nolan stage model, selecting a methodology, information resources management.

TEXT BOOKS

1. D.P. Goyal, "Management Information Systems", Macmillan India Ltd.

REFERENCE READINGS

1. Bentley, "System Analysis and Design", TMH
2. Robert G. Murdick & Joel E. Ross & James R. Claggett, "Information Systems for Modern Management" PHI.
3. A. Ziya Aktas, "Structured Analysis & Design of Information System", PHI.
4. V. Rajaraman, "Analysis & Design of Information Systems", PHI.
5. J. Kanter, "Management/Information Systems", PHI.
6. Gordon B. Davis & M.H. Olson, "Management Information Systems : Conceptual Foundation, Structure & Development.

MCM-306 – Operating System

Maximum Marks: 100(50+50)

Time allowed: 3 Hrs.

External: 50

Internal: 50

Teaching hours: 55

Minimum Pass Marks: 35%

Instructions for paper-setters

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% marks each. Section E will have 10-20 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

Instructions for candidates

Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.

SECTION-A

Introduction to operating system, its need and Operating system services, Definition, Early systems, Introduction to various types of operating systems: Batch processing operating system, Multiprogramming operating system, Time Sharing operating system, Multi tasking operating system, Distributed operating system, Network operating system, Real time operating system, Multi processor system and parallel processing.

SECTION-B

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

SECTION-C

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.

SECTION-D

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.

Introduction to Windows Operating system.

TEXT BOOKS

1. Abraham Silberschatz, Peter B. Galvin, "Operating System Concepts", Addison-Wesley publishing. Co., 4th. Ed., 1994.

REFERENCE READINGS

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

MCM-307 – Object Oriented Programming with "C++"

Maximum Marks: 100(50+50)

External: 50

Teaching hours: 55

Instructions for paper-setters

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% marks each. Section E will have 10-20 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

Instructions for candidates

Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.

Time allowed: 3 Hrs.

Internal: 50

Minimum Pass Marks: 35%

SECTION A

Evolution of OOP: Procedure Oriented Programming, OOP Paradigm, Advantages and disadvantages of OOP over its predecessor paradigms.

Characteristics of Object Oriented Programming: Abstraction, Encapsulation, Data hiding, Inheritance, Polymorphism, Code Extensibility and Reusability, User defined Data Types.

Introduction to C++: Identifier, Keywords, Constants, Operators: Arithmetic, relational, logical, conditional and assignment. Size of operator, Operator precedence and associativity.

Type conversion, Variable declaration, expressions, statements, manipulators Input and output statements, stream I/O, Conditional and Iterative statements, breaking control statements.

SECTION B

Storage Classes: Automatic, Static, Extern, Register. Arrays, Arrays as Character Strings, Structures, Unions, Bit fields, Enumerations and User defined types.

Pointers: Pointer Operations, Pointer Arithmetic, Pointers and Arrays, Pointer to functions. Functions: Prototyping, Definition and Call, Scope Rules. Parameter Passing: by value, by address and by reference, Functions returning references, Const functions, recursion, Default Arguments, Const arguments.

SECTION C

Pre-processor: #define, #error, #include, #if, #else, #endif, #ifdef, #ifndef, #undef
Type casting: static-cast, const-cast, dynamic-cast, reinterpret-cast.

Classes and Objects: Class Declaration and Class Definition, Defining member functions, making functions inline, Nesting of member functions, Members access control. this pointer. Union as space saving classes.

Objects: Object as function arguments, array of objects, functions returning objects, Const member functions. Static data members and Static member functions.

Friend functions and Friend classes.

SECTION D

Constructors: properties, types of constructors (Default, parameterized and copy), Dynamic constructors, multiple constructors in classes. Destructors: Properties, Virtual destructors. Destroying objects. Rules for constructors and destructors.

Array of objects. Dynamic memory allocation using new and delete operators, Nested and container classes. Scopes: Local, Global, Namespace and Class

Inheritance: Defining derived classes, inheriting private members, single inheritance, types of derivation, function redefining, constructors in derived class.

Polymorphism : Operator overloading and Function overloading.

