1st Semester		Contact Hrs.			Marks			Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
BMAT1-101	Calculus-I	4	1	0	40	60	100	5
BMAT1-102	Algebra-I	4	1	0	40	60	100	5
BMAT1-103	Analysis-I	4	1	0	40	60	100	5
BHUM1-101	English	4	0	0	40	60	100	4
BCAP1-101	Fortran Programming	4	0	0	40	60	100	4
BCAP1-102	Fortran Programming Lab.	0	0	2	60	40	100	1
Total		**20**	**3**	**2**	**260**	**340**	**600**	**24**

2nd Semester		Contact Hrs.			Marks			Credits
Subject	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
BMAT1-204	Calculus-II	4	1	0	40	60	100	5
BMAT1-205	Algebra-II	4	1	0	40	60	100	5
BMAT1-206	Analysis-II	4	1	0	40	60	100	5
BHUM1-202	Environmental Science	4	0	0	40	60	100	4
BCAP1-203	Fundamentals of Computers and C^+ Programming	4	0	0	40	60	100	4
BCAP1-204	C^+ Programming Lab.	0	0	2	60	40	100	1
Total		**20**	**3**	**2**	**260**	**340**	**600**	**24**

3rd Semester		Contact Hrs.			Marks			Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
BMAT1-307	Differential Equations-I	4	1	0	40	60	100	5
BMAT1-308	Mathematical Statistics	4	1	0	40	60	100	5
BMAT1-309	Geometry	4	1	0	40	60	100	5
BMAT1-310	Number Theory	4	1	0	40	60	100	5
BCAP1-305	Object Oriented Programming	3	0	0	40	60	100	3
BCAP1-306	Object Oriented Programming Lab.	0	0	2	60	40	100	1
Total		**19**	**4**	**2**	**260**	**340**	**600**	**24**

4th Semester		Contact Hrs.			Marks			Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
BMAT1-410	Differential Equations-II	4	1	0	40	60	100	5
BMAT1-411	Linear Algebra	4	1	0	40	60	100	5
BMAT1-412	Mechanics-I	4	1	0	40	60	100	5
BMAT1-413	Numerical Methods	4	1	0	40	60	100	5
BCAP1-407	Latex and R	3	0	0	40	60	100	3
BCAP1-408	Latex and R Lab.	0	0	2	60	40	100	1
Total		**19**	**4**	**2**	**260**	**340**	**600**	**24**

5th Semester		Contact Hrs.			Marks			Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
BMAT1-514	Mechanics-II	4	1	0	40	60	100	5
BMAT1-515	Mathematical Methods	4	1	0	40	60	100	5
BMAT1-516	Differential Geometry	4	1	0	40	60	100	5
BMAT1-517	Finite Element Methods	4	1	0	40	60	100	5
BCAP1-509	MATLAB	3	0	2	40	60	100	3
BCAP1-510	MATLAB Lab.	0	0	2	60	40	100	1
Total		**19**	**4**	**2**	**260**	**340**	**600**	**24**

6th Semester		Contact Hrs.			Marks			Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
BMAT1-618	LPP	4	1	0	40	60	100	5
BMAT1-619	Ring Theory	4	1	0	40	60	100	5
BMAT1-620	Mathematical Modelling	4	1	0	40	60	100	5
BMAT1-621	Discrete Mathematics	4	1	0	40	60	100	5
BMAT1-622	Financial Mathematics	4	1	0	40	60	100	5
Total		**20**	**5**	**0**	**200**	**300**	**500**	**25**

Overall

Semester	Marks	Credits
1st	600	24
2nd	600	24
3rd	600	24
4th	600	24
5th	600	24
6th	500	25
Total	**3500**	**145**

CALCULUS-I

Subject Code: BMAT1-101 **L T P C** **Duration: 55 Hrs.**
4 1 0 5

UNIT-I (14 Hrs.)

Basic concept of limit and continuity, Properties of limit and classification of discontinuities, Properties of continuous functions, Differentiability and differentials, Successive differentiation and Leibnitz theorem, Derivatives of higher order, nth derivative of well-known functions.

