



# UNIVERSITY OF MADRAS

**Chepauk, Chennai 600 005**

**[Est. 1857, State University, NAAC 'A' Grade, CGPA 3.32,  
NIRF 2019 Rank: 20]**

**Website: [www.unom.ac.in](http://www.unom.ac.in), Tel. 044-2539 9561**

## **Undergraduate Programme in Mathematics** *(With effect from the Academic Year 2020-21)*

**FEBRUARY 2020**

**Note: The Board of Studies is designed Learning Outcomes Based Curriculum Framework of B.Sc. Mathematics Programme prescribed by UGC**

# Content

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## **1. PREAMBLE**

The curriculum of B.Sc. Mathematics is structured in a way that the students acquire in-depth knowledge to perceive the principles of the core. Basics in Algebra, Calculus, Analytical Geometry, Differential Equations and Transform Techniques are covered exclusively to prepare the students to proceed to the next level of Higher Mathematics of Linear Algebra, Real and Complex Analysis, Mechanics. A list of varied electives namely, Operations Research, Graph Theory, Number Theory, Programming Language 'C', Mathematical Modelling, Programming with Python are furnished to bridge between the Main and Applied Mathematics. The comprehensive curriculum design yields an excellent career opportunity in Research, Education, Public and Private Sectors, Business sectors, Banking, IT Industries and in every domain of contemporaries.

## **2. PROGRAM LEARNING OUTCOMES**

The comprehensive course outline enables the students to enhance Computational skills and Mathematical reasoning. The program develops the ability to think critically, logically and analytically thereby preparing the students to enhanced career opportunities in Industries, Commerce, Education and Research.

### **a. NATURE AND EXTENT OF BACHELOR'S DEGREE PROGRAMME**

Mathematics is the culmination of in-depth of knowledge of Algebra, Calculus, Differential equations and several other branches of Mathematics. This also leads to selected areas like Computer science and Statistics. Mathematics is a diverse discipline that deals with data, measurement and observations from science, with inference, deduction and proof and with mathematical models of natural phenomena of human behaviour and of social systems.

### **b. AIMS OF BACHELOR'S DEGREE PROGRAMME IN MATHEMATICS**

The overall aim of B.Sc. Mathematics is to

- develop broad and balanced knowledge and understanding of definitions, concepts, principles and theorems.
- enhance the ability of learners to apply the knowledge and skills acquired by them during the programme to solve specific theoretical and applied problems in mathematics.
- provide students/learners sufficient knowledge and skills enabling them to undertake further studies in mathematics and its allied areas on multiple disciplines concerned with mathematics.

### **c. GRADUATE ATTRIBUTES IN MATHEMATICS**

The graduate attributes in mathematics are mentioned in the expected course learning outcomes of each course which provides critical thinking, analytical reasoning, problem solving and research related skills etc.,

### 3. COURSE STRUCTURE

#### FIRST SEMESTER

Course Content	Name of the Course	Ins. Hrs	Credits	Int. Marks	Ext.Marks	Total
Part - I	Language Paper -I	4	3	25	75	100
Part - II	English Paper -I	4	3	25	75	100
Part - III	BMA-CSC01: Algebra@	5	4	25	75	100
	BMA-CSC02: Differential Calculus@	4	4	25	75	100
	Allied Paper- I	9	5	25	75	100
Part - IV	Basic Tamil/Adv. Tamil/NME –I*	2	2	25	75	100
	Soft Skills -I	2	3	50	50	100

#### SECOND SEMESTER

Course Content	Name of the Course	Ins. Hrs	Credits	Int. Marks	Ext.Marks	Total
Part - I	Language Paper -II	5	3	25	75	100
Part - II	English Paper -II	5	3	25	75	100
Part - III	BMA-CSC03: Trigonometry@	4	4	25	75	100
	BMA-CSC04: Integral Calculus and Vector Analysis@	5	4	25	75	100
	Allied Paper- II	9	5	25	75	100
Part - IV	Basic Tamil/Adv. Tamil/NME-II*	1	2	25	75	100
	Soft Skills -II	1	3	50	50	100

\*NME: CHOOSE ANY ONE OF THE PAPER FROM THE OTHER DEPARTMENT

#### THIRD SEMESTER

Course Content	Name of the Course	Ins. Hrs	Credits	Int. Marks	Ext. Marks	Total
Part - I	Language Paper -III	5	3	25	75	100
Part - II	English Paper -III	5	3	25	75	100
Part - III	BMA-CSC05: Analytical Geometry@	5	4	25	75	100
	BMA-CSC06: Differential Equations@	4	4	25	75	100
	Allied Paper- III	9	5	25	75	100
Part - IV	Environmental Studies	1	Examination will be held in the IV Sem.			
	Soft Skills -III	1	3	50	50	100

#### FOURTH SEMESTER

Course Content	Name of the Course	Ins. Hrs	Credits	Int. Marks	Ext.Marks	Total
Part - I	Language Paper -IV	5	3	25	75	100
Part - II	English Paper -IV	5	3	25	75	100
Part - III	BMA-CSC07: Transform Techniques@	4	4	25	75	100
	BMA-CSC08: Statics@	5	4	25	75	100
	Allied Paper- IV	9	5	25	75	100
Part - IV	Environmental Studies	1	2	25	75	100
	Soft Skills -IV	1	3	50	50	100

#### FIFTH SEMESTER

Course Content	Name of the Course	Ins. Hrs	Credits	Int. Marks	Ext.Marks	Total
Part - III	BMA-CSC09: Algebraic Structures-I@	6	4	25	75	100
	BMA-CSC10: Real Analysis-I@	6	4	25	75	100
	BMA-CSC11: Dynamics@	6	4	25	75	100
	BMA-CSC12: Discrete Mathematics@	6	4	25	75	100
	Elective Paper -I: Choose any one from Group-A	6	5	25	75	100
Part - IV	Value Education		2	25	75	100

#### SIXTH SEMESTER

Course Content	Name of the Course	Ins. Hrs	Credits	Int. Marks	Ext.Marks	Total
Part - III	BMA-CSC13: Algebraic Structures-II@	6	4	25	75	100
	BMA-CSC14: Real Analysis-II@	6	4	25	75	100
	BMA-CSC15: Complex Analysis@	6	4	25	75	100
	Elective Paper -II: Choose any one from Group-B	6	5	25	75	100
	Elective Paper -III: Choose any one from Group-B	6	5	25	75	100
Part - V	Extension Activity		1			

@ Common to B.Sc. Mathematics with Computer Applications.

## LIST OF ALLIED SUBJECTS:

BPS-CSA01	Allied Physics – I (Theory)
BCY-CSA1A	Allied Chemistry – I (Theory)
BMA-CSA01	Calculus of finite differences and Numerical Analysis –I@
BMA-CSA02	Mathematical Statistics – I@
	Financial Accounting - I
BPS-CSA02	Allied Physics – II (Theory) (pre-requisite Physics – I).
BPS-CSAP1	Allied Physics I & II (Practical)
BCY-CSA2A	Allied Chemistry – II (Theory) (pre-requisite Chemistry – I)
BCY-CSAP1	Allied Chemistry – I & II (Practical)
BMA-CSA03	Calculus of finite differences and Numerical Analysis -II (pre-requisite Calculus of finite differences and Numerical Analysis -I)@
BMA-CSA04	Mathematical Statistics II - (pre requisite Mathematical Statistics- I)@
	Financial Accounting - II (prerequisite Financial Accounting - I)
	Cost Accounting
	Management Accounting.

@ Common to B.Sc. Mathematics with Computer Applications.

## LIST OF ELECTIVE SUBJECTS

### GROUP – A

BMA-DSEA1	PROGRAMMING LANGUAGE ‘C’ WITH PRACTICALS
BMA-DSEA2	PROGRAMMING LANGUAGE PYTHON WITH PRACTICALS
BMA-DSEA3	MATHEMATICAL MODELING
BMA-DSEA4	NUMERICAL METHODS

### GROUP - B

BMA-DSEB1	ELEMENTARY NUMBER THEORY
BMA-DSEB2	GRAPH THEORY
BMA-DSEB3	OPERATIONS RESEARCH
BMA-DSEB4	SPECIAL FUNCTIONS
BMA-DSEB5	APPLIED STATISTICS

The following distribution of marks for Computer related subjects which have both theory and practical (syllabus combined both theory and practical in each paper together) in B.Sc. Mathematics be followed:

PAPER	INTERNAL	EXTERNAL	TOTAL
Theory	25	75	100
Practical	40	60	100

Finally, theory marks (100) be reduced to 60% and practical marks (100) be reduced to 40%.

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**B.Sc. DEGREE COURSE IN MATHEMATICS**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BMA-CSC01**

**CORE-I: ALGEBRA**  
**(Common to B.Sc. Maths with Computer Applications)**

**Inst.Hrs : 5**  
**Credits : 4**

**YEAR: I**  
**SEMESTER: I**

**Learning Outcomes:**  
**Students will acquire**

- Basic ideas on Theory of Equations, Matrices and Theory of Numbers.
- Knowledge to solve theoretical and applied problems.

**UNIT I**

Theory of Equations :Polynomial equations with Imaginary and irrational roots- Relation between roots and coefficients- Symmetric functions of roots in terms of coefficients.  
Chapter 6 : Section 9 to 12.

**UNIT II**

Reciprocal equations - Standard form-Increase or Decrease the roots of the given equation - Removal of terms Approximate solutions of roots of polynomials by Horner's method.  
Chapter 6: section 16, 16.1, 16.2, 17, 30.

**UNIT III**

Summation of Series : Binomial- Exponential -Logarithmic series (Theorems without proof):  
Chapter 3: Section 10, Chapter 4: Section 3, 3.1, 3.5, 3.6, 3.7 (omit 3.4)

**UNIT IV**

Symmetric- Skew Symmetric- Hermitian- Skew Hermitian- Orthogonal Matrices- Eigen values & Eigen Vectors- Similar matrices- Cayley - Hamilton Theorem.  
Chapter 2: Section 6.1 to 6.3, 9.1, 9.2, 16, 16.1, 16.2, 16.3.

**UNIT V**

Prime number and Composite number - Divisors of a given number N- Euler's function (without proof) - Integral part of a real number - congruences.  
Chapter 5: Section 1 to 13.

**Contents and treatment as in**

1. Algebra, Volume I by T. K. ManicavachagamPillay,T.Natarajan, K.S.Ganapathy, Viswanathan Publication 2007 - Unit – 1 and 2.
2. Algebra, Volume II by T. K. ManicavachagomPillay ,T.Natarajan ,K.S.Ganapathy, Viswanathan Publication 2008 - Unit – 3, 4 and 5.

**Reference:-**

1. Algebra by S. Arumugam (New Gama publishing house, Palayamkottai).
2. Algebra and Trigonometry, Volume I and II by P.R.Vittal, V.Malini (Margham Publishers).

**e-Resources:**

1. <http://mathworld.wolfram.com>
2. <http://www.themathpage.com/>

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**SYLLABUS WITH EFFECT FROM 2020-2021**

**BMA-CSC02**

**CORE-II: DIFFERENTIAL CALCULUS**  
**(Common to B.Sc. Maths with Computer Applications)**

**Inst.Hrs : 4**

**Credits : 4**

**YEAR: I**

**SEMESTER: I**

**Learning outcomes:**

**Students will acquire Knowledge about**

- The basics of differentiation and its applications.
- The notion of curvature, evolutes, involutes and polar co-ordinates.

**UNIT I**

Successive differentiation -  $n^{\text{th}}$  derivative- standard results – Trigonometrical transformation – formation of equations using derivatives - Leibnitz's theorem and its applications

Chapter 3 section 1.1 to 1.6, 2.1 and 2.2

**UNIT II**

Total differential of a function – special cases – implicit functions - partial derivatives of a function of two functions - Maxima and Minima of functions of two variables- Lagrange's method of undetermined multipliers.

Chapter 8 : Section 1.3 to 1.5 and 1.7, Section 4, 4.1 and 5.

**UNIT III**

Envelopes – method of finding envelopes – Curvature- circle, radius and centre of curvature- Cartesian formula for radius of curvature – coordinates of the centre of curvature – evolute-and involute - radius of curvature and centre of curvature in polar coordinates – p-r equation

Chapter 10 Section 1.1 to 1.4 and Section 2.1 to 2.7

**UNIT IV**

Polar coordinates - angle between the radius vector and the tangent – slope of the tangent in the polar coordinates – the angle of intersection of two curves in polar coordinates- polar sub tangent and polar sub normal – the length of arc in polar coordinates.

Chapter 9 Section 4.1 to 4.6

**UNIT V**

Definition-Asymptotes parallel to the axes – special cases – another method for finding asymptotes - asymptotes by inspection – intersection of a curve with an asymptote.