TEXT BOOKS

1. Herbert Schildt, "The Complete Reference C++", Tata McGraw-Hill, 2001.
2. Deitel and Deitel, "C++ How to Program", Pearson Education, 2001

REFERENCE READINGS

1. Robert Lafore, "Object Oriented Programming in C++", Galgotia Publications, 1994.
2. Bjarne Strastrup, "The C++ Programming Language", Addison- Wesley Publication Co., 2001.
3. E. Balagurusamy, " Object Oriented Programming with C++", Tata McGraw-Hill, 2001

MCM-308-Software Lab-III (C++)

Maximum Marks: 100(50+50)

External: 50,

Teaching hours: 50

Internal: 50

Minimum Pass Marks: 35%

Programs to be developed based upon various constructs in the C++

SYLLABUS

B.Sc. (Mathematics, Computer Applications, Management) Part-II

Semester-IV

Code	Course Title	Marks
MCM-401:	Environmental Studies (Qualifying paper)	100
MCM-402	Analysis	100
MCM-403	Algebra-II	100
MCM-404	Business Research Methodology	100
MCM-405	Business Environment	100
MCM-406	Software Engineering	100
MCM-407	Computer Graphics	100
MCM-408	Software Lab-IV (Comp. Graphics implementation using C++)	100

MCM-401 – Environmental Studies (Qualifying paper)

Maximum Marks: 100

Teaching hours: 50

Written Paper: 75 Marks

Instructions for paper-setters

Time allowed: 3 Hrs.

Minimum Pass Marks: 35

Field Work: 25 Marks

The Written Paper will have two parts. First part will be of 25 marks it will contain 10 questions, the students will attempt 5 questions of marks out of this part. The answer to these questions should not-exceed 50 words each. Part second will be of 50 marks and will contain 10 essay type questions. The candidates will attempt 5 questions out of this part and the answer to each question should not exceed 500 words. Each question will carry ten marks

UNIT 1: The multidisciplinary nature of environmental studies: Definition, scope and importance, Need for public awareness.

UNIT 2: Natural resources:

Renewable and non renewable resources:

Natural resources and associated problems.

- (a) Forest resources: Use of over exploitation, deforestation, case studies, Timber extraction, mining, dams and their effects on forests and tribal people.
- (b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
- (c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- (d) Food resources: World food problems, change caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- (e) Energy resources: Growing energy needs, renewable and non-renewable energy, use of alternate energy sources. Case studies.
- (f) Land resources: Land as a resources, land degradation, man induced landslides, soil erosion and desertification.
- (g) Role of an individual in conservation of natural resources, Equitable use of resources for sustainable lifestyles.

UNIT 3: Ecosystem

- Concept of an ecosystem,
- Structure and function of an ecosystem,
- Producers, consumers and decomposers,
- Energy flow in the ecosystem,
- Ecological succession,
- Food chains, food webs and ecological pyramids.

- Introduction, types, characteristic features, structure and function of the following ecosystem:
 - a. Forest ecosystem
 - b. Grassland ecosystem
 - c. Desert ecosystem
 - d. Aquatic ecosystems (ponds, streams lakes, rivers, oceans, estuaries).

UNIT 4: Biodiversity and its conservation

- Introduction--definition, species and ecosystem diversity,
- Biogeographical classification of India.
- Value of biodiversity: Consumptive use, productive use, social, ethical, aesthetic and option values.
- Biodiversity of global, National and local levels, India as mega-diversity nation.
- Hot-spots of biodiversity.
- Threats to biodiversity: Habitat loss, poaching of wildlife, man wildlife conflicts. Endangered and endemic species of India.
- Conservation of biodiversity: *In situ* and *Ex-situ* conservation of biodiversity.

UNIT 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 Pollution
- Soil Waste Management: Causes effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Pollution case studies.
- Disaster Management: Floods, Earthquake, Cyclone and Landslides.

UNIT 6: Social Issues and Environment

- From unsustainable to sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people: its problem and concerns. Case studies
- Environmental ethics: Issues and possible solutions.

- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation
- Consumerism and waste products
- Environmental Protection Act
- Air (Prevention and Control of Pollution) Act
- Water (Prevention and Control of Pollution) Act
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation
- Public awareness

UNIT 7: Human population and the environment

- Population growth, variation among nations
- Population explosion-Family welfare programme
- Environment and human health
- Human rights
- Value education
- HIV/AIDS
- Women and child welfare
- Role of information technology in environmental and human health
- Case studies

UNIT 8: Field Work

- Visit to a local area to document environmental areas, River /forest/grassland/hill/mountain.
- Visit to a local polluted site- Urban/rural/industrial/agriculture.
- Study of common plants, insects, birds.
- Study of simple ecosystems-pond, river, hill slopes, *etc.*(Field work Equal to 5 Lecture hours)

MCM-402 – Analysis

Maximum Marks: 100(50+50)

External: 50

Teaching hours: 55

Instructions for paper-setters

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% marks each. Section E will have 10-20 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

Instructions for candidates

Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.

Time allowed: 3 Hrs.