UNIT-II (14 Hrs.)

Concavity, Convexity, Points of inflexion, Increasing and decreasing function, Asymptotes, Polar curves, Multiple points, Tracing of Cartesian curves, Idea of some well-known parametric and polar curves, Curvature of a curve at a point, Radius of curvature for Cartesian, Parametric, Polar forms, Centre of curvature.

UNIT-III (15 Hrs.)

Partial differentiation –Function of two variables, Partial derivatives of higher order, Homogeneous functions, Euler's theorem and its extension (with proof), Composite functions, Total derivative, Differentiation of implicit functions and composite functions, Jacobians and its properties.

UNIT-IV (12 Hrs.)

Tangent plane and normal to a surface, Maxima and Minima of functions of two variables, working rule to find the extreme values of a function z= f (x, y), Lagrange's method of undetermined multipliers, Gradient, Curl and Divergence, Geometrical interpretation and basic properties, Directional Derivative.

Recommended Textbooks/References:

1. G.B. Thomas, M.D. Weir, J. Hass Thomas, 'Calculus', 12th Edn., Pearson Education.
2. Gorakh Prasad, 'Integral Calculus', 14th Edn., Pothishala Private Ltd., Allahabad, Reprint **2007**.
3. Zafar Ahsan, 'Differential Equations and their Applications', 2nd Edn., Prentice Hall of India Pvt. Ltd., New Delhi.
4. B.S. Grewal, 'Higher Engineering Mathematics', 35th Edn., Khanna Publishers, **2000**.
5. Erwin Kreyszig, 'Advanced Engineering Mathematics', 9th Edn., John Wiley & Sons, **2006**.

ALGEBRA-I

Subject Code: BMAT1-102 **L T P C** **Duration: 55 Hrs.**
4 1 0 5

UNIT-I (14 Hrs.)

Matrices, Row and Column Space of Matrix, Row reduction and echelon forms, Rank, Systems of linear equations, Gaussian elimination, Determinants and their properties, Cramer's rule, Vector equations, The matrix equation AX = B, Solution sets of linear systems (Homogeneous & Non-homogeneous), Applications of linear systems.

UNIT-II (14 Hrs.)

Eigenvalues, Eigenvectors, Characteristic polynomial, Minimal polynomial, Characteristic equation of a matrix, Cayley-Hamilton theorem and its use in finding the inverse of a matrix, Diagonalization, Linear transformations, Representation of linear transformations by matrices, Change of basis, Rank-nullity theorem, Minimal polynomial.

UNIT-III (14 Hrs.)

Binary space, Definition of group, Ring and field, Vector space, Subspace, Linear combination, Linear span, Dimension of vector space, Direct sum of spaces, Quotient space, Homomorphism & Isomorphism of vector space.

UNIT-IV (13 Hrs.)

Linear Transformation, Null space, Range space, Product of linear transformation, Singular and non-singular transformation, Canonical forms, Jordan forms, Triangular forms, Rank-nullity theorem, Eigen value & Eigen vectors of linear transformation.

Recommended Books:

1. Chandrika Prasad, 'Text Book on Algebra and Theory of Equations', Pothishala Pvt. Ltd.
2. I.N. Herstein, 'Topics in Algebra', 2nd Edn., Vikas Publishing House, **1976**.
3. 'Linear Algebra', Schaum Outline Series.
4. H.S. Hall and S.R. Knight, 'Higher Algebra', H.M. Publications, **1994**.
5. Shanti Narayan, 'A Text Books of Matrices'.

ANALYSIS-I

Subject Code: BMAT1-103 **L T P C** **Duration: 55 Hrs.**
4 1 0 5

UNIT-I (14 Hrs.)

Real Numbers and Sequences of Real Numbers

Preliminaries: Sets and Functions, Mathematical induction, Finite and infinite sets.

Algebraic and order properties of R, Absolute value and the real line, Completeness property of R, Applications of supremum property, Archimedean property, Density of rational numbers in R, Intervals- Characterization theorem, Nested intervals, Nested interval property, The unaccountability of R, Binary and decimal representation of real numbers.