Chapter 11 - Section 1 to 7.

**Content and treatment as in**

“Calculus”, Volume - 1 by S. Narayanan and T.K. Manicavachagompillay - S.Viswanathan publishers – 2006



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**Reference:-**

1. Calculus , Dr. P.R. Vittal&Dr. V. Malini, Margham Publications, Chennai.
2. Calculus by Thomas and Fenny, Pearson Publication.
3. Calculus by Stewart
4. Calculus , Dr. P.R. Vittal&Dr. V. Malini, Margham Publications, Chennai.

**e-Resources:**

1. <http://www.themathpage.com/>
2. <http://mathworld.wolfram.com>
3. <http://www.univie.ac.at/future.media/moe/galerie.html>
4. <http://www.analyzemath.com/calculus>

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**BMA-CSC03**

**CORE-III: TRIGONOMETRY**  
**(Common to B.Sc. Maths with Computer Applications)**

**Inst.Hrs : 4**

**Credits : 4**

**YEAR: I**

**SEMESTER: II**

**Learning outcomes:**

**Students will acquire Knowledge**

- About the expansions of Trigonometric Functions, Hyperbolic Functions and sum of Trigonometric Series.

**UNIT I**

Expansions of powers of  $\sin\theta$ ,  $\cos\theta$  - Expansions of  $\cos^n\theta$ ,  $\sin^n\theta$ ,  $\cos^m\theta\sin^n\theta$

Chapter 2, Section 2.1, 2.1.1, 2.1.2, 2.1.3

**UNIT II**

Expansions of  $\sin n\theta$ ,  $\cos n\theta$ ,  $\tan n\theta$  - Expansions of  $\tan(\theta_1+\theta_2+\dots+\theta_n)$  - Expansions of  $\sin x$ ,  $\cos x$ ,  $\tan x$  in terms of  $x$  - Sum of roots of trigonometric equations – Formation of equation with trigonometric roots. Chapter 3, Section 3.1 to 3.6

**UNIT III**

Hyperbolic functions-Relation between circular and hyperbolic functions - Formulas in hyperbolic functions – Inverse hyperbolic functions Chapter 4, Section 4.1 to 4.7 .

**UNIT IV**

Inverse function of exponential functions – Values of  $\text{Log}(u+iv)$  - Complex index.

Chapter 5, Section 5.1 to 5.3

**UNIT V**

Sums of Trigonometric series – Applications of binomial, exponential, logarithmic and Gregory's series - Difference method. Chapter 6, Section 6.1 to 6.6.3

**Content and treatment as in**

Trigonometry by P. Duraipandian and KayalalPachaiyappa, Muhil Publishers.

**Reference:-**

1. Trigonometry, Calculus , Dr. P.R. Vittal , Margham Publications, Chennai.
2. Trigonometry by T.K. Manickavachagam Pillay.S.Viswanathan (Printers and Publishers ) Pvt.Ltd.

**e-Resources:**

1. <http://mathworld.wolfram.com>
2. <http://ocw.mit.edu/courses/mathematics/>

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**BMA-CSC04**

**CORE-IV: INTEGRAL CALCULUS AND VECTOR ANALYSIS**  
**(Common to B.Sc. Maths with Computer Applications)**

**Inst.Hrs : 5**  
**Credits : 4**

**YEAR: I**  
**SEMESTER: II**

**Learning outcomes:**

**Students will acquire Knowledge about**

- Integration and its geometrical applications, double, triple integrals and improper integrals.
- Vector differentiation and Vector integration.

**UNIT I**

Reduction formulae– Types,  $\int x^n e^{ax} dx$ ,  $\int x^n \cos ax dx$ ,  $\int x^n \sin ax dx$ ,  $\int \cos^n x dx$ ,  $\int \sin^n x dx$ ,  $\int \sin^m x \cos^n x dx$ ,  $\int \tan^n x dx$ ,  $\int \cot^n x dx$ ,  $\int \sec^n x dx$ ,  $\int \operatorname{cosec}^n x dx$ ,  $\int x^n (\log x)^m dx$ - Bernoulli's formula.

Chapter 1 Section 13, 13.1 to 13.10,14,15.1.

**UNIT II**

Multiple Integrals- definition of the double integrals- evaluation of the double integrals- double integrals in polar coordinates – triple integrals – applications of multiple integrals – volumes of solids of revolution – areas of curved surfaces – change of variables – Jacobians.

Chapter 5 Section 1, 2.1, 2.2, 3.1, 4, 6.1, 6.2, 6.3, 7

Chapter 6 Section 1.1, 1.2, 2.1 to 2.4.

**UNIT III**

Beta and Gamma functions - infinite integral – definitions – recurrence formula of  $\Gamma$  functions - properties of  $\beta$ -functions - relation between  $\beta$  and  $\Gamma$  functions.

Chapter 7 Sections 1.1 to 1.4 , 2.1, 2.3, 3, 4, 5.

**UNIT IV**

Introduction - directional derivative- Gradient- divergence- curl- Laplacian Differential Operator.

Chapter 2 Sections 2.1 - 2.13.

**UNIT V**

Line, surface and volume integrals - Integral Theorems - Gauss, Greens and Stokes (Without proof) – Problems.

Chapter 3 Sections 3.1 to 3.6 and Chapter 4 Sections 4.1 to 4.5.

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**Content and treatment as in**

1. "Calculus", Vol- II by S. Narayanan and T.K. Manicavachagampillay - S. Viswanathanpublishers– 2007 for Unit 1 , Unit 2 , Unit 3.
2. "Vector Analysis" by P.Duraipandian and KayalalPachaiyappa, S.ChandFor Unit 4, Unit 5.

**Reference:-**

1. Integral Calculus and differential equations : Dipak Chatterjee (TATA McGraw Hill Publishing companyLtd.).
2. Vector Algebra and Analysis by Narayanan and T.K.Manickvachagam Pillay S .Viswanathan Publishers.
3. Vector Analysis: Murray Spiegel (Schaum Publishing Company, NewYork).

**e-Resources:**

1. <http://mathworld.wolfram.com>.
2. <http://www.sosmath.com>.

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**BMA-CSC05**

**CORE-V: ANALYTICAL GEOMETRY**  
**(Common to B.Sc. Maths with Computer Applications)**

**Inst.Hrs : 5**

**Credits : 4**

**YEAR: II**

**SEMESTER: III**

**Learning outcomes:**

**Students will acquire Knowledge**

- To analyze characteristics and properties of two and three dimensional geometric shapes.
- To develop mathematical arguments about geometric relationships.
- In Geometry and its applications in real world.

**UNIT I**

Chord of contact – polar and pole,- conjugate points and conjugate lines – chord with  $(x_1, y_1)$  as its midpoint – diameters – conjugate diameters of an ellipse.- semi diameters- conjugate diameters of hyperbola

Chapter 7: Sections 7.1 to 7.3 , Chapter – 8 Section 8.1 to 8.5.

**UNIT II**

Polar coordinates: General polar equation of straight line – Polar equation of a circle on  $A_1A_2$  as diameter, Equation of a straight line, circle, conic – Equation of chord, tangent, normal. Equations of the asymptotes of a hyperbola.

Chapter 10 : Sec 10.1 to 10.8.

**UNIT III**

Introduction – System of Planes - Length of the perpendicular – Orthogonal projection.

Chapter 2 Sec 2.1 to 2.10.

**UNIT IV**

Representation of line – angle between a line and a plane- co-planar lines- shortest distance 2 skew lines- Length of the perpendicular- intersection of three planes

Chapter 3 :Sec 3.1 to 3.8.

**UNIT V**

Equation of a sphere - general equation - section of a sphere by a plane - equation of the circle - tangent plane - angle of intersection of two spheres- condition for the orthogonality - radical plane.

Chapter 6 : Sec 6.1 to 6.8.

**Contents and treatment as in**

1. Analytical Geometry of 2D by P.Durai Pandian- Muhil publishers for Unit – 1 and 2
2. Analytical Solid Geometry of 3D by Shanthy Narayan and Dr.P.K. Mittal-S.Chand& Co. Pvt.Ltd.- for Unit – 3 to 5

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**Reference :**

1. Analytical Geometry of Two Dimension by T. K. Manikavachakam Pillai and S. Narayanan.S.Viswanathan (Printers and Publishers ) Pvt. Ltd.
2. Analytical Geometry of Three Dimension by T. K. Manikavachakam Pillai and S. Narayanan.S.Viswanathan (Printers and Publishers ) Pvt. Ltd.

**e-Resources:**

1. <http://mathworld.wolfram.com>.
2. <http://www.univie.ac.at/future.media/moe/galerie.html>

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**BMA-CSC06**

**CORE-VI: DIFFERENTIAL EQUATIONS**  
**(Common to B.Sc. Maths with Computer Applications)**

**Inst.Hrs : 4**  
**Credits : 4**

**YEAR: II**  
**SEMESTER: III**

**Learning outcomes:**

**Students will acquire knowledge**

- About the methods of solving Ordinary and Partial Differential Equations.
- To introduce Differential Equation as a powerful tool in solving problems in Science.

**UNIT I**

Ordinary Differential Equations: Variable separable-Homogeneous Equation-Non-Homogeneous Equations of first degree in  $x$  and  $y$ -Linear Equation-Bernoulli's Equation-Exact differential equations.

Chapter 2: Section 1 to 6.

**UNIT II**

Equation of first order but not of higher degree: Equation solvable for  $dy/dx$ - Equation solvable for  $y$ -Equation solvable for  $x$ - Clairauts form-Linear Equations with constant coefficients- Particular integrals  $e^{ax}$ ,  $\sin ax$ ,  $\cos ax$ ,  $x^m$ ,  $Ve^{ax}$  where  $V$  is  $\sin ax$  or  $\cos ax$  or  $x^m$ .

Chapter 4: Section 1, 2.1, 2.2, 3.1.

Chapter 5: Section 4.

**UNIT III**

Simultaneous linear differential equations- Linear Equations of the Second Order -Complete solution in terms of a known integrals- Reduction to the Normal form- Change of the Independent Variable - Method of Variation of Parameters.

Chapter 6: Section- 6

Chapter 8:Section- 1,2,3,4.

**UNIT IV**

Partial differential equation: Formation of PDE by Eliminating arbitrary constants and arbitrary functions-complete integral-singular integral-General integral- Lagrange's Linear Equations  $Pp+Qq=R$ .

Chapter 12: Section- 1, 2, 3.1, 3.2, 4.

**UNIT V**

Special methods - Standard forms - Charpit's Methods - Related problems

Chapter 12: Section-5.1, 5.2, 5.3, 5.4, 6.

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**Contents and treatment as in**

“Differential Equations and its applications”, by S.Narayanan, T.K.Manikavachagam Pillay — S.Viswanathan (Printers and Publishers ) Pvt. Ltd(2006).

**Reference:**

- 1.Mathematics for B.Sc-Branch-I Volume –III by P.Kandasamy ,K.Thilagavathy  
S.Chand Publications.
- 2.Differential equations with applications and historical notes by George F.Simmons,  
2<sup>nd</sup>Ed,TataMcgraw Hill Publications .
3. Differential Equations by ShepleyL.Ross, 3 rdEd ,JohnWiely and sons 1984.
- 4 .Differential Equations by N.P.Bali,Laxmi Publications Ltd,New Delhi-2004.
5. Ordinary and Partial differential Equation by Dr.M.D.Raisinghaniania ,S.Chand.

**e-Resources:**

- 1.<http://mathworld.wolfram.com>
2. [http://www.analyzemath.com/calculus/Differential\\_Equations/applications.html](http://www.analyzemath.com/calculus/Differential_Equations/applications.html)



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**SYLLABUS WITH EFFECT FROM 2020-2021**

**BMA-CSC07**

**CORE-VII: TRANSFORM TECHNIQUES**  
**(Common to B.Sc. Maths with Computer Applications)**

Inst.Hrs : 4

Credits : 4

YEAR: II

SEMESTER: IV

**Learning outcomes:**

**Students will acquire knowledge**

- About Laplace Transforms and its inverse
- To apply Laplace transform in solving Ordinary Differential Equations with constant coefficients, simultaneous Ordinary Differential Equations.
- To solve problems in Fourier series and Fourier transforms.

**UNIT I:**The Laplace Transforms-Definitions-Sufficient conditions for the existence of the Laplace transform(without proof)-Laplace transform of periodic functions-some general theorems-evaluation of integrals using Laplace transform-Problems.

***Chapter 5: Section-1 to 5.***

**UNIT II:**The inverse Laplace Transforms- Applications of Laplace Transforms to ordinary differential equations with constant co-efficients and variable co-efficients, simultaneous equations and equations involving integrals-Problems.

***Chapter 5: Section-6 to 12.***

**UNIT III:** Fourier series- Expansion of periodic functions of period  $2\pi$ - Expansion of even and odd functions, Half range Fourier series-Change of intervals –Problems.

