DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,
CHHATRAPATI SAMBHAJINAGAR.

CIRCULAR NO.SU/B.Sc./CBC&GS/87/2024

It is hereby inform to all concerned that, the Revised syllabi prepared by the Board of Studies/Ad-hoc Boards and recommended by the Dean, Faculty of Science & Technology, **Academic Council at its meeting held on 08 April 2024 has accepted** the following Syllabi under the Faculty of Science & Technology **as per Norms of Choiced Based Credit Grading System** run at the Affiliated Colleges, Dr.Babasaheb Ambedkar Marathwada University as appended herewith.

Sr.No.	Courses	Semester
1.	BA./B.Sc.Mathematics (Optional)	Vth and VIth semester
2.	B.Sc.Statistics (Optional)	Vth and VIth semester
3.	B.Sc.Horticuluture (Optional)	Vth and VIth semester
4.	B.Sc.Industrial Chemistry(Optional)	Vth and VIth semester

This is effective from the Academic Year 2024-25 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.
REF.NO.SU/2024/26158-66
Date:- 03.05.2024.

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Deputy Registrar,
Academic Section

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1] **The Principal of all concerned Colleges,**
Dr. Babasaheb Ambedkar Marathwada University,

2] **The Director, University Network & Information Centre, UNIC, with a request to upload this Circular on University Website.**

Copy to :-

1] **The Director, Board of Examinations & Evaluation,** Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.
2] The Section Officer,[B.Sc.Unit] Examination Branch, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.
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DR.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY

CHHATRAPATI SAMBHAJINAGAR -431004 (MS) INDIA

Undergraduate Bachelor Degree Program
in Science and Technology

B.A./B.Sc.(Mathematics)Third Year (Semester-V & VI)

Course Structure and Curriculum

Choice Based Credit and Grading System

(Effective from Academic Year 2024-2025)

21/3/24

Dr.Babasaheb Ambedkar Marathwada University
Chhatrapati Sambhaji Nagar-431004 (MS) India

Course Structure of **B.A./B.Sc.(Mathematics) Third Year** (Semester-V & Semester-VI) under CBC&GS Pattern

B.A./B.Sc.(Mathematics)Third Year (Semester-V)

	Course Code	Course Title	Total Periods (Teaching Periods /week)	Credits	Scheme of Examination			
					Max. Marks	CIA	UA	Min. Marks
DSC-1C Core Courses	**MAT501 Paper - XIII**	**Real Analysis-I**	**30 (45Periods) (3/week)**	**2**	**50**	**10**	**40**	**20**
	MAT502 Paper-XIV	**Abstract Algebra**	**30 (45Periods) (3/week)**	**2**	**50**	**10**	**40**	**20**
	MAT503P Paper-XV	**Lab.Course-III (Based on MAT501 and MAT502)**	**90 (120Periods) (6/week)**	**3**	**50**	**10**	**40**	**20**
SEC-1 Elective Course (Any One)	**MAT-504 Paper-XVI(A)**	**Mathematical Statistics-I**	**30 (45Periods) (3/week)**	**2**	**50**	**10**	**40**	**20**
	MAT-505 Paper-XVI(B)	**Programming in C-I**	**30 (45Periods) (3/week)**	**2**	**50**	**10**	**40**	**20**
				9	200	40	160	80

Total Credits for Semester-V: **09**

B.A./B.Sc.(Mathematics) Third Year (Semester-VI)								
	Course Code	Course Title	Total Periods (Teaching Periods /week)	Credits	Scheme of Examination			
					Max. Marks	CIA	UA	Min. Marks
DSC-1D Core Courses	**MAT601 Paper-XVII**	**Real Analysis-II**	**30 (45Periods) (3/week)**	**2**	**50**	**10**	**40**	**20**
	MAT602 Paper-XVIII	**Ordinary Differential Equations**	**30 (45Periods) (3/week)**	**2**	**50**	**10**	**40**	**20**
	MAT603P Paper-XIX	**Lab Course-IV (Based on MAT601 and MAT602)**	**90 (120Periods) (6/week)**	**3**	**50**	**10**	**40**	**20**
SEC-2 Elective Course (Any One)	**MAT-604 Paper-XX (A)**	**Mathematical Statistics-II**	**30 (45Periods) (3/week)**	**2**	**50**	**10**	**40**	**20**
	MAT-605 Paper-XX(B)	**Programming in C-II**	**30 (45Periods) (3/week)**	**2**	**50**	**10**	**40**	**20**
				9	200	40	160	80
Total Credits for Semester-VI: **09**								