A sequence in R, The limit of a sequence, Convergence of a sequence, Uniqueness of limits, Limit theorems, Monotone sequence, Euler's number, Subsequence, Divergent criteria, Monotone subsequence theorem, Bolzano-Weierstrass theorem, Cauchy sequence, Cauchy convergence criterion, Properties of divergent sequences.

UNIT-II (14 Hrs.)

Infinite Series

Infinite series- partial sums, Convergence of infinite series, the nth term test, Cauchy criterion for series, Examples including the geometric series, The harmonic series, P- series, The alternating harmonic series, Comparison test and limit comparison test.

Absolute convergence, Grouping and rearrangements of series, Tests for absolute convergence- The root test, the ratio test, the integral test, The Rabbe's test, alternating series, Alternating series test, Dirichlet test, Abel's test.

UNIT-III (14 Hrs.)

Limits and Continuous Functions

Cluster point of a subset of R, Limit of a function at a cluster point of a set, Sequential criterion for the limits, Divergence criterion, Limit theorems, squeeze theorem, left handed and right handed limits, Infinite limits.

Continuous functions, Sequential criterion of continuity, Discontinuity criterion, Combinations of continuous functions- sum, Difference, Product and quotient and compositions.

Continuous functions on intervals, Boundedness theorem, Maximum-Minimum theorem, Bolzano's Intermediate value theorem, Preservation of intervals theorem,

Uniform continuity, Non-uniform continuity criteria, Uniform continuity theorem, Lipschitz functions, Continuous Extension theorem, Approximations of continuous functions by step functions and by piecewise linear functions, Weierstrass Approximation theorem. Monotone and inverse functions, The nth root function and rational powers.

UNIT-IV (13 Hrs.)

Differentiation

Differentiability and Derivatives of real functions, Differentiability and Continuity, Basic properties of the derivatives, Caratheodory theorem, Chain rule, Inverse functions and their derivatives, Rolle's theorem, Mean Value theorem, Applications of mean value theorem, Intermediate value property of derivatives, Darboux's theorem, L'hospital rules, Taylor's theorem, Applications of Taylor's theorem, Convex functions, Newton's method, Differentiation of vector valued functions.

Recommended Books:

1. Robert G. Bartle and Donald R. Sherbert, 'Introduction to Real Analysis', 3rd Edn., John Wiley & Sons, Inc., **2000**.
2. Walter Rudin, 'Principles of Mathematical Analysis', 3rd Edn., McGraw Hill, **1976**.
3. S.C. Malik and Savita Arora, 'Mathematical Analysis', New Age International Publisher, **Reprint 2008**.
4. T.M. Apostol, 'Mathematical Analysis', 2nd Edn., Narosa Publishing House, **Reprint 2002**.

ENGLISH

Subject Code: BHUM1-101 **L T P C** **Duration: 55 Hrs.**
4 0 0 4

UNIT-I (8 Hrs.)

Communication Skills: Introduction, Definition, The Importance of Communication, The Communication Process – Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context.

Barriers to Communication: Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers.

Perspectives in Communication: Introduction, Visual Perception, Language, Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment.

UNIT-II (8 Hrs.)

Elements of Communication: Introduction, Face to Face Communication - Tone of Voice, Body Language (Non-verbal communication), Verbal Communication, Physical Communication.

Communication Styles: Introduction, The Communication Styles Matrix with example for each - Direct Communication Style, Spirited Communication Style, Systematic Communication Style, Considerate Communication Style.

UNIT-III (8 Hrs.)

Basic Listening Skills: Introduction, Self-Awareness, Active Listening, becoming an Active Listener, Listening in Difficult Situations.

Effective Written Communication: Introduction, When and When Not to Use Written Communication - Complexity of the Topic, Amount of Discussion' Required, Shades of Meaning, Formal Communication.

Writing Effectively: Subject Lines, Put the Main Point First, Know Your Audience, Organization of the Message.

UNIT-IV (12 Hrs.)