***Chapter 6: Section-1 to 6.***

**UNIT IV:** Fourier Transform- Infinite Fourier Transform(Complex form) – Properties of Fourier Transform – Fourier cosine and Fourier sine Transform – Properties – Parseval’s identity – Convolution theorem - Problems.

***Chapter 6: Section-8 to 15.***

**UNIT V:** Z Transforms: Definition of Z-Transform and its properties - Z-Transforms of some basic functions- Examples and simple problems

***Chapter 7: Sections -7.1 to 7.3.***

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**Contents and treatment as in**

1. “Calculus-Volume III” – S.Narayananand T.K.ManicavachagamPillai. (Ananda Book Depot)( **for Units I to IV**)
2. “Engineering Mathematics for Semester III- Third Edition – T.Veerarajan ( Tata McGraw-Hill Publishing Company Ltd, New Delhi) ( **for Unit-V**)

**Reference Books**

1. Engineering Mathematics Volume III – P.Kandasamy and others ( S.Chand and Co.)
2. Advanced Engineering Mathematics- Stanley Grossman and William R.Devit.

Engineering Mathematics III-A.Singaravelu, Meenakshi Agency, Chenani, 2008

**e-Resources:**

1. <http://mathworld.wolfram.com>.
2. <http://www.sosmath.com>.

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**BMA-CSC08**

**CORE-VIII: STATICS**  
**(Common to B.Sc. Maths with Computer Applications)**

**Inst.Hrs : 5**

**Credits : 4**

**YEAR: II**

**SEMESTER: IV**

**Learning outcomes:**

**Students will acquire knowledge about**

- Particles or body in rest under the given forces.
- Forces, equilibrium of a particle and centre of mass of various bodies.

**UNIT I**

Force- Newtons laws of motion - resultant of two forces on a particle- Equilibrium of a particle  
Chapter 2 - Section 2 .1 , 2.2 , Chapter 3 - Section 3.1.

**UNIT II**

Forces on a rigid body – moment of a force – general motion of a rigid body- equivalent systems of forces – parallel forces – forces along the sides of a triangle – couples  
Chapter 4 - Section 4 .1 to 4.6.

**UNIT III**

Resultant of several coplanar forces- equation of the line of action of the resultant- Equilibrium of a rigid body under three coplanar forces – Reduction of coplanar forces into a force and a couple.-problems involving frictional forces  
Chapter 4 - Section 4.7 to 4.9,  
Chapter 5 - Section 5.1, 5.2.

**UNIT IV**

Centre of mass – finding mass centre – a hanging body in equilibrium  
Chapter 6 - Section 6.1 to 6.3.

**UNIT V**

Hanging strings- equilibrium of a uniform homogeneous string – suspension bridge  
Chapter 9 - Section 9.1, 9.2.

**Contents and treatment as in**

“Mechanics” by P. Duraipandian ,LaxmiDuraipandian , MuthamizhJayapragasham, S. Chand and Co limited 2008 .

**Reference:**

1. Dynamics – K. ViswanathaNaik and M. S. Kasi, Emerald Publishers.
2. Dynamics – A. V. Dharmapadam, S. Viswanathan Publishers.
3. Mechanics – Walter Grenier.

**e-Resources:**

1. <https://www.wikipedia.org/>
2. <https://physics.info>

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE COURSE IN MATHEMATICS**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BMA-CSC09**

**CORE-IX: ALGEBRAIC STRUCTURES-I**  
**(Common to B.Sc. Maths with Computer Applications)**

**Inst.Hrs : 6**

**Credits : 4**

**YEAR: III**

**SEMESTER: V**

**Learning outcomes:**

**Students will acquire knowledge about the concepts of Sets, Groups and Rings.**

**UNIT I**

Introduction to groups- Subgroups- cyclic groups and properties of cyclic groups- Lagrange's Theorem- A counting principle.  
Chapter 2 Section 2.4 and 2.5.

**UNIT II**

Normal subgroups and Quotient group- Homomorphism- Automorphism.  
Chapter 2 Section 2.6 to 2.8.

**UNIT III**

Cayley's Theorem- Permutation groups.  
Chapter 2 Section 2.9 and 2.10.

**UNIT IV**

Definition and examples of ring- Some special classes of rings- homomorphism of rings- Ideals and quotient rings- More ideals and quotient rings.  
Chapter 3 Section 3.1 to 3.5.

**UNIT V**

The field of quotients of an integral domain- Euclidean Rings- The particular Euclidean ring.  
Section 3.6 to 3.8.

**Contents and treatment as in**

“Topics in Algebra” – I. N. Herstein, Wiley Eastern Ltd.

**Reference:**

- 1.Modern Algebra by M.L.Santiago, McGraw Hill Education India pvt Ltd.
- 2.Modern Algebra by S. Arumugam and others, New Gamma publishing House, Palayamkottai.
- 3.Modern Algebra by Visvanathan Nayak, Emerald Publishers, Reprint 1992.

**e-Resources:**

1. <https://nptel.ac.in>
2. <http://garsia.math.yorku.ca/~sdenton/algstruct>.

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE COURSE IN MATHEMATICS**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BMA-CSC10**

**CORE-X: REAL ANALYSIS-I**  
**(Common to B.Sc. Maths with Computer Applications)**

**Inst.Hrs : 6**

**Credits : 4**

**YEAR: III**

**SEMESTER: V**

**Learning outcomes:**

**Students will acquire knowledge to**

- Apply Mathematical concepts and Principles to perform numerical and symbolic computations.
- Understand and perform simple proofs.
- Know how abstract ideas and rigorous methods in Mathematical Analysis can be applied to practical problems.

**UNIT I**

Sets and Functions: Sets and elements- Operations on sets- functions- real valued functions- equivalence- countability - real numbers- least upper bounds.

Chapter 1 Section 1.1 to 1.7

**UNIT II**

Sequences of Real Numbers: Definition of a sequence and subsequence- limit of a sequence- convergent sequences- divergent sequences- bounded sequences- monotone sequences-

Chapter 2 Section 2.1 to 2.6

**UNIT III**

Operations on convergent sequences- operations on divergent sequences- limit superior and limit inferior- Cauchy sequences.

Chapter 2 Section 2.7 to 2.10

**UNIT IV**

Series of Real Numbers: Convergence and divergence- series with non-negative terms- alternating series- conditional convergence and absolute convergence- tests for absolute convergence- series whose terms form a non-increasing sequence- the class  $\mathbb{I}^2$

Chapter 3 Section 3.1 to 3.4, 3.6, 3.7 and 3.10

**UNIT V**

Limits and Metric Spaces: Limit of a function on a real line-. Metric spaces - Limits in metric spaces.

Continuous Functions on Metric Spaces: Function continuous at a point on the real line- Reformulation- Function continuous on a metric space.

Chapter 4 Section 4.1 to 4.3 Chapter 5 Section 5.1-5.3

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**Contents and Treatment as in**

“Methods of Real Analysis” : Richard R. Goldberg (Oxford and IBH Publishing Co.).

**Reference:**

1. Principles of Mathematical Analysis by Walter Rudin, TataMcGrawHill.
2. Mathematical Analysis Tom M Apostol, Narosa Publishing House.

**e-Resources:**

1. <https://mathcs.org/analysis/reals/numseq/sequence.html>.
2. <http://www-groups.mcs.st-andrews.ac.uk/~john/analysis/index.html>
3. <http://www.phengkimving.com>.

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE COURSE IN MATHEMATICS**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BMA-CSC11**

**CORE-XI: DYNAMICS**  
**(Common to B.Sc. Maths with Computer Applications)**

**Inst.Hrs : 6**  
**Credits : 4**

**YEAR: III**  
**SEMESTER: V**

**Learning outcomes:**

**Students will acquire knowledge of**

- The motion of bodies under the influence of forces.
- Rectilinear motion of particles, Projectiles, Impact and Moment of Inertia of Particles.

**UNIT I**

Kinematics -Basic units – velocity – acceleration- coplanar motion.

Chapter 1 - Section 1.1 to 1.4.

**UNIT II** Work, Energy and power – work – conservative field of force – power – Rectilinear motion under varying Force: Simple harmonic motion ( S.H.M.) – S.H.M. along a horizontal line- S.H.M. along a vertical line

Chapter 11 - Section 11.1to 11.3, Chapter 12 - Section 12.1 to 12.3

**UNIT III**

Projectiles -Forces on a projectile- projectile projected on an inclined plane.

Impact: Impulsive force - impact of sphere - impact of two smooth spheres – impact of a smooth sphere on a plane – oblique impact of two smooth spheres

Chapter 13 - Section 13.1,13.2, Chapter 14 - Section 14.1, 14.5

**UNIT IV**

Circular motion – Conical pendulum – simple pendulum – central orbits -general orbits - central orbits- conic as centered orbit.

Chapter 15 - Section 15.1, 15.2, 15.6

Chapter 16 - Section 16.1 to 16.3

**UNIT V**

Moment of inertia, Perpendicular and parallel axes theorem.

Chapter 17 -Section 17.1, 17.1.1

**Contents and treatment as in**

“Mechanics” – P. Duraipandian, LaxmiDuraipandian ,MuthamizhJayapragasham, S. Chand and Co limited 2008 .

**Reference :**

1. Dynamics – K. ViswanathaNaik and M. S. Kasi, Emerald Publishers.
2. Dynamics – A. V. Dharmapadam, S. Viswanathan Publishers.
3. Mechanics – Walter Grenier

**e-Resources:**

1. <https://nptel.ac.in>
2. <https://www.wikipedia.org>

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE COURSE IN MATHEMATICS**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BMA-CSC12**

**CORE-XII: DISCRETE MATHEMATICS**  
**(Common to B.Sc. Maths with Computer Applications)**

**Inst.Hrs : 6**

**Credits : 4**

**YEAR: III**  
**SEMESTER: V**

**Learning outcomes:**

**Students will acquire knowledge**

- To apply tools and ideas in Mathematics for solving Applied Problems.
- To Evaluate Boolean functions and to express a logic sentence in terms of predicates, quantifiers, and logical connectives.

**UNIT I**

Integers: Set, some basic properties of integers, Mathematical induction, divisibility of integers, representation of positive integers

Chapter 1 - Sections 1.1 to 1.5

**UNIT II**

Boolean algebra & Applications: Boolean algebra, two element Boolean algebra, Disjunctive normal form, Conjunctive normal form

Chapter 5 - Sections 5.1 to 5.4

**UNIT III**

Application, Simplification of circuits, Designing of switching circuits, Logical Gates and Combinatorial circuits.

Chapter 5 - Section 5.5, 5.6

**UNIT IV**

Recurrence relations and Generating functions: Sequence and recurrence relation, Solving recurrence relations by iteration method, Modeling of counting problems by recurrence relations, Linear (difference equations) recurrence relations with constant coefficients, Generating functions, Sum and product of two generating functions, Useful generating functions, Combinatorial problems.

Chapter 6 - Section 6.1 to 6.6

**UNIT V**

Propositional logic and Predicate logic: Propositional logic, Adequate system of connectives, Translation of sentences in a Natural Language into Statement Formula, Logical validity of arguments, Predicate Logic, Negation of a statement obtained by qualification of a predicate, Logical operations on predicates or quantified predicates, Symbolization of sentences by using predicates, Quantifiers and connectives, Logical validity of arguments.

Chapter 8 - Sections 8.1, 8.5 to 8.8 (Omit Section 8.2 to 8.4)



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**SYLLABUS WITH EFFECT FROM 2020-2021**

**Contents and treatment as in**

“Introduction to Discrete Mathematics”, 2<sup>nd</sup> edition, 2002 by M. K. Sen and B. C. Chakraborty, Books and Allied Private Ltd., Kolkata.

**Reference:-**

1. Discrete mathematics for computer scientists and mathematicians by J. L. Mertz, AbrahamKendel and T. P. Baker prentice-hall, India.
2. Discrete mathematics for computer scientists by John Truss-Addison Wesley.
3. Elements of Discrete Mathematics, C. L. Liu, New York Mcgraw-Hill, 1977.

**e-Resources:**

1. <https://brilliant.org/wiki/discrete-mathematics/>.
2. [https://www.tutorialspoint.com/discrete\\_mathematics/](https://www.tutorialspoint.com/discrete_mathematics/).

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE COURSE IN MATHEMATICS**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BMA-CSC13**

**CORE-XIII: ALGEBRAIC STRUCTURES-II**  
**(Common to B.Sc. Maths with Computer Applications)**

**Inst.Hrs : 6**

**Credits : 4**

**YEAR: III**

**SEMESTER: VI**

**Learning outcomes:**

Students will acquire knowledge about the Vector Spaces, Dual spaces, Inner product spaces and linear transformations.