Internal: 50

Minimum Pass Marks: 35%

SECTION-A

Definition and existence of Riemann integrals. Properties of integrals. Integrability of continuous and monotonic functions. The fundamental theorem of integral calculus. Mean value theorem of integral calculus.

SECTION-B

Improper integrals and their convergence, Comparison tests, Absolute and conditional convergence, Abel's and Dirichlet's tests. Frullani integral. Integral as a function of a parameter. Continuity, Derivability and Integrability of an integral of a function of a parameter. Beta and Gamma functions.

SECTION-C

Double and triple integrals. Double integration over rectangular and non rectangular regions. Dirichlet integrals. Change of order on integration in double integrals. Cylindrical and spherical co-ordinates. Jacobians.

SECTION-D

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.

REFERENCES

1. R.R. Goldberg, Real Analysis, Oxford & IBH Publishing Co., New Delhi, 1970.
2. T.M. Apostol, *Mathematical Analysis*, Norosa Publishing House, New Delhi, 1985.
3. Shanti Narayan, *Course of Mathematical Analysis*, S. Chand & Co., New Delhi, 1979.

MCM-403 – Algebra-II

Maximum Marks: 100(50+50)

External: 50

Teaching hours: 55

Instructions for paper-setters

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% marks each. Section E will have 10-20 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

Instructions for candidates

Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.

Section A

Rings, Elementary Properties of Rings, Types of Rings, The Ring of Matrices, Polynomial Rings, Ring of Endomorphisms of an Abelian Group. Boolean Ring. Subring and Characteristic of a Ring. Field, The ring of Gaussian Integers, Ideals, Ideals in the matrix Ring. Finitely Generated and Principal Ideals, Principal Ideal Ring.

Section B

The Quotient Ring of Ring by an Ideal, Homomorphisms, Natural Homomorphism, the Fundamental Theorem of Homomorphisms, the Correspondence Theorem, The Opposite Ring and the Opposite of a Matrix Ring. Sum and Direct Sum of Ideals.

Section C

Unique Factorization Domains, Examples, Greatest Common Divisors, Principal Ideal Domains, Euclidean Domains, Examples, Euclidean Domain as a UFD. Primitive Elements, Gauss Lemma and the Polynomial Rings over a UFD.

Section D

Modules, Examples. Submodules, Finitely Generated Modules, Cyclic Module, Direct Sum of Modules, R-homomorphisms and quotient modules. The fundamental Theorem of R-homomorphisms. The Ring $\text{Hom}_R(M, M)$.

TEXT BOOK:

Basic Abstract Algebra, Bhattacharya, Jain and Nagpaul. Chapter 9.

Chapter 10; (Sections 1-3 only). Chapter 11, Chapter 14 (Sections 1 - 3 only).

MCM-404 – Business Research Methodology

Maximum Marks: 100(50+50)

Time allowed: 3 Hrs.

External: 50

Internal: 50

Teaching hours: 55

Minimum Pass Marks: 35%

Instructions for paper-setters

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% marks each. Section E will have 10-20 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

Instructions for candidates

Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.

Section A

INTRODUCTION: Nature and Scope of Research Methodology, Formulation of Research Problem, Definition of Research, Qualities of Researcher, Components of Research Problem, Various Steps in Scientific Research, Types of Research, Statement of Research Objectives, Research Hypothesis. Research Process, Research Design: Exploratory, Descriptive and Experimental Research Design, Sampling Design

Section B

DATA COLLECTION: Methods of Data Collection: Observation Design, Interviewing for Research and Formulation of Questionnaires, Procedure Questionnaire, Sources of Data: Primary Data, Secondary Data; Scaling Techniques and Techniques of Data.

Section C

STATISTICAL ANALYSIS: Awareness of Software Packages Relevant to Management Researches, Interpretation of Data and Drawing Inferences, Research Publication. Application of Statistical Tools and Techniques: T-test, Chi-square Test, Correlation & Regression Analysis.

Section D

RESEARCH REPORTS: Structure and Components of Research Report, Types of Report, Mechanics of report writing, Good Research Report, Pictures and Graphs

REFERENCE BOOKS:

1. Management Research: Bennet, Roger
2. Statistical Method : Gupta, S. P.
3. Research Methodology : Kothari, C. R.
4. Survey Methods : Fowler, Floyed, J. Jr

MCM-405 – Business Environment

Maximum Marks: 100(50+50)

Time allowed: 3 Hrs.

External: 50

Internal: 50

Teaching hours: 55

Minimum Pass Marks: 35%

Instructions for paper-setters

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% marks each. Section E will have 10-20 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

Instructions for candidates

Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.