Interview Skills: Purpose of an interview, Do's and Don'ts of an interview

Giving Presentations: Dealing with Fears, planning your Presentation, structuring your Presentation, Delivering your Presentation, Techniques of Delivery

Group Discussion: Introduction, Communication skills in group discussion, Do's and Don'ts of group discussion.

Recommended Books:

1. Stephen. P. Robbins, 'Organizational Behaviour', 1st Edn., Pearson, **2013.**
2. Gopala Swamy Ramesh, 'The Ace of Soft Skills: Attitude, Communication and Etiquette for Success', 5th Edn., Pearson, **2013.**
3. Deborah Dalley, Lois Burton, Margaret, Green Hall, 'Developing Your Influencing Skills', 1st Edn., Universe of Learning Ltd., **2010.**
4. Barun K. Mitra, 'Personality Development and Soft Skills', 1st Edn., Oxford Press, **2011.**
5. Butter Field, 'Soft Skill for Everyone', 1st Edn., Cengage Learning India Pvt. Ltd., **2011.**
6. Francis Peters S.J., 'Soft Skills and Professional Communication', 1st Edn., McGraw Hill Education, **2011.**
7. John Adair, 'Effective Communication', 4th Edn., Pan MacMillan, **2009.**

8. Aubrey Daniels, 'Bringing out the Best in People', 2nd Edn., McGraw Hill, **1999.**

FORTRAN PROGRAMMING

Subject Code: BCAP1-101 **L T P C** **Duration: 45 Hrs.**
4 0 0 4

UNIT-I (10 Hrs.)

Introduction to Computing, Introduction to Digital Computers, Operating Systems, Linux, Windows and other Operating Systems, Open Source Foundation and GNU, Programming and Problem Solving.

UNIT- II (13 Hrs.)

Basic FORTRAN, Introduction to FORTRAN, Data Types, Constants, and Variables, Operation and Intrinsic Functions, Expressions and Assignment Statements, Simple Input/Output, Program Structure, Example: Simple Unit Conversion.

UNIT- III (12 Hrs.)

Control Constructs, Logical Operators and Logical Expression, If Constructs, The Case Construct, Do Loops, Programming Units, Types of Programming Units, Main Program, External Procedures, Internal Procedures, Modules, Subroutines, Functions, Arguments of Procedures, Scope of Variables, Recursion, Arrays and Array Operations, Arrays in Fortran, Array Processing, Array Constructors, Mask Array.

UNIT- IV (10 Hrs.)

Fortran I/O and External Files, Formatted Output, Formatted Input, File Processing User Defined Types and Structures, Derived Types, Type Bound Procedures, Polymorphism Graphics (Gnu plot), The Gnu plot Scientific Graphic Library, Linking Fortran Programs to Gnu Plot Graphic Library.

Recommended Books:

1. Jane Sleightholme, Ian Chivers, 'Introduction to Programming with FORTRAN', Springer, **2003**.
2. V. Rajaraman, 'Computer Programming in FORTRAN 77', PHI Learning Pvt. Ltd., **1997**.

FORTRAN PROGRAMMING LAB.

Subject Code: BCAP1-102 **L T P C**
0 0 2 1

Operational Knowledge and Implementation of numerical methods & statistical Techniques using FORTRAN Programming Language.

1. **Input-output statements:** formatted and non-formatted statements
2. **Decision Making:** switch, if-else, nested if, else-if ladder
3. **Jumping Statements:** break, continue, goto
4. **Loops:** while, do-while, for
5. **Functions:** definition, declaration, variable scope, parameterized functions, return statement.
6. Call by value, call by reference, recursive functions.
7. **Arrays:** Array declarations, Single and multi-dimensional.
8. Strings and string functions.

CALCULUS-II

Subject Code: BMAT1-204 **L T P C** **Duration: 55 Hrs.**
4 1 0 5

UNIT-I (11 Hrs.)

Arc formula for the Cartesian equation y=f(x), other expressions for lengths of Arcs, Areas under Curves, Area formulas for parametric, polar equation, Area of the closed curve, Volume and surfaces of Revolution of curves, Area of the surface of the Frustum of a cone, Area of the surface

obtained by Revolving the curve about axes.