**UNIT I**

Vector spaces. Elementary basic concepts- linear independence and bases Chapter 4 Section 4.1 and 4.2.

**UNIT II**

Dual spaces  
Chapter 4 Section 4.3.

**UNIT III**

Inner product spaces.  
Chapter 4 Section 4.4.

**UNIT IV**

Algebra of linear transformations- characteristic roots.  
Chapter 6 Section 6.1 and 6.2.

**UNIT V**

Matrices- canonical forms- triangular forms.  
Chapter 6 Section 6.3 and 6.4.

**Content and Treatment as in**

“Topics in Algebra” – I. N. Herstein-Wiley Eastern Ltd.

**Reference:**

1. University Algebra – N. S. Gopalakrishnan – New Age International Publications, Wiley Eastern Ltd.
2. First course in Algebra – John B. Fraleigh, Addison Wesley.
3. Text Book of Algebra – R. Balakrishna and N. Ramabadrana, Vikas publishing Co.
4. Algebra – S. Arumugam, New Gamma publishing house, Palayamkottai.

**e-Resources:**

1. <https://nptel.ac.in>.
2. <http://ebooks.lpude.in.linearalgebra>.

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE COURSE IN MATHEMATICS**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BMA-CSC14**

**CORE-XIV: REAL ANALYSIS-II**  
**(Common to B.Sc. Maths with Computer Applications)**

**Inst.Hrs : 6**  
**Credits : 4**

**YEAR: III**  
**SEMESTER: VI**

**Learning outcomes:**

**Students will acquire knowledge about**

- The Real Numbers and the Analytic Properties of Real- Valued Functions.
- The Analytic concepts of Connectedness, Compactness, Completeness And Calculus.

**UNIT I**

Continuous Functions on Metric Spaces: Open sets- closed sets- Discontinuous function on  $\mathbb{R}^1$ . Connectedness, Completeness and Compactness :More about open sets- Connected sets. Chapter 5 Section 5.4 to 5.6  
Chapter 6 Section 6.1 and 6.2

**UNIT II**

Bounded sets and totally bounded sets: Complete metric spaces- compact metric spaces, continuous functions on a compact metric space, continuity of inverse functions, uniform continuity.  
Chapter 6 Section 6.3 to 6.8

**UNIT III**

Calculus:Sets of measure zero, definition of the Riemann integral, existence of the Riemann integral- properties of Riemann integral.  
Chapter 7 Section 7.1 to 7.4

**UNIT IV**

Derivatives- Rolle's theorem, Law of mean, Fundamental theorems of calculus.  
Chapter 7 Section 7.5 to 7.8

**UNIT V**

Taylor's theorem- Pointwise convergence of sequences of functions, uniform convergence of sequences of functions.  
Chapter 8 Section 8.5 Chapter 9 Section 9.1 and 9.2

**Content and Treatment as in**

“Methods of Real Analysis”- Richard R. Goldberg (Oxford and IBH Publishing Co)

**Reference:-**

1. Principles of Mathematical Analysis by Walter Rudin,TataMcGrawHill.
2. Mathematical Analysis Tom M Apostol,Narosa Publishing House.

**e-Resources:**

1. <https://nptel.ac.in>.
2. <https://mathonline.wikidot.com>.
3. [https://en.wikipedia.org/wiki/Metric\\_space](https://en.wikipedia.org/wiki/Metric_space).

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE COURSE IN MATHEMATICS**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BMA-CSC15**

**CORE-XV: COMPLEX ANALYSIS**  
**(Common to B.Sc. Maths with Computer Applications)**

**Inst.Hrs : 6**  
**Credits : 4**

**YEAR: III**  
**SEMESTER: VI**

**Learning outcomes:**

Students will acquire knowledge about the basic ideas of analysis of Complex Functions in solving Complex Variables.

**UNIT I**

Analytic Functions: Functions of a Complex Variable – Limit- Theorems on Limits – Continuous functions- Differentiability – Cauchy – Riemann equations – Analytic functions- Harmonic functions – Conformal mapping.

Chapter 1 – sec 2.1 to 2.9.

**UNIT II**

Bilinear Transformations: Elementary transformations – Bilinear transformations – Cross ratio- Fixed Points of Bilinear Transformations – Mapping by Elementary Functions - The Mapping  $w = z^n$ ,  $n$  is a positive integer,  $w = e^z$ ,  $\sin z$ ,  $\cos z$ .

Chapter 3 – sec 3.1 to 3.4 , Chapter 5 – sec 5.1 to 5.5

**UNIT III**

Complex Integration – definite integral – Cauchy’s Theorem – Cauchy’s integral formula – Higher derivatives. Chapter 6 – sec 6.1 to 6.4

**UNIT IV**

Series expansions – Taylor’s series – Laurent’s Series – Zeroes of analytic functions- Singularities. Chapter 7 – 7.1 to 7.4

**UNIT V**

Residues – Cauchy’s Residue Theorem – Evaluation of definite integrals.

Chapter 8 – 8.1 to 8.3.

**Content and treatment as in**

“Complex Analysis” by Dr.S.Arumugam, Thangapandi Isaac, Dr.A.Somasundaram, SciTech publications(India) Pvt Ltd, 2002.

**Reference:**

1. Complex variables and Applications (Sixth Edition) by James Ward Brown and Ruel V. Churchill, Mc.Grawhill Inc.
2. Complex Analysis by P.Duraipandian, Kayalak Pachaiyappa, S.Chand & Co Pvt.Ltd.
3. Complex Analysis , T.K.Manickavachagom Pillay, S.Viswanathan Publishers Pvt. Ltd.

**e-Resources:**

1. <http://ebooks.lpude.in.complexanalysis>.
2. <https://nptel.ac.in>.

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE COURSE IN MATHEMATICS**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BMA-CSA03**

**ALLIED: CALCULUS OF FINITE DIFFERENCES**  
**AND NUMERICAL ANALYSIS-I**  
**(Common to B.Sc. Maths with Computer Applications)**

**Learning outcomes:**

**Students will acquire knowledge about**

- Numerical techniques used as powerful tools in scientific computing.
- Linear algebraic, transcendental equations and interpolation using finite difference formulae.

**UNIT I**

Solutions of algebraic and transcendental equations: Bisection method- Iteration method- Regula-falsi method- Newton-Raphson method. - Chapter 1 :Section 1.1 - 1.4

**UNIT II**

Solutions of Simultaneous Linear Equations: Gauss-Elimination method, Gauss-Jordan method, Crout's method, Gauss-Seidel method. - Chapter 2 :Section 2.1 - 2.4 , 2.6

**UNIT III**

Finite Differences: E operators and relation between them- Differences of a polynomial-Factorial polynomials- inverse operator  $\Delta^{-1}$  -Summation Series. - Chapter 3 :Section 3.1 to 3.4, 3.6, 3.7.

**UNIT IV**

Interpolation with Equal Intervals:Newton's Forward and Backward Interpolation formulae-Central Differences Formulae: Gauss-Forward and Backward Formulae- Stirling's Formula and Bessel's Formula-Equidistant terms with one or more missing values.  
Chapter 4 :Section 4.1- 4.3 (omit 4.1a, 4.4), 4.7 . - Chapter 5 :Section 5.1- 5.6.

**UNIT V**

Interpolation with Unequal Intervals: Divided Differences - Newton's Divided Differences Formula for Interpolation -Lagrange's Formula for Interpolation-Inverse Interpolation-Lagrange's method- Reversion of Series method. - Chapter 6 :Section 6.1, 6.2, 6.5, 6.7.

**Content and Treatment as in**

“Calculus of Finite Differences and Numerical Analysis” by P. Kandasamy and K. Thilagavathy, S. Chand and Co Pvt.Ltd.

**Reference:**

1. “Numerical Analysis “ by B. D. Gupta, Konark Publishing.
2. “Numerical methods in Science and Engineering” by M. K. Venkataraman, National Publishing House, Chennai.

**e-Resources:**

1. <https://nptel.ac.in>
2. [https://www.encyclopediaofmath.org/index.php/Finite-difference\\_calculus](https://www.encyclopediaofmath.org/index.php/Finite-difference_calculus)

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE COURSE IN MATHEMATICS**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BMA-CSA04**

**ALLIED: MATHEMATICAL STATISTICS-I**  
**(Common to B.Sc. Maths with Computer Applications)**

**Learning outcomes:**

**Students will acquire knowledge of**

- The laws of Probability and Baye's theorem.
- Measures of Location, Dispersion, Correlation and Regression
- The Discrete and Continuous Probability Distributions.

**UNIT I**

Concept of sample space- Events- Definition of Probability (Classical,Statstical& Axiomatic)- Addition and Multiplication laws of Probability- Independence- Conditional Probability- Baye's theorem – Simple Problems.

**UNIT II**

Random Variables (Discrete and Continuous) Distribution function- Expected values and Moments- Moment generating function – Probability generating function- Examples.

**UNIT III**

Characteristic function- Uniqueness and Inversion theorems (Statements and applications only)- Cumulants - Chebychev's Inequality – Simple Problems.

**UNIT IV**

Concepts of bivariate distributions- Correlation and Regression- Linear Prediction- Rank Correlation coefficient-Concepts of partial and multiple correlation coefficients- Simple problems.

**UNIT V**

Standard Distributions – Binomial- Poisson- Normal- Uniform distributions- Geometric- Exponential-Gamma -Beta distributions- Inter relationship between distributions.

**Reference:**

- S.C.Gupta&V.K.Kapoor : Elements of Mathematical Statistics, Sultan Chand & Sons, NewDelhi.
- Hogg R.V. & Craig A.T. (1988) : Introduction to Mathematical Statistics, McMillan.
- Mood A.M. &Graybill F.A. &Boes D.G. (1974): Introduction to theory of Statistics, McGraw Hill.
- Snedecor G.W. & Cochran W.G(1967) : Statistical Methods, Oxford and IBH.

**e-Resources:**

1. <https://nptel.ac.in>
2. <https://www.wikipedia.org>.
3. <http://ebooks.lpude.in.statistics>.

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE COURSE IN MATHEMATICS**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BMA-CSA05**

**ALLIED: CALCULUS OF FINITE DIFFERENCES**  
**AND NUMERICAL ANALYSIS-II**  
**(Common to B.Sc. Maths with Computer Applications)**

**Learning outcomes:**

**Students will acquire knowledge about**

- Numerical techniques used as powerful tools in scientific computing.
- Numerical Differentiation, Numerical Integration and Difference Equations.

**UNIT I**

Numerical Differentiation: Derivatives using Newton's forward and backward difference formulae-Derivatives using Stirling's formula- Derivatives using divided difference formula- Maxima and Minima using the above formulae.

Chapter 7 :Section 7.1- 7.4, 7.6.

**UNIT II**

Numerical Integration: General Quadrature formula- Trapezoidal rule-Simpson's one-third rule- Simpson's three-eighth rule- Weddle's rule- Euler-Maclaurin Summation formula- Stirling's formula for  $n!$ . - Chapter 7 :Section 7.7- 7.9, 7.13- 7.15.

**UNIT III**

Difference equations:Linear homogenous and nonhomogenous difference equation with constant coefficients- particular integrals for  $a^u x^m, x^m, \sin kx, \cos kx$ .

Chapter 8 :Section 8.1- 8.4, 8.6

**UNIT IV**

Numerical solution of Ordinary Differential Equations (I order only):

Taylor's series method- Picard's method- Euler's method- Modified Euler's method.

Chapter 9: Section 9.5-9.7, 9.9.

**UNIT V**

Numerical solution of Ordinary Differential Equations (I order only):

Runge-kuttamethod(fourth order only)- Predictor-Corrector method- Milne's method - Adams-Bashforth method.

Chapter 9 : Section 9.10 - 9.14.

**Content and Treatment as in**

“Calculus of Finite Differences and Numerical Analysis” by P. Kandasamy and K. Thilagavathy, S. Chand and Co. Pvt.Ltd.

**Reference:**

- 1) “Numerical Analysis “ by B. D. Gupta, Konark Publishing.
- 2) “Numerical methods in Science and Engineering” by M. K. Venkataraman, National Publishing House, Chennai.

**e-Resources:**

1. <https://nptel.ac.in>
2. [https://www.encyclopediaofmath.org/index.php/Finite-difference\\_calculus](https://www.encyclopediaofmath.org/index.php/Finite-difference_calculus)

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE COURSE IN MATHEMATICS**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BMA-CSA06**

**ALLIED: MATHEMATICAL STATISTICS-II**  
**(Common to B.Sc. Maths with Computer Applications)**

**Learning outcomes:**

**Students will acquire knowledge**

- To provide the foundation of statistical analysis used in varied applications.
- Of Sampling methods, Tests of significance and testing of hypothesis.