Section-A

Business Environment and Society Concept, Nature and Significance of Business Environment, Social responsibility of Business, Business Ethics, Business and Culture, Technological Development and Social Changes.

Section-B

Business and Economy: Economic System, Capitalism, Socialism, Mixed Economy, Features of Indian Economy, Public Sector, Private Sector, Small Scale industries: Concept, Significance, Issues and Priorities. Role of Public Sector in Indian Economy and its Problems.

Section-C

Business and Government: Role of Government in Economic Planning in India, New Industrial Policy, New Economic Policy, Privatization, Liberalization and Globalization and their Implications on Indian Economy.

Section-D

Business and Law: Provisions under Companies Act, 1956 relating to setting up of a company, Provisions under the MRTP Act relating to Restrictive trade Practices and Unfair trade Practices, Salient Features of the Consumer Protection Act relating to Consumer protection in India. International Business Environment- An overview, International Economic. Groupings: GATT, WTO, UNCTAD, World Bank, IMF, European Union.

TEXT BOOKS:

1. Maheshwari, S.N. and Maheshwari, S.K. (2005). A Manual of Business Law. Himalaya Publishing House, New Delhi (Latest Edition).
2. Bedi, Suresh. Business Environment (2004). Excel Books, New Delhi.
3. Tulsian, P.C. Business Law (2004). Tata McGraw – Hill, New Delhi.

REFERENCE BOOKS:

- Tuteja, S.K. (1998). Law for Managers. Sultan Chand and Sons, New Delhi.

MCM-406 – Software Engineering

Maximum Marks: 100(50+50)

Time allowed: 3 Hrs.

External: 50

Internal: 50

Teaching hours: 55

Minimum Pass Marks: 35%

Instructions for paper-setters

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% marks each. Section E will have 10-20 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

Instructions for candidates

Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.

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.

SECTION B

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 C

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.

SECTION D

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.
Software maintenance : The Nature of maintenance, maintenance problems, maintenance techniques and tools.

TEXT BOOK

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

MCM-407 – Computer Graphics

Maximum Marks: 100(50+50)

Time allowed: 3 Hrs.

External: 50

Internal: 50

Teaching hours: 55

Minimum Pass Marks: 35%

Instructions for paper-setters

The question paper will consist of five sections A, B, C, D and E. Sections A, B, C and D will have two questions from the respective sections of the syllabus and will carry 15% marks each. Section E will have 10-20 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

Instructions for candidates

Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.

SECTION A

Graphics Hardware: The Functional characteristics of the systems are emphasized.

Input Devices: Keyboard, Touch Panel, Light Pens, Graphic Tablets, Joysticks, Trackball, Data Glove, Digitizer, Image Scanner, Mouse, Voice Systems.

Hard Copy Devices: Impact and non impact printers, such as line printer, dot matrix, laser, ink-jet, electrostatic, flatbed and drum plotters.

Video Display Devices: Refresh cathode-ray tube, raster scan displays random scan display, colour CRT-monitors, Direct view storage tube, flat-panel displays, 3-D viewing devices, virtual reality, raster scan systems, random scan systems, graphics monitors and workstations.

SECTION B

Scan conversion algorithms for line, circle and ellipse, Bresenham's algorithms, area filling techniques, character generation.

2-dimensional Graphics : Cartesian and Homogeneous co-ordinate system, Geometric transformations (translation, Scaling, Rotation, Reflection, Shearing), Composite transformations, affine transformation, Two dimensional viewing transformation and clipping (line, polygon and text).

SECTION C

3-dimensional Graphics: Geometric transformations (translation, Scaling, Rotation, Reflection, Shearing), Composite transformations, Mathematics of Projections (parallel & perspective). 3-D viewing transformations and clipping.

SECTION D

Hidden line and surface elimination algorithms, z-buffer, scan-line, subdivision, Painter's algorithm. Illumination Models: Diffuse reflection, Specular reflection, refracted light, texture surface patterns, Halftoning, Dithering.

TEXT BOOKS

1. D. Hearn and M.P. Baker, "Computer Graphics", PHI New Delhi; Second Edition, 1995.
2. J.D. Foley, A.V. Dam, S.K. Feiner, J.F. Hughes, R.L. Philips, "Introduction to Computer Graphics", Addison-Wesley Publishing Company, N.Y. : Second Edition, 1994.
3. R.A. Plastock and G. Kalley, "Computer Graphics", McGraw Hill, 1986.

MCM-408 – Software Lab -IV

Maximum Marks: 100(50+50)

External: 50,

Teaching hours: 50

Internal: 50

Minimum Pass Marks: 35%

Programs will be developed for Computer Graphics implementation using C++.