UNIT-II (11 Hrs.)

Integration by Partial fractions, integration of rational and irrational functions, Properties of definite integral, Reduction formulae for integrals of rational, trigonometric, exponential and logarithmic function and of their combinations.

UNIT-III (12 Hrs.)

Definite integrals and their properties, Reduction formulae for integral of the form $\int_0^{\frac{\pi}{2}} \sin^n \theta \, d\theta$, $\int_0^{\frac{\pi}{2}} \cos^n \theta \, d\theta$, $\int_0^{\frac{\pi}{2}} \sin^m \theta \cos^n \theta \, d\theta$, Improper Integral and special function- Beta and Gamma functions and their properties.

UNIT-IV (12 Hrs.)

Double integrals (Cartesian), Change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes, Centre of mass and Gravity, Triple integrals (Cartesian), Simple applications involving cubes, sphere and rectangular parallelepipeds; Scalar line integrals, vector line integrals, scalar surface integrals, vector surface integrals, Theorems of Green, Gauss and Stokes.

Recommended Textbooks/References:

1. G.B. Thomas and R.L. Finney, 'Calculus and Analytic Geometry', 9th Edn., Pearson, Reprint, **2002**.
2. T. Veerarajan, 'Engineering Mathematics for First Year', Tata McGraw Hill, New Delhi, **2008**.
3. B.V. Ramana, 'Higher Engineering Mathematics', 11th Reprint, Tata McGraw Hill, New Delhi, **2010**.
4. B.S. Grewal, 'Higher Engineering Mathematics', 35th Edn., Khanna Publishers, **2000**.
5. Erwin Kreyszig, 'Advanced Engineering Mathematics', 9th Edn., John Wiley & Sons, **2006**.

ALGEBRA-II

Subject Code: BMAT1-205 **L T P C** **Duration: 55 Hrs.**
4 1 0 5

UNIT-I (12 Hrs.)

Definition of a group, with examples and simple properties, Abelian Group, Groups of transformations. Subgroups, Generation of groups and cyclic groups, Order of Group, Coset decomposition, Lagrange's theorem and its consequences, Fermat's and Euler's theorems.

UNIT-II (12 Hrs.)

Normal Subgroup, Quotient Groups, Homomorphism, Isomorphism, Automorphism, Permutation of Group, Even and Odd Permutation, Cayley Theorem, Sylow's Theorem

UNIT-III (12 Hrs.)

Definition and examples of a ring and its properties, Subrings, Integral domains, Characteristics of ring, Division rings and Fields, Ring homomorphism and isomorphism, Ideals and Quotient rings.

UNIT-IV (12 Hrs.)

Inner product, length, orthogonality, orthogonal projections, Cauchy-Schwartz inequality, Gram-Schmidt orthogonalisation process, inner product spaces.

Recommended Books:

1. David S. Dummit and Richard M Foote, 'Abstract Algebra,' John Wiley & Sons, **2004.**
2. Surjeet Singh and Qazi Zameeruddin, 'Modern Algebra.' 7th Edn., Vikas Publishing House, New Delhi, **1993.**
3. I.N. Herstein, 'Topics in Algebra', 2nd Edn., Vikas Publishing House, **1976**.
4. John B. Fraleigh, 'A First Course in Abstract Algebra', 7th Edn., Pearson, **2002**.

5. M. Artin, 'Abstract Algebra', 2nd Edn., Pearson, **2011**.
6. Joseph A. Gallian, 'Contemporary Abstract Algebra', 4th Edn., Narosa, **1999**.
7. George E. Andrews, 'Number Theory', Hindustan Publishing Corporation, **1984**.

ANALYSIS-II

Subject Code: BMAT1-206 **L T P C** **Duration: 55 Hrs.**
4 1 0 5

UNIT-I (12 Hrs.)