**UNIT I**

Sampling theory – Sampling Distributions – Concept of Standard error – Sampling distribution based on normal distribution- t, Chi Square and F distributions.

**UNIT II**

Point estimation – Concepts of unbiasedness – consistency – efficiency and sufficiency- Cramer Rao inequality – Methods of estimation- Maximum likelihood- moments - minimum square and their properties (Statement only).

**UNIT III**

Test of significance – Standard error- Large sample test, Exact test based on normal, t, chi-square and F distribution with respect to population mean/means, proportion/proportions, variance and correlation coefficient. Test of independence of attributes based on contingency tables- Goodness of fit based on chi-square.

**UNIT IV**

Analysis of Variance: One way, two way classification concepts & Problems. Interval estimation – Confidence intervals for population mean/means- Proportion/proportions and variances based on t, Chi-Square and F.

**UNIT V**

Test of hypothesis- Type I and II errors- Power of test – Neymann Pearson lemma- Likelihood ratio test-concepts of most powerful test- statements and results only-simple problems.

**Reference:**

- S.C.Gupta&V.K.Kapoor: Elements of Mathematical Statistics, Sultan Chand & Sons, NewDelhi.
- Hogg R.V. & Craig A.T. (1988 ): Introduction to Mathematical Statistics, McMillan.
- Mood A.M. & Graybill F.A. & Boes D.G. (1974): Introduction to theory of Statistics, McGraw Hill.
- Snedecor G.W. & Cochran W.G(1967) : Statistical Methods, Oxford and IBH.
- Hoel P.G. (1971) : Introduction to Mathematical Statistics, Wiley.
- Wilks S.S. Elementary Statistical Analysis, Oxford and IBH.

**e-Resources:**

1. <https://nptel.ac.in>
2. <https://www.wikipedia.org>.
3. <http://ebooks.lpude.in/statistics>.



**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE COURSE IN MATHEMATICS**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BMA-DSEA1**

**ELECTIVE-I: PROGRAMMING IN 'C' WITH PRACTICALS**

**Inst.Hrs : 6**

**Credits : 5**

**YEAR: III**  
**SEMESTER: V**

**Learning outcomes:**

**Students will acquire knowledge**

- About the basic concepts and structure of 'C' program.
- To write simple programs with Mathematical Applications.

**THEORY**

**UNIT I**

Introduction - Constants-Variables-Data-types -Operators, Precedence of operators – Managing Input and Output Operations .

Chapters : 2,3 and 4.

**UNIT II**

Decision making and branching: Simple if, if else, nested if, else if ladder and switch statement – conditional operator – go to statement.

Decision making and looping : while, do while and for statement – nested for loops – jumps in loops (continue and break statements).

Chapters : 5 and 6.

**UNIT III**

Arrays : One dimensional and 2 dimensional arrays – declarations – initialization of arrays.

Character Arrays and Strings: Declaration and Initialization of Strings - Reading and Writing strings - Operations on strings - String handling functions.

Chapters: 7 and 8

**UNIT IV**

Functions : Need for User defined functions- A Multi function Program- Elements of User defined functions - Function definition , Function Call and Function Declaration – Return Values and their types- Categories of functions – Nesting of Functions- Recursion .

Pointers: Understanding Pointers-Accessing address of a variable- Declaration and Initialization of Pointers- Accessing a Variable through its Pointer- Function call by reference - call by value.

Chapters : 9 and 11.

**UNIT V**

File Management in C : Definition-Opening and Closing a file- Input/ Output operations on Files- Error Handling during I/O operations.

Chapter 12.

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE COURSE IN MATHEMATICS**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**Content and Treatment as in**

“Programming in ANSI C”, 7<sup>th</sup> Edition, 2017, by E. Balagurusamy, McGraw Hill Education India Private Limited.

**Reference:-**

1. “Programming in C” by Venugopal.
2. “Programming with C” by Gottfried.B.S ,Schaum”s outline series, TMH 2001.
3. “Let us ‘C’” by YashvantKanitkar ,BPB Publications.
4. “Programming with C” by R.S.Bichkar,Universities Press (INDIA) Pvt.Ltd.

**e-Resources:**

1. <https://www.w3schools.in/c-tutorial>.
2. <https://en.cppreference.com/w/c>.

**PRACTICALS**

Writing ‘C’ programs for the following:

1. To convert Centigrade to Fahrenheit
2. To find the area, circumference of a circle
3. To convert days into months and days
4. To solve a quadratic equation
5. To find sum of n numbers
6. To find the largest and smallest numbers
7. To generate Pascal’s triangle, Floyd’s triangle
8. To find the trace of a matrix
9. To add and subtract two matrices
10. To multiply two matrices
11. To generate Fibonacci series using functions
12. To compute factorial of a given number, using functions
13. To add complex numbers using functions
14. To concatenate two strings using string handling functions
15. To check whether the given string is a palindrome or not using string handling functions.

**Question paper pattern: External (60)+ Internal(40)**

**Internal:**

Internal Practical Assessment + Attendance + Record = 30 + 5 + 5 = 40 marks

**External:**

- Answer any 2 questions out of 3 questions : (2 x 30 = 60)

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE COURSE IN MATHEMATICS**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BMA-DSEB2**

**ELECTIVE-II / III: GRAPH THEORY**

**Inst.Hrs : 6**  
**Credits : 5**

**YEAR: III**  
**SEMESTER: VI**

**Learning outcomes:**

**Students will acquire knowledge**

- To describe and apply some basic algorithms for graph.
- To model real world problems using graph theory.

**UNIT I**

Graphs and Subgraphs: Introduction- Definition and examples, degrees, sub graphs, isomorphism, independent sets and coverings, intersection graphs and line graphs, matrices, operations on graphs

Chapter 2 Sections 2.0 – 2.9 (Omit section 2.5)

**UNIT II**

Degree sequences and Connectedness: Degree sequences and graphic sequences – simple problems. Walks, trails, paths, connectedness and components, blocks, connectivity – simple problems.

Chapter 3 Sections 3.0 – 3.2 , Chapter 4 Sections 4.0 – 4.4

**UNIT III**

Eulerian and Hamiltonian graphs - Chapter 5 Sections 5.0 – 5.2

**UNIT IV**

Trees : Characterisation of Trees, Centre of a Tree -simple problems.

Planarity : Definition and properties, characterization of planar graphs.

Chapter 6 Sections 6.0 – 6.2 , Chapter 8 Sections 8.0 – 8.2

**UNIT V**

Directed Graphs: Definition and basic properties, paths and connections, digraphs and matrices, tournaments - Chapter 10 Sections 10.0 – 10.4

**Content and treatment as in**

“Invitation to Graph Theory”, by S.Arumugam and S.Ramachandran, Scitech Publications (India) Pvt. Ltd., Chennai 17.

**Reference:**

1. A first look at graph theory by John Clark and Derek Allan Holton, Allied publishers.
2. Graph Theory by S.Kumaravelu and SusheelaKumaravelu, Publishers authors C/o 182 Chidambara Nagar, Nagarkoil.

**e-Resources:**

1. <https://nptel.ac.in>.
2. <https://mathonline.wikidot.com>.
3. <http://ebooks.lpude.in/graphtheory>.

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE COURSE IN MATHEMATICS**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BMA-DSEB3**

**ELECTIVE-II / III: OPERATIONS RESEARCH**

**Inst.Hrs : 6**  
**Credits : 5**

**YEAR: III**  
**SEMESTER: VI**

**Learning outcomes:**

**Students will acquire knowledge in**

- Solving Linear Programming Problems.
- Sequencing the jobs to be carried out based on Cost Optimization.
- Solving assignment and transportation problems and Queuing Theory Models.

**UNIT I**

Linear programming: Formulation – graphical solution. Simplex method. Big-M method. Duality-primal-dual relation.

Chapter 6 Sections 6.1 – 6.13, 6.20 – 6.31

**UNIT II**

Transportation problem: Mathematical Formulation. Basic Feasible solution. North West Corner rule, Least Cost Method, Vogel's approximation. Optimal Solution. Unbalanced Transportation Problems. Degeneracy in Transportation problems.

Assignment problem: Mathematical Formulation. Comparison with Transportation Model. Hungarian Method. Unbalanced Assignment problems

Chapter 9 Sections 9.1 – 9.12 ,Chapter 8 Sections 8.1 – 8.5

**UNIT III**

Sequencing problem:  $n$  jobs on 2 machines –  $n$  jobs on 3 machines – two jobs on  $m$  machines –  $n$  jobs on  $m$  machines.

Game theory : Two-person Zero-sum game with saddle point – without saddle point – dominance – solving  $2 \times n$  or  $m \times 2$  game by graphical method.

Chapter 10 Sections 10.1 – 10.6 ,Chapter 12 Sections 12.1 – 12.15

**UNIT IV**

Queuing theory: Basic concepts. Steady state analysis of  $M / M / 1$  and  $M / M / S$  models with finite and infinite capacities.

Chapter 5 Sections 5.1 – 5.18

**UNIT V**

Network: : Project Network diagram – CPM and PERT computations. (Crashing excluded)

Chapter 13

Sections 13.1 – 13.10

**Content and treatment as in**

Operations Research, by R.K.Gupta , Krishna Prakashan India (p),Meerut Publications.

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE COURSE IN MATHEMATICS**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**Reference:**

1. Gauss S.I. Linear programming , McGraw-Hill Book Company.
2. Gupta P.K. and Hira D.S., Problems in Operations Research ,S.Chand& Co.
3. KantiSwaroop, Gupta P.K and Manmohan , Problems in Operations Research,Sultan Chand & Sons.
4. Ravindran A., Phillips D.T. and Solberg J.J., Operations Research, John wiley & Sons.
5. Taha H.A. Operation Research, Macmillan pub. Company, New York.
6. Linear Programming, Transporation, Assignment Game by Dr.Paria, Books and Allied (P) Ltd.,1999.
7. V.Sundaresan,K.S. Ganapathy Subramaian and K.Ganesan, Resource Management Techniques, A.R Publications.

**e-Resources:**

1. <http://ebooks.lpude.in.operationsresearch>.
2. <https://ocw.mit.edu>.

**UNIVERSITY OF MADRAS**  
**UG – NON-MAJOR ELECTIVE COURSE**  
**OFFERED IN THE DEPARTMENT OF MATHEMATICS**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BMA-NME01**

**NME-I: FUNCTIONAL MATHEMATICS-I**

**UNIT I**

Ratio and Proportion

**UNIT II**

Percentages

**UNIT III**

Profit and Loss, Discounts

**UNIT IV**

Simple Interest and Compound interest

**UNIT V**

Solutions of Simultaneous equations, Problems on Ages and Numbers.

**Reference:**

Quantitative Aptitude- R.S. Agarwal

**UNIVERSITY OF MADRAS**  
**UG – NON-MAJOR ELECTIVE COURSE**  
**OFFERED IN THE DEPARTMENT OF MATHEMATICS**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BMA-NME02**

**NME-II: FUNCTIONAL MATHEMATICS-II**

**UNIT I**

Time and work – Pipes and cisterns- Problem

**UNIT II**

Time and Distance, Relative speeds- Problems on Races, Boats and Trains.

**UNIT III**

Mensuration – Problems

**UNIT IV**

Polygons – Interior angles- Number of diagonals- Regular Polygons- Problems

**UNIT V**

Stocks and Shares – Problems

**Reference:**

1. Quantitative Aptitude- R.S. Agarwal
2. Functional Mathematics, M. Sivananda Rani, Margham Publications, Chennai.

**UNIVERSITY OF MADRAS**  
**U.G. DEGREE COURSES**

**சிறப்புத் தமிழ் (Advanced Tamil)**

**இரண்டாம் பருவம்**

**2 மதிப்பீடுகள்**

**I. கட்டுரை**

1. பெண்ணின் பெருமை-திரு.வி.க

**II. செய்யுள்**

**புறநானூறு**

- அ. கெடுகசிந்தை-ஓக்கூர் மாசாத்தியார்
- ஆ. ஈன்று புறந்தருதல் - பொன்முடியார்
- இ. யாதும் ஊரோ - கனியண் பூங்குன்றனார்
- ஈ. திருகுறள் - வான் சிறப்பு முழுமையும்
- உ. சிலப்பதிகாரம் - மங்கல வாழ்த்துப் பாடல்
- ஊ. திருவாசகம் - வேண்டத்தக்கது
- எ. திருவாய்மொழி - உயர்வற
- ஏ. இரட்சண்ய யாத்ரிகம் (சிலுவைப்பாடு)-பாடல்எண்-1,3,4
- ஐ. சீறாப்புராணம் - வானவர்க்கும்
- ஓ. பாரதியார் - நல்லதோர் வீணை

**III. இலக்கிய வரலாறு**

பாடம் தழுவிய இலக்கிய வரலாறு

**IV. மொழிப் பெயர்ப்பு**

ஆங்கிலப் பகுதியை தமிழாக்கம் செய்தல்

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UNIVERSITY OF MADRAS  
U.G. DEGREE COURSES

சிறப்புத் தமிழ் (Advanced Tamil)

முதற் பருவம்

2 மதிப்பீடுகள்

**I. நாட்டுப் புறப்பாடல்**

1. பஞ்சம்
2. மானம் விடிவதெப்போ?