UA- University Assessment **CIA-** Continuous Internal Assessment

Note: CIA : **Internal Test -05** Marks and **Assignment/Tutorial-05** Marks

(Two internal testseach of 05 marks be conducted and average of the two tests will be considered)

Dr.Babasaheb Ambedkar Marathwada University
Chhatrapati Sambhajinagar -431004 (MS) India

Curriculum of B.A./B.Sc. (Mathematics) Third Year (Semester-V & Semester-VI) under CBC&GS pattern

B.A./B.Sc.(Mathematics) Third Year (Semester-V)

Course Code: **MAT501**	Course Name: **Real Analysis-I [Core course]**
Credits :**02**	Total Periods: **45**
Course Objectives	1. To introduce the basic concepts and notions of real analysis 2. To learn the basic concepts of Sequence and Series of Real numbers 3. To acquire the skill of finding the jacobians
Course Outcomes	**CO1:**Define and recognize bounded, convergent, divergent, Cauchy, and monotonic sequences. **CO2:**Define and recognize convergent, divergent, alternating series and limit comparison tests for conditional convergence and absolute convergence of an infinite series of real numbers. **CO3:**Determine the Jacobian of Implicit and explicit functions and condition for Jacobian to be vanish.
Course Content	
Unit-I	**Functions [10Hrs]** Functions, Real valued functions, Equivalence, Countability, Real Numbers,Least upper bounds [1]
Unit-II	**Sequences of Real Numbers [12 Hrs]** Definition of Sequence and Subsequence, Limit of a sequence, Convergent sequences, Divergent Sequence, Bounded Sequences,Monotone Sequences,Cauchy Sequences.[1]
Unit-III	**Series of Real Numbers [13 Hrs]** Convergence and divergence, Series with non-negative terms, Alternating Series, Conditional convergence and absolute convergence. [1]
Unit-IV	**Jacobians [10Hrs]** Definition, Case of function of functions, Jacobian of Implicit functions, Necessary and sufficient condition for a Jacobian to vanish.[2]
Recommended Textbook	**1.** Richard R.Goldberg: Methods of Real Analysis, Oxford and IBH Co.Pvt.Ltd, New Delhi (1974) **2.** J.N.Sharma and A.R.Vashistha: Real Analysis, Krishna Prakashan Media(P) Ltd, Meerut (2014)
Scope	Chapter 1: 1.3, 1.4, 1.5, 1.6,1.7**[1]** Chapter 2:2.1, 2.2, 2.3, 2.4, 2.5, 2.6,2.10(A, B, C, D)**[1]** Chapter 3:3.1, 3.2, 3.3, 3.4 [1] Chapter 13: Articles 1,2,3,4,5,6,7**[2]**
Reference Books	1.D.Somasundaram and B.Choudhary: A first course in Mathematical Analysis,Narsoba Publishing House, New Delhi (1996) 2. Hari Kisan: Real Analysis, Pragati Prakashan, Meerut (2016) 3.S.K.Mittal and S.K.Pundir: Real Analysis, Pragati Prakashan, Meerut (2019)

Course Code: **MAT502**	Course Name: **Abstract Algebra [Core course]**
Credits :**02**	Total Periods: **45**
Course Objectives	Student will learn group, ring, ideal, maximal ideal and their properties.
Course Outcomes	**CO1:** Describe group and subgroup, **CO2**: Explain Normal subgroup and Quotient groups. **CO3:** Define Ring and some special types of rings. **CO4:** Describe Ideals and Maximal Ideals.
Course Content	
Unit-I	Group Theory: Definition of a group, Some examples of groups, Some preliminary lemmas, Subgroups, Cosets, Lagrange's theorem [10Hrs]
Unit-II	A counting principle, Normal subgroups and quotient groups, Group homomorphism, Kernel of group homomorphism, Group isomorphism [12Hrs]
Unit-III	Ring Theory: Definition and examples of rings, Some special classes of rings, Characteristic of an integral domain, Ring homomorphism, Kernel of ring homomorphism, Ring isomorphism.[13Hrs]
Unit-IV	Ideals and quotient rings, More ideals and quotient rings, Maximal ideals, Polynomial rings, Irreducible polynomial.[10Hrs]
Recommended Textbook	I. N. Herstein: Topics in Algebra, Willey Eastern Pvt. Ltd., New Delhi, Second Edition. (1975)
Scope	**Chapter 2:** 2.1, 2.2, 2.3, 2.4, 2.5 (Theorem 2.5.1 without proof), 2.6, 2.7 (Cauchy's and Sylow's theorem for Abelian groups are without proof, Omit Lemma 2.7.5 and Theorem 2.7.2). **Chapter 3:** 3.1, 3.2, 3.3, 3.4, 3.5, 3.9. (Theorem 3.9.1 and Lemma 3.9.2 are without proof).
Reference Books	1. A. R. Vasishtha: Modern Algebra, Krishna Prakashan Media Pvt. Ltd. Meerut. (2019) 2. M.L.Khanna: Modern Algebra, Jai Prakash Nath and Co. Meerut. (2018) 3. Surjeet Singh and QaziZameeruddin: Modern Algebra, Vikas Publishing House Pvt. Ltd. New Delhi. (2021) 4. Goyal J. K. And K. P. Gupta: Advanced Course in Modern Algebra, PragatiPrakashan, Meerut. (2022) 5. V. K. Khanna and S. K. Bhambri: A course in Abstract Algebra,Vikas Publishing House Pvt. Ltd. New Delhi (2022).