Riemann Integral:
Definition, Examples and Properties of Riemann Integral, Bounded Theorem, Riemann Integrable Functions, Cauchy Criterion, The Squeeze Theorem, Classes of Riemann Integrable Functions, Additivity Theorem, Fundamental theorem- First and Second Form, Substitution Theorem, Lebesgue integrability Criterion, Composition theorem, Product Theorem, Taylor's Theorem with Remainder, Approximate integration, The Trapezoidal Rule, The Mid Point Rule, Simpson's Rule.

UNIT-II (10 Hrs.)

Sequences of Functions:
Pointwise and Uniform Convergence, Interchange of Limit and Continuity, Interchange of Limit and Derivatives, Interchange of Limit and Integral, Bounded Convergence Theorem, Dini's Theorem. The exponential Functions Logarithmic Functions, The Trigonometric Functions.

UNIT-III (10 Hrs.)

Series of Functions:
Absolutely and uniformly convergent series of functions defined on a domain, Interchange of Integral and Summation, Tests for Uniform Convergence—Cauchy Criterion, Weirstrass M- Test, Power Series, Radius of Convergence, Cauchy Hadamard Theorem, Term by Term differentiation, Taylor's Series.

UNIT-IV (12 Hrs.)

Metric Spaces:
Metric spaces, Examples of Metric Spaces, Neighborhood of a point, Limit point and isolated points of a set, Closed Set, Interior Point of a Set, Open Set, Perfect Set, Bounded Set, Dense Set, Union and Intersection of Open Sets, Closure of a Set, Subspaces of a Metric Space, Compact Sets, k-Cells, Compactness of a k-Cells, Weierstrass Theorem, Perfect Sets in R^k, Connected Sets in R, Images of Compact and Connected Sets under Continuous Functions, Compactness and Uniform Continuity of Functions.

Recommended Books:

1. Robert G. Bartle and Donald R. Sherbert, 'Introduction to Real Analysis', 3rd Edn., John Wiley & Sons, Inc. **2000**.
2. Walter Rudin, 'Principles of Mathematical Analysis', 3rd Edn., McGraw Hill, **1976**.
3. S.C. Malik and Savita Arora, 'Mathematical Analysis', New Age International Publisher, Reprint **2008**.
4. S. Shirali & H.L. Vasudeva, 'Metric Spaces', Springer, **2006**.
5. T.M. Apostol, 'Mathematical Analysis', 2nd Edn., Narosa Publishing House, Reprint **2002**.

ENVIRONMENTAL SCIENCES

Subject Code: BHUM1-202 **L T P C** **Duration: 45 Hrs.**
4 0 0 4

UNIT-I (12 Hrs.)

Natural Resources: Renewable and Non-renewable Resources: Natural resources and associated problems. (a) Forest resources: Use and 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.

UNIT-II (11 Hrs.)

Ecosystems: (a) Concept of an ecosystem. (b) Structure and function of an ecosystem. (c) Producers, consumers and decomposers. (d) Energy flow in the ecosystem. (e) Ecological succession. (f) Food chains, food webs and ecological pyramids.

Biodiversity and its Conservation: (a) Introduction – Definition: genetic, species and ecosystem diversity. (b) Biogeographically classification of India. (c) Value of biodiversity: consumptive use, productive use, social, ethical aesthetic.

UNIT-III (12 Hrs.)

Environmental Pollution: Definition (a) Causes, effects and control measures of: i) Air pollution ii) Water pollution iii) Soil pollution iv) Marine pollution v) Noise pollution vi) Thermal pollution vii) Nuclear pollution (b) Solid Waste Management: Causes, effects and control measures of urban and industrial wastes.

UNIT-IV (12 Hrs.)

Social Issues and the Environment: (a) From unsustainable to sustainable development (b) Urban problems and related to energy (c) Water conservation, rain water harvesting, Watershed Management (d) Resettlement and rehabilitation of people; its problems and concerns. Case studies. (e) Environmental ethics: Issues and possible solutions (f) Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.

Recommended Books:

1. J.G. Henry and G.W. Heinke, 'Environmental Sc. & Engineering', Pearson Education, **2004**.
2. G.B. Masters, 'Introduction to Environmental Engg. & Science', Pearson Education, **2004**.
3. ErachBharucha, 'Textbook for Environmental Studies', UGC, New Delhi.