**II. புனை கதை**

1. "கட்டை விரல்" - சி.என்.அண்ணாதுரை

**III. புதுக்கவிதை**

1. ஆடிக்காற்றே-சிற்பி
2. கடமையைச் செய்-மீரா
3. இழந்தவர்கள்-அப்துல் ரகுமான்

**IV. மொழித்திறன்**

1. கலைச்சொல்லாக்கம்
2. பொருந்தியச் சொல் தருதல்
3. பிழை நீக்கி எழுதுதல்

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**UNIVERSITY OF MADRAS**  
**U.G. DEGREE COURSES**

**அடிப்படைத் தமிழ்ப் பாடம் - (BASIC TAMIL)**

இரண்டாம் பருவம்

2 மதிப்பீடுகள்

1. நீதி நூல்கள்

1. ஆத்திச் சூடி(1-12)
2. கொன்றை வேந்தன்(1-8)
3. திருக்குறள்(5)
  - I. அகர முதல ..... (1)
  - II. செயற்கரிய ..... (26)
  - III. மணத்துக்கண் ..... (34)
  - IV. கற்க கசடறக்..... (391)
  - V. எப்பொருள் ..... (423)

(இப்பகுதியில் 15 வினாக்கள் பாடம் தொடர்பாகவும், 5 வினாக்கள் பாடல் வரிகளை எழுதும் வகையில் அமைதல் வேண்டும்)

2. நீதி கதைகள்

1. பீர்பால் கதை
2. பரமாத் குரு கதை

3. அறிமுகம்

1. தமிழ் இலக்கிய வரலாறு - இலக்கியங்கள் புலவர்கள்
2. தமிழக வரலாறு - வரலாற்றுச் சின்னங்கள், சுற்றுலாத்தலங்கள், அலுவலகப் பெயர்கள்
3. பழமொழிகள்.

**NOTE:**

The mode of conduct of Examination for PART-IV - Basic Tamil (I & II Semesters) are as follows:

அடிப்படைத் தமிழுக்கு விடையைத் தேர்ந்தெடுத்தல் முறையின்படி (objective type) 50 வினாக்கள் கொடுக்கப்பட வேண்டும். ஒவ்வொரு வினாவிற்கும் 2 மதிப்பெண்கள் வீதம் எழுத்துத் தேர்வில் 100க்கு மதிப்பெண்கள் வழங்கி பின்னர் 75க்கு மாற்றம் செய்ய வேண்டும். அகமதிப்பீட்டிற்கு உள்ள 25 மதிப்பெண்களுடன் எழுத்துத் தேர்வு மதிப்பெண்ணையும் சேர்த்து 100க்கு மொத்தமாக வழங்கலாம்.

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**UNIVERSITY OF MADRAS**  
**U.G. DEGREE COURSES**

**அடிப்படைத் தமிழ்ப் பாடம் (BASIC TAMIL)**

முதற் பருவம்

2 மதிப்பீடுகள்

தமிழ் மொழியில் அடிப்படைக் கூறுகள்

1. எழுத்துக்கள்: முதல் எழுத்துக்கள்

1. உயிர எழுத்து, ஆய்த எழுத்து
2. மெய் எழுத்து
3. உயிர் மெய் எழுத்து

2. சொற்கள்

1. பெயர் சொல்
2. வினை சொல்
3. இடை சொல்
4. உரி சொல்

3. தொடரமைப்பு

1. எழுவாய்
2. பயனிலை
3. செயப்படுப் பொருள்

4. (a) பிழை நீக்கம்

1. ஒற்றுப் பிழை
2. எழுத்துப் பிழை
3. தொடர் பிழை

(b) எண்கள் (Numerals), உறவுப் பெயர்கள், வாழ் இடங்களும், பொருள்களும்

5. அறிமுகம்

1. விழாக்கள்
2. இயற்கை
3. உணவு முறைகள்-சுவை-காய்கள்-பழங்கள்

**NOTE:**

The mode of conduct of Examination for Part-IV-Basic Tamil (I&II Semesters) are as follows:

அடிப்படைத் தமிழுக்கு விடையைத் தேர்ந்தெடுத்தல் முறையின்படி (objective type) 50 வினாக்கள் கொடுக்கப்பட வேண்டும். ஒவ்வொரு வினாவிற்கும் 2 மதிப்பெண்கள் வீதம் எழுத்துத் தேர்வில் 100க்கு மதிப்பெண்கள் வழங்கி பின்னர் 75க்கு மாற்றம் செய்ய வேண்டும். அகமதிப்பீட்டிற்கு உள்ள 25 மதிப்பெண்களுடன் எழுத்துத் தேர்வு மதிப்பெண்ணையும் சேர்த்து 100க்கு மொத்தமாக வழங்கலாம்.

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**UNIVERSITY OF MADRAS**  
**UG & 5 YR INTEGRATED DEGREE COURSES**  
**SYLLABUS – OTHER LANGUAGES**

**BP1-LARC1**

**PART I - ARABIC**  
**(w.e.f.2012-2013)**  
**FIRST YEAR - SEMESTER – I**  
**PAPER I – PROSE AND GRAMMAR – I**

**Books Prescribed:**

**1) Duroos Al-Lugha Al-Arabiyya Part-I**

By Dr. V. Abdur Rahim (Lesson 1 to 12)

Unit 1 : Lesson 1 to 4

Unit 2 : Lesson 5 to 8

Unit 3 : Lesson 9 to 12

**2) An-Nahu Al-Wadeh Part-I (Al-Ibtidaiyyah)**

By Ali Al Jarim and Mustafa Ameen

Unit 4 :

Al-Jumlah Al-Mufeedha, Ajza Al-Jumlah, Al-Fi'l al-Madhi,  
Al-Fi'l-al-Mudhari', Fi'l al-Amr

Unit 5 : Al-Fa'il, Al-Maf'uool, Al-Mubthdha Wal-Khabar

**SEMESTER - II**  
**PAPER II – COMMUNICATION SKILLS IN ARABIC**

**Books Prescribed:**

**Arabic Conversation Book**

By Mohd. Harun Rashid and Khalid Perwez

Published by Goodword Books

Unit 1 : Lesson 1 to 4

Unit 2 : Lesson 5 to 9

Unit 3 : Lesson 10 to 13

Unit 4 : Lesson 14 to 16

Unit 5 : Lesson 17 to 19

**UNIVERSITY OF MADRAS**  
**UG & 5 YR INTEGRATED DEGREE COURSES**  
**SYLLABUS – OTHER LANGUAGES**

**SECOND YEAR- SEMESTER - III**  
**PAPER III – PROSE AND GRAMMAR – II**

**Books Prescribed:**

**1) Duroos Al-Lugha Al-Arabiyya Part-I**

By Dr. V. Abdur Rahim (Lesson 13 to 23)

Unit 1 : Lesson 13 to 17

Unit 2 : Lesson 18 to 20

Unit 3 : Lesson 21 to 23

**2) An-Nahu Al-Wadeh Part-I (Al-Ibtidaiyyah)**

By Ali Al Jarim and Mustafa Ameen

Unit 4 : Al-Jumlah Al-Fi'liyyah, Al-Jumlah Al-Ismiyyah,  
Nasb Al-Fi'l-al-Mudhari',

Jazm Al-Fi'l-al-Mudhari', Raf' Al-Fi'l-al-Mudhari'

Unit 5 : Kana wa Akhawatuha, Inna wa Akhawathuha, Jarr al-  
Ism, An-Na'tu

**SEMESTER IV**  
**PAPER IV – QURAN AND HADITH**

**Books Prescribed:**

**1) Sooratu Luqman**

Al-Quran – Chapter 31

Unit 1 : Verse 1 to 11

Unit 2 : Verse 12 to 21

Unit 3 : Verse 22 to 34

**2) Ahadeeth Sahlah**

By Dr. V. Abdur Rahim

Unit 4 : Hadith 1 to 10

Unit 5 : Hadith 11 to 20

**UNIVERSITY OF MADRAS**  
**UG & 5 YR INTEGRATED DEGREE COURSES**  
**SYLLABUS – OTHER LANGUAGES**

**REVISED QUESTION PAPER PATTERN**  
**Arabic Language Part –I**

**Part –A (30 Words)**  
**10 out of 12 - (10 x 2marks = 20 marks)**

**Part – B (200 words)**  
**5 out of 7 - (5 x 5marks = 25 marks)**

**Part – C (500 words)**  
**3 out of 5 - (3 x 10marks = 30 marks)**

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**UNIVERSITY OF MADRAS**  
**UG & 5 YR INTEGRATED DEGREE COURSES**  
**SYLLABUS – OTHER LANGUAGES**

**BP1-LURD1**

**PART-I- URDU**

(With effective from the academic year 2008-2009).

**FIRST SEMESTER**

**PAPER-I PROSE AND LETTER WRITING**

3 Hours

Max Marks: 75

(A) PROSE (following lessons only)

1. Umeed Ki Khushi by Sir Syed Ahmed Khan.
2. Internel – by Izhar Ahmed
3. Khanvada-e-Walajahi ke Gumnam Shaer – by Dr.Syed Sajjad Hussain.

**Book Prescribed**

Sogath-e-Adab Ed. By Dr. Syed Sajjad Hussain, published by University of Madras.

(B) LETTER WRITING

1. letter to the Principal asking for leave
2. Letter to the Publisher or Book seller placing order for books
3. Letter to a Firm Manager seeking a job.
4. Letter to a Bank Manager seeking a loan
5. Letter to the father asking money for payment of college fees.

**Unit wise distribution**

Unit-I	(1) Umeed Ki Khushi (First Half) (2) Letter to the Principal
Unit-II	(1) Umeed Ki Khushi (Second Half) (2) Letter to the Publisher
Unit-III	(1) Internel (First Half) (2) Letter seeking a job
Unit-IV	(1) Interner (second half) (2) Letter to a Bankd Manager
Unit-V	(1) Khanvada-e-Walajahi (Full) (2) Letter to the father.

**UNIVERSITY OF MADRAS**  
**UG & 5 YR INTEGRATED DEGREE COURSES**  
**SYLLABUS – OTHER LANGUAGES**

**SECOND SEMESTER**

PAPER-II PROSE GRAMMAR AND TRANSLATION

3 Hours

Max Marks: 75

(A) PROSE (following lessons only)

1. Ghalib Ke Khutooth by Ghalib
2. Abdul Haqw Marhoom by Rasheed Ahmed Sioddqui.
3. Thirukkural by Dr. Hayath Ifthkhar.

**Book Prescribed**

Soghath-e-Adab Ed. By Dr. Syed Sajjad Hussain, published by University of Madras.

(B) GRAMMAR –following topics only.

1. Ism aur Uski Qismein
2. Sifath
3. Zameer
4. Fel
5. Tazkeer-o-Taneez

**Book Prescribed**

Urdu Grammar – Yaqoob Aslam

(C) TRANSLATION

1. Translation of unseen passage from English to Urdu
2. Translation of commercial Words

Commercial Words

- 1.Profit, 2.Loss 3.Expensess 4. Investment 5.Debit 6.Credit 7.Export 8. Import 9.Wages  
10.Salary 11.Warehouse 12.Cash 13.Account 14.Invoice 15.Tranportations 16.Customer  
17.Seller 18.Buyer 19. Discount 20.Commission 21.Interest 22.Bank Loan 23.Voucher  
24.Inventory 25.Godown 26.Insurace 27.Rate of Interest 28.Receipt 29.Share 30.Trade  
31.Commerce 32. Finance.

**Unit wise distribution**

- Unit-I (1) Ghalib Ke Khutooth  
(2) Ism aur Uski Qismein
- Unit-II (1) Abdul Haqw Marhoom  
(2) Sifath
- Unit-III (1) Thirukkural  
(2) Zameer
- Unit-IV (1) Zameer  
(2) Fel



**UNIVERSITY OF MADRAS**  
**UG & 5 YR INTEGRATED DEGREE COURSES**  
**SYLLABUS – OTHER LANGUAGES**

- Unit-V
- (1) Tazkeer-o-Taneez
  - (2) Translation of unseen passage from English to Urdu.
  - (3) Translation of commercial Words

**QUESTION PAPER PATTERN**

(W.E.F.2008-09)

PART- A (5X3=15)

5 out of 7 Questions (One or two sentences)

PART- B (5x6=30)

5 out of 7 Questions(Paragraph)

PART -C(3x10=30)

3 out of 6 Questions (Essay Type)

**REVISED PATTERN OF QUESTION PAPER**

**(W.E.F.2009-2010 And Thereafter)**

Duration :3 hours

Max Marks: 100

The question paper will comprise of Ten Questions, out of which five question have to be answered. Marks are equal for all the five questions i.e. each question will carry 20 Marks Wherever the text of prose and poetry are prescribed one compulsory question on reference to the context should be asked in the case of prose and commentary of couplets should be asked in the case of poetry. These questions will comprise of eight extracts from prose or eight couplets from poetry out of which four has to be answered.