Course Code: **MAT503P**	Course Name: **Lab Course-III [Core course]** **(Based on MAT501 and MAT502)**
Credits :**03**	Total Periods: **120**
Course Objectives	Student will be able to apply the basic concepts and results of real analysis and abstract algebra
Course Outcomes	**CO1:**Define and recognize bounded, convergent, divergent, Cauchy, and monotonic sequences. **CO2:**Define and recognize convergence and divergence of series. **CO3:**Determine the Jacobian of Implicit and explicit function. **CO4:** Describe group and subgroup, **CO5**: Explain Normal subgroup and Quotient groups. **CO6:** Define Ring and some special types of rings. **CO7:** Describe Ideals and Maximal Ideals.
Course Content	
Section-A (Based on MAT 501) [Conduct at least five practicals from the following list of practicals)	
Practical-IA	To solve examples/results on functions, real valued functions and equivalence.
Practical-IIA	To solve examples/exercise on countability, real numbers and least upper bounds
Practical-IIIA	To solve examples/exercise on convergent and divergent sequences
Practical-IVA	To solve examples/exercise on bounded sequences and monotone sequences
Practical-VA	To solve examples/exercise on convergent and divergent series
Practical-VIA	To solve examples/exercise on conditional and absolute convergence of series
Practical-VIIA	To solve examples/exercise on Jacobians
Section-B (Based on MAT502) [Conduct at least five practicalsfrom the following list of practicals]	
Practical-IB	To solve examples/exercise/ properties on groups
Practical-IIB	To solve examples/exercise/ results on subgroups
Practical-IIIB	To solve examples/exercise on normal groups and quotient groups
Practical-IVB	To solve examples/exercise/properties on group homomorphisms
Practical-VB	To solve examples/exercise on rings
Practical-VIB	To solve examples/exercise on ring homomorphisms
Practical-VIIB	To solve examples/exercise on ideals, more ideals and polynomial rings
Recommended Textbook	1.Richard R.Goldberg: Methods of Real Analysis ,Oxford and IBH Co.Pvt.Ltd,NewDelhi (1976) 2.J.N.Sharma and A.R.Vashistha: Real Analysis, Krishna Prakashan Media(P) Ltd,Meerut(2014) 3. I. N. Herstein: Topics in Algebra, Willey Eastern Pvt. Ltd., New Delhi, Second Edition (1975)
Scope	As mentioned in course content of MAT501 and MAT 502
Reference Books	1.D.Somasundaram and B.Choudhary: A first course in Mathematical Analysis,Narsoba Publishing House, New Delhi (1996). 2. Hari Kisan: Real Analysis, PragatiPrakashan, Meerut (2016) 3.S.K.Mittal and S.K.Pundir: Real Analysis, PragatiPrakashan, Meerut.(2019) 4.A. R. Vasishtha: Modern Algebra, Krishna Prakashan Media Pvt. Ltd. Meerut. (2019) 5.M. L. Khanna: Modern Algebra, Jai Prakash Nath and Co. Meerut.(2018) 6.Surjeet Singh and QaziZameeruddin: Modern Algebra, Vikas Publishing House Pvt. Ltd. New Delhi.(2021)

Course Code: **MAT504**	Course Name: **Mathematical Statistics-I [Skill/Elective course]**
Credits :**02**	Total Periods: **45**
Course Objectives	Student will be able to learn and apply various statistical techniques
Course Outcomes	**