FUNDAMENTALS OF COMPUTER AND C+ PROGRAMMING

Subject Code: BCAP1-203 **L T P C** **Duration: 45 Hrs.**
4 0 0 4

UNIT-I (10 Hrs.)

Computer Fundamentals: Block diagram of a computer, Characteristics of computers, Hardware-input devices, Output devices, Memories, Software, System software, Application software, Compiler, Interpreter, utility program, Introduction to operating Systems-Windows based/MACOS/LINUX, Significance and advantages of operating systems.

UNIT-II (12 Hrs.)

C+ Programming: Introduction to C language, Evolution and characteristics of C language, Character set, Keywords, Identifiers, Data types, Variables, Constants, Operators, Expressions, Type conversion and type casting, Overview of pre-processors, Structure of a C program, Input and output statements. Control Statements: Basic programming constructs, 'if', 'if-else', 'nested-if' statements, Conditional operator, 'for', 'while', 'do - while', Switch, Break, Continue.

UNIT-III (11 Hrs.)

Arrays and strings Need for an array, Declaration and initialization, Basic operation on arrays, Multidimensional array, Structures, Union, Introduction to strings, String handling. Pointers Introduction, Declaration and initialization, Pointers and arrays: Similarities and advantages/disadvantages of using pointers.

UNIT-IV (12 Hrs.)

Functions and Storage Classes Need for functions, Prototype, Function definition, Function call, return type and return statement, Passing arguments, Functions and arrays, Functions and pointers, Recursive functions, Difference between recursion and iteration storage classes. Files Introduction, File Operations, Character I/O, String I/O, Numeric I/O, Formatted I/O, Block I/O.

Recommended Books:

1. Shubhnandan Jamwal, 'Programming in C', 3rd Edn., Pearson.

2. E. Balagurusamy, 'Programming in ANSI C', 3rd Edn., Tata McGraw Hill.
3. V. Rajaraman, 'Fundamentals of Computers', 3rd Edn., PHI.
4. P.K. Sinha, 'Computer Fundamentals', 5th Edn., BPB Publication.
5. Brian Kernighan and Dennis Ritchie, 'C Programming Language, 2nd Edn., PHI.
6. Byron Gottfried, 'Programming with C', 2nd Edn., Tata McGraw Hill.
7. Yashvant P. Kanetkar, 'Let us C', 4th Edn., BPB Publications, New Delhi.
8. R.S. Salaria, 'Application Programming in C', 2nd Edn., Khanna Book Publishing.

C+ PROGRAMMING LAB.

Subject Code: BCAP1-204 **L T P C**
0 0 2 1

List of following programs are as follows:
1. **Operators:** Arithmetic, Logical, Conditional, Assignment, Increment/Decrement operators
2. **Decision Making:** switch, if-else, nested if, else-if ladder, break, continue, go to
3. **Loops:** while, do-while, for
4. **Functions:** Definition, Declaration, call by value, Call by reference, Recursive Function
5. **Arrays:** Arrays declarations, Single and multi-dimensional, Strings and string functions
6. **Pointers:** Pointer declarations, Pointer to function, Pointer to array.

Recommended Books:

1. Shubhnandan Jamwal, 'Programming in C', 3rd Edn., Pearson.
2. E. Balagurusamy, 'Programming in ANSI C', 3rd Edn., Tata McGraw Hill.
3. V. Rajaraman, 'Fundamentals of Computers', 3rd Edn., PHI.
4. P.K. Sinha, 'Computer Fundamentals', 5th Edn., BPB Publication.
5. Brian Kernighan and Dennis Ritchie, 'C Programming Language, 2nd Edn., PHI.
6. Byron Gottfried, 'Programming with C', 2nd Edn., Tata McGraw Hill.
7. Yashvant P. Kanetkar, 'Let us C', 4th Edn., BPB Publications, New Delhi.
8. R.S. Salaria, 'Application Programming in C', 2nd Edn., Khanna Book Publishing.