**UNIVERSITY OF MADRAS**  
**UG & 5 YR INTEGRATED DEGREE COURSES**  
**SYLLABUS – OTHER LANGUAGES**

**THIRD SEMESTER**

**PAPER III POETRY AND HISTORY OF URDU LITERATURE**

(Common to all U.G. courses and Five Year Integrated P.G. courses 2008-2009)

**Time : 3 hours**

**Max.Marks: 75**

(A) **POETRY** (Following Ghazals only)

1. Faqeerana Aaye Sadaa Kar Chale - Mir Taqi Mir
2. Dil-e-nadaan Tuje Hua Kya Hai - Mirza Ghalib
3. Khaathir Se Ya Lihaaz se maan tho gaza 0 Daag Dehlavi
4. Sitaaton se aagae Jahan aur bhi hain - Allama Iqbal
5. Na Ab Musjujrane Ko Ji Chaahta Hai – Jigar Muradabadi

*Books Prescribed*

Urdu Saheri –Inthikhaab - (Published by National Council for Promotion of Urdu Language – New Delhi)

(B) **HISTORY OF URDU LITERATURE** (Following topics only)

1. Urdu Zaban Ki Ibtada
2. Ghar Se Door Dakhani Hindustan Mein
3. Dilli Ki Shaeri
4. Nazeer Akbarabadi
5. Dabistan-e-Lucknow

*Books Prescribed*

Urdu Ki Kahani – Ehtisham Hussain (Published by National Council for Promotion of Urdu Language – New Delhi)

*Unit wise Distribution*

- Unit –I (1) Faqeerana Aaye  
(2) Urdu Zaban Ki Ibtada
- Unit–II (1) Dil-e-nadaan Tuje  
(2) Ghar Se Door
- Unit–III (1) Khaathir Se  
(2) Dilli Ki Shaeri
- Unit–IV (1) Sitaaron Se Aage  
(2) Nazeer Akbarabadi
- Unit–V (1) Na Ab Muskurane Ko Ji  
(2) Dabistan-e-Lucknow

**UNIVERSITY OF MADRAS**  
**UG & 5 YR INTEGRATED DEGREE COURSES**  
**SYLLABUS – OTHER LANGUAGES**

**FOURTH SEMESTER**

**PAPER - IV - POETRY AND NON-DETAILED**

**Time : 3 hours**

**Max. Marks: 75**

**(A) POETRY** (Following Poems only)

1. Aadmi Nama – Nazeer Akbarabadi
2. Nisar Main Teri Galiyonke – Faiz Ahmed Faiz
3. Taj Mahal – Sahir Ludhianvi
4. Rubaiyaath – Mir Anees, Hali, Akbar Allahabadi, Amjad Hyderabad.

**(B) NON-DETAILED** (Following short stories only)

1. Qaathil - Premchand
2. Jaamun Ka Ped – Krishan Chander
3. Bhola – Rajender Singh Bedi
4. Dard Ka Ehsaas – ameerunissa

***Book Prescribed***

Soghath-e-Adab –Edited by Dr.Syed Sajjad Husain (Published by University of Madras)

***Unit wise Distribution***

- Unit –I (1) Aadmi Naama (First Half)  
(2) Qaathil (First Half)
- Unit–II (1) Aadmi Naama (Second Half)  
(2) Qaathil (Second Half)
- Unit–III (1) Nisar Main Teri Galiyonke  
(2) Jamun Ka Ped
- Unit–IV (1) Nisar Main Teri Galiyonke  
(2) Bhola
- Unit–V (1) Taj Mahal  
(2) Dard Ka Ehsaas

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சென்னைப்பல்கலைக்கழகப்பாடத்திட்டமாற்றம்

2020 ஆம்கல்வியாண்டுமுதல்

பொதுத்தமிழ் – (Foundation Course)

B.A./B.Sc./B.Com.,

BFC-LT001

முதற்பருவம் I SEMESTER

பாடப்பகுப்பு

I இலக்கியம்

II பாடம்சார்ந்ததமிழிலக்கியவரலாறு

III மொழிப்பயிற்சி

முதல்பருவம்

இலக்கியம்

அலகு 1

மரபுக்கவிதை

- பாரதியார் – பாரதசமுதாயம்.
- பாரதிதாசன் – ஒற்றுமைப்பாட்டு
- கவிமணிதேசிகவிநாயகம்பிள்ளை – உடல்நலம்பேணல்
- நாமக்கல்கவிஞர்வெ. இராமலிங்கம்பிள்ளை – தமிழன்இதயம்
- கவிஞர்கண்ணதாசன் – குடும்பம்ஒருகதம்பம்
- பட்டுக்கோட்டைஅ. கல்யாணசுந்தரம் – வருங்காலம்உண்டு
- தமிழ்ஒளி – வழிப்பயணம்

புதுக்கவிதை

- கவிஞர்ந. பிச்சமூர்த்தி – காதல், லீலை
- கவிஞர்அப்துல்ரகுமான் – பித்தன்
- கவிஞர்மு.மேத்தா – ஒருகடிதம்அனாதையாகிவிட்டது, நிழல்கள்
- கவிஞர்இன்குலாப் –  
ஒவ்வொருபுல்லையும்பெயர்சொல்லிஅழைப்பேன்

- கவிஞர்தமிழன்பன் – சொல்லில்உயர்வுதமிழ்ச்சொல்லே
- கவிஞர்வைரமுத்து – விதைச்சோளம்
- கவிஞர்அ.சங்கரி – இன்றுநான்பெரியபெண்

## அலகு 2

- ஏற்றப்பாட்டு
- தெம்மாங்கு
- அம்பாபாடல்கள்
- விளையாட்டுப்பாடல்கள்
- நடவுப்பாடல்கள்

## அலகு 3

### சிறுகதைகள்

- கு.ப.ரா – கனகாம்பரம்
- கு.அழகிரிசாமி – குமாரபுரம்ஸ்டேஷன்
- தமிழ்ச்செல்வன் – வெயிலோடுபோய்
- தோப்பில்முகமதுமீரான் – வட்டக்கண்ணாடி
- அம்பை – பிளாஸ்டிக்டப்பாவில்பராசக்திமுதலியோர்

### உரைநடை

- இரா.பி.சேதுப்பிள்ளை – வண்மையும்வறுமையும்

## அலகு 4

- நா.முத்துசாமி – நாற்காலிக்காரர்

## அலகு 5

### தமிழிலக்கியவரலாறு

- மரபுக்கவிதை – இருபதாம்நூற்றாண்டுகவிஞர்கள்
- புதுக்கவிதை

- நாட்டுப்புறப்பாடல்கள், கதைகள், கதைப்பாடல்கள், பழமொழிகள், விடுகதைகள்
- சிறுகதை, உரைநடைவரலாறு
- நாடகம் – சார்ந்தபகுதிகள்

## அலகு 6

### மொழிப்பயிற்சி

- வாக்கியவகை(தொடர்வாக்கியம், தனிவாக்கியம், கூட்டுவாக்கியம்)
- இருவழக்குகள் (பேச்சு, எழுத்து)
- எழுவாய், பயனிலை, செயப்படுபொருள்
- ஒருமை, பன்மைமயக்கம்
- திணை, பால், எண், இடவேறுபாடு
- நால்வகைச்சொற்கள் (பெயர், வினை, இடை, உரி)
- அகரவரிசைப்படுத்துதல்

மதிப்பெண்பங்கீடு– I & II – 50 மதிப்பெண்கள்

III – 25 மதிப்பெண்கள்

சென்னைப்பல்கலைக்கழகப்பாடத்திட்டமாற்றம்

2020 ஆம்கல்வியாண்டுமுதல்

பொதுத்தமிழ் – (Foundation Course)

B.A./B.Sc./B.Com.,

BFC-LT002

பொதுத்தமிழ்இரண்டாம்பருவம்

மொத்தமதிப்பெண்கள் – 75

பாடப்பகுப்பு

- I. இலக்கியம்
- II. அதைச்சார்ந்ததமிழிலக்கியவரலாறு
- III. மொழிப்பயிற்சி

**அலகு 1**

1. நற்றிணை – 61 , 88
2. குறுந்தொகை -87,88,89
3. கலித்தொகை – 11 ஆம்பாடல் – அரிதாயஅறன்எய்தி

**அலகு 2**

1. அகநானூறு – 86 ஆம்பாடல் (உழுந்துதலைபெய்த )
2. ஐங்குறுநூறு – கிள்ளைப்பத்து
3. பரிபாடல் –செவ்வேள் 5 (கடுவன்இளவெயினார் (1 முதல் 10 வரிகள் – வெற்றிவேல் )

**அலகு 3**

1. புறநானூறு – 48, 292
2. பதிற்றுப்பத்து –காக்கைப்பாடினியார்,நச்செள்ளையார்பாடல்கள் (56, 57)

#### அலகு 4

1. பத்துப்பாட்டு-முல்லைப்பாட்டு (முழுவதும்)

#### அலகு 5

1. திருக்குறள் – பொருட்பால் - 3 அதிகாரம் (காலமறிதல், சுற்றந்தழால், கண்ணோட்டம்)
2. நாலடியார் –ஈகை(முதல் 5 பாடல்கள்)

#### II தமிழிலக்கியவரலாறு

1. முச்சங்கவரலாறு , பதினெண்மேற்கணக்குநூல்கள்  
( எட்டுத்தொகை, பத்துப்பாட்டு)
2. பதினெண்கீழ்க்கணக்குநூல்கள்

#### III மொழிப்பயிற்சி

1. இலக்கணக்குறிப்பு (வேற்றுமைத்தொகை, உவமைத்தொகை, பண்புத்தொகை, உம்மைத்தொகை, அன்மொழித்தொகை)  
[பத்தியிலிருந்துஇலக்கணக்குறிப்புகளைக்கண்டறிதல்]
2. ஒற்றுமிகும்மிகாஇடங்கள்
3. மரபுத்தொடர்கள்(தமிழ்மரபுத்தொடர்களைக்கண்டறிதல்)

மதிப்பெண்பங்கீடு –

I & II இலக்கியம் – 50

III. மொழிப்பயிற்சி - 25



சென்னைப்பல்கலைக்கழகப்பாடத்திட்டமாற்றம்

2020 ஆம்கல்வியாண்டுமுதல்

பொதுத்தமிழ் – (Foundation Course)

B.A./B.Sc./B.Com.,

BFC-LT003

பொதுத்தமிழ்மூன்றாம்பருவம்

மொத்தமதிப்பெண்கள் – 75

பாடப்பகிர்வு

- I. இலக்கியம்
- II. அதைச்சார்ந்ததமிழிலக்கியவரலாறு
- III. மொழிப்பயிற்சியும்மொழிபெயர்ப்பும்

**அலகு 1**

1. காரைக்கால்அம்மையார் – அற்புதத்திருவந்தாதி  
("பிறந்துமொழி" எனத்தொடங்கி 5 பாடல்கள்)
2. தேவாரம் – திருஞானசம்பந்தர் – திருத்தில்லைபதிகம்  
"கற்றாங்கு" எனத்தொடங்கி 11 பாடல்கள்
3. திருநாவுக்கரசர் – "மாசில்வீணையும்" எனத்தொடங்கி 10 பாடல்கள்
4. சுந்தரர் – "பித்தாபிறைசூடி" எனத்தொடங்கி 10 பாடல்கள்
5. மாணிக்கவாசகர் – திருப்பள்ளியெழுச்சி 10 பாடல்கள்

**அலகு 2**

1. ஆண்டாள் – நாச்சியார்திருமொழி – ஏழாம்பத்து
2. பொய்கையாழ்வார், பூதத்தாழ்வார், பேயாழ்வார் – முதல்பாடல்
3. நம்மாழ்வார் – முதல்பத்து – நான்காந்திருமொழிமுதல் 5 பாடல்கள்

**அலகு 3**

1. தாயுமானவர் – பைங்கிளிகண்ணி (5 கண்ணிகள்)

2. வள்ளலார் - திருவருட்பா – பிள்ளைச்சிறுவிண்ணப்பம் (1-5)
3. அருணகிரிநாதர் – விநாயகர்துதி - நினதுதிருவடிஎனத்தொடங்கும் 5 ஆம்பாடல்

#### அலகு 4

1. சித்தர்பாடல்கள் – திருமூலர் – திருமந்திரம் (270,271,274,275,285)
2. குணங்குடிமஸ்தான் – பராபரக்கண்ணி (முதல்பத்துக்கண்ணிகள்)
3. வேதநாயகம்பிள்ளை – தாய்தந்தையர்வணக்கம் 25 - 32 வரிகள்  
(பெண்மதிமாலை)

#### அலகு 5

1. முத்தொள்ளாயிரம்
2. தமிழ்விடுதாது – முதல்16கண்ணிகள்
3. நந்திக்கலம்பகம்(61, 96, 100, 105, 110)

#### II தமிழிலக்கியவரலாறு

1. பக்திஇலக்கியம் (சைவம், வைணவம், சித்தர்கள், இஸ்லாம், கிறித்துவம்)
2. சிற்றிலக்கியங்கள்

#### III மொழிப்பயிற்சியும்மொழிபெயர்ப்பும்

ஒருபொருள்குறித்தபலசொல் , பலபொருள்குறித்தஒருசொல்,  
பிறமொழிச்சொல்நீக்கல், அலுவலகக்கடிதம்வரைதல்,  
தமிழில்மொழிபெயர்த்தல்

மதிப்பெண்பங்கீடு I & II – 50

சென்னைப்பல்கலைக்கழகப்பாடத்திட்டமாற்றம்

2020 ஆம்கல்வியாண்டுமுதல்

பொதுத்தமிழ் – (Foundation Course)

B.A./B.Sc./B.Com.,

BFC-LT004

பொதுத்தமிழ்நான்காம்பருவம்

மொத்தமதிப்பெண்கள் – 75

பாடப்பகிர்வு-

I இலக்கியம்

II அதைச்சார்ந்ததமிழிலக்கியவரலாறு

III மொழித்திறன்

அலகு 1

1. சிலப்பதிகாரம் – ஊர்க்காண்காதை
2. மணிமேகலை – பாத்திரமரபுகூறியகாதை

அலகு 2

1. சீவகசிந்தாமணி – ஏமாங்கதநாட்டுவளம் 10 பாடல்கள்மட்டும்
2. சூளாமணி – 5 பாடல்கள் (நாட்டுச்சருக்கம், நகரச்சருக்கம், தூதுசருக்கம், கல்யாணச்சருக்கம், சுயம்வரச்சருக்கம்)

அலகு 3

1. கம்பராமாயணம் – குகப்படலம்
2. பெரியபுராணம் – மெய்ப்பொருள்நாயனார்புராணம்

அலகு 4

1. சீறாப்புராணம் - உடும்புபேசியபடலம் – 40 பாடல்கள்
2. தேம்பாவணி – வளன்சனித்தபடலம் – 31 பாடல்கள்

## அலகு 5

1. மீனாட்சியம்மைபிள்ளைத்தமிழ் – வருகைப்பருவம் – 5 பாடல்கள்
2. திருக்குற்றாலக்குறவஞ்சி - மலைவளம்

## II இலக்கியவரலாறு

1. காப்பியஇலக்கியங்கள்
2. சிற்றிலக்கியங்கள்
3. இஸ்லாமியஇலக்கியவரலாறு
4. கிறித்துவஇலக்கியவரலாறு

## III மொழித்திறனறிதல்

- i. கலைச்சொற்கள்
- ii. படைப்பு – சிறுகதை (அ) புதுக்கவிதை

மதிப்பெண்பங்கீடு - I & II – 50

III – 25

**UNIVERSITY OF MADRAS**  
**U.G. DEGREE COURSE**

**ENVIRONMENTAL STUDIES PROGRAMME**  
ABILITY ENHANCEMENT COMPULSORY COURSES  
(AECC- Environmental Studies)

Syllabus with effect from the academic year 2018-2019  
( i.e. for batch of candidates admitted to the course from the academic year 2017-18)

Credits: 2

II Year / III/IV Sem.

**Unit 1: Introduction to Environmental Studies**

- Multidisciplinary nature of environmental studies;
- Scope and importance; concept of sustainability and sustainable development.

**Unit 2 : Ecosystem (2 lectures)**

- What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem:  
Food chains, food webs and ecological succession, Case studies of the following ecosystem:
  - a) Forest ecosystem
  - b) Grassland ecosystem
  - c) Desert ecosystem
  - d) Aquatic ecosystem (ponds, stream, lakes, rivers, ocean, estuaries)

**Unit 3: Natural Resources : Renewable and Non – renewable Resources ( 6 lectures)**

- Land resources and land use change: Land degradation, soil erosion and desertification.
- Deforestation : Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.
- Water : Use and over –exploitation of surface and ground water, floods, droughts, conflicts over water ( international and inter-state).
- Energy resources : Renewable and non renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

**Unit 4: Biodiversity and Conservation ( 8 lectures)**

- Levels of biological diversity: genetics, species and ecosystem diversity, Biogeographic zones of India: Biodiversity patterns and global biodiversity hot spots
- India as a mega- biodiversity nation, Endangered and endemic species of India.
- Threats to biodiversity: Habitat loss, poaching of wildlife, man- wildlife conflicts, biological invasions; Conservations of biodiversity: In-situ and Ex-situ Conservation of biodiversity.
- Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

**Unit 5: Environmental Pollution (8 lectures)**

- Environmental pollution: types, causes, effects and controls: Air, Water, soil and noise Pollution.
- Nuclear hazards and human health risks
- Solid waste management: Control measures of urban and industrial waste
- Pollution case studies.

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### Unit 6: Environmental Policies & Practices ( 8 lecturers)

- Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture
- Environment Laws: Environment Protection Act, Air (Prevention & Control of Pollution) Act; Water (Prevention and Control of Pollution ) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD).
- Nature reserves, tribal populations and rights, and human Wildlife conflicts in Indian context.

### Unit 7: Human Communities and the Environment (7 lectures)

- Human population growth, impacts on environment, human health and welfare.
- Resettlement and rehabilitation of projects affected persons; case studies.
- Disaster management: floods, earthquake, cyclone and landslides.
- Environmental movements : Chipko, Silent Valley, Bishnois of Rajasthan.
- Environmental ethics : Role of Indian and other religions and cultures in environmental conservation.
- Environmental communication and public awareness, case studies(e.g. CNG Vehicles in Delhi)

### Unit 8 : Field Work (6 lectures)

- Visit to an area to document environmental assets: river / forest/ flora/ fauna etc.
- Visit to a local polluted site – Urban / Rural/ Industrial/ Agricultural.
- Study of common plants, insects, birds and basic principles of identification.
- Study of simple ecosystem- pond, river, Delhi Ridge etc.

(Equal to 5 Lectures)

### Suggested Readings:

1. Carson , R. 2002.Silent Spring, Houghton Mifflin Harcourt.
2. Gadgil , M.,& Guha, R. 1993.This Fissured Land: An Ecological History of India. Univ.of California Press.
3. Glesson, B. and Low, N.(eds.)1999. Global Ethics and Environment, London, Routledge.
4. Gleick,P.H.1993.Water Crisis. Pacific Institute for Studies in Dev.,Environment & Security. Stockholm Env.Institute, Oxford Univ.Press.
5. Groom, Martha J., Gary K.Meffe, and Carl Ronald Carroll. Principles of Conservation Biology. Sunderland: Sinauer Associates,2006.
6. Grumbine,R.Edward, and Pandit,M.K2013.Threats from India's Himalayas dams .Science,339:36-37
7. McCully,P.1996.Rivers no more :the environmental effects of dams(pp.29-64).Zed books.
8. McNeill,John R.2000.Something New Under the Sun: An Environmental History of the Twentieth Century.
9. Odum,E.P.,Odum, H.T.& Andrees,J.1971.Fundamental of Ecology. Philadelphia Saunders.
10. Pepper,I.L.,Gerba,C.P & Brusseau,M.L.2011.Environmental and Pollution Science. Academic Press.
11. Rao,M.N.& Datta,A.K1987.Waste Water Treatment. Oxford and IBH Publishing Co.Pvt.Ltd.
12. Raven,P.H.,Hassenzahl,D.M & Berg,L.R.2012 Environment.8<sup>th</sup> edition. John Willey & sons.

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13. Rosencranz, A., Divan,S.,& Noble, M.L.2001.Environmental law and policy in India. Tirupathi 1992.
14. Sengupta,R.2003.Ecology and Economics: An approach to sustainable development.OUP
15. Singh,J.S.,Singh,S.P and Gupta,S.R.2014.Ecology,Environmental Science and Conservation. S.Chand Publishing, New Delhi.
16. Sodhi,N.S.,Gibson,L.&Raven ,P.H(eds).2013.Conservation Biology :Voices from the Tropics. John Willey & Sons.
17. Thapar,V.1998.Land of the Tiger: A Natural History of the Indian Subcontinent.
18. Warren,C.E.1971.Biology and water Pollution Control. WB Saunders.
19. Willson,E.O.2006. The Creation: An appeal to save life on earth..New York: Norton.
20. World Commission on Environment and Development.1987.Our Common Future. Oxford University Press.

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**U.G. DEGREE COURSE**

**PART – IV - VALUE EDUCATION**

**Common for all U.G. & Five Year Integrated Courses**  
**(Effective from the Academic Year 2012 – 2013)**

**SYLLABUS**

**CREDITS: 2**

**III YEAR / V SEM**

**Objective:** Value are socially accepted norms to evaluate objects, persons and situations that form part and parcel of sociality. A value system is a set of consistent values and measures. Knowledge of the values are inculcated through education. It contributes in forming true human being, who are able to face life and make it meaningful. There are different kinds of values like, ethical or moral values, doctrinal or ideological values, social values and aesthetic values. Values can be defined as broad preferences concerning appropriate courses of action or outcomes. As such, values reflect a person's sense of right and wrong or what "ought" to be. There are representative values like, "Equal rights for all", "Excellence deserves admiration". "People should be treated with respect and dignity". Values tend to influence attitudes and behavior and help to solve common human problems. Values are related to the norms of a culture.

**UNIT I:** Value education-its purpose and significance in the present world – Value system – The role of culture and civilization – Holistic living – balancing the outer and inner – Body, Mind and Intellectual level – Duties and responsibilities.

**UNIT II:** Salient values for life – Truth, commitment, honesty and integrity, forgiveness and love, empathy and ability to sacrifice, care, unity, and inclusiveness, Self esteem and self confidence, punctuality – Time, task and resource management – Problem solving and decision making skills – Interpersonal and Intra personal relationship – Team work – Positive and creative thinking.

**UNIT III:** Human Rights – Universal Declaration of Human Rights – Human Rights violations – National Integration – Peace and non-violence – Dr.A P J Kalam's ten points for enlightened citizenship – Social Values and Welfare of the citizen – The role of media in value building.

**UNIT IV:** Environment and Ecological balance – interdependence of all beings – living and non-living. The binding of man and nature – Environment conservation and enrichment.

**UNIT V:** Social Evils – Corruption, Cyber crime, Terrorism – Alcoholism, Drug addiction – Dowry – Domestic violence – untouchability – female infanticide – atrocities against women – How to tackle them.



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**Books for Reference :**

1. M.G. Chitakra: Education and Human Values, A.P.H. Publishing Corporation, New Delhi, 2003.
2. Chakravarthy, S.K: Values and ethics for Organizations: Theory and Practice, Oxford University Press, New Delhi, 1999.
3. Satchidananda, M.K: Ethics, Education, Indian Unity and Culture, Ajantha Publications, Delhi, 1991.
4. Das, M.S. & Gupta, V.K.: Social Values among Young adults: A changing Scenario, M.D. Publications, New Delhi, 1995.
5. Bandiste, D.D.: Humanist Values: A Source Book, B.R. Publishing Corporation, Delhi, 1999.
6. Ruhela, S.P.: Human Values and education, Sterling Publications, New Delhi, 1986.
7. Kaul, G.N.: Values and Education in Independent Indian, Associated Publishers, Mumbai, 1975.
8. NCERT, Education in Values, New Delhi, 1992.
9. Swami Budhananda (1983) How to Build Character A Primer : Rmakrishna Mission, New Delhi.
10. A Culture Heritage of India (4 Vols.), Bharatiya Vidya Bhuvan, Bombay, (Selected Chapters only)
11. For Life, For the future : Reserves and Remains – UNESCO Publication.
12. Values, A Vedanta Kesari Presentation, Sri Ramakrishna Math, Chennai, 1996.
13. Swami Vivekananda, Youth and Modern India, Ramakrishna Mission, Chennai.
14. Swami Vivekananda, Call to the Youth for Nation Building, Advaita Ashrama, Calcutta.
15. Awakening Indians to India, Chinmayananda Mission, 2003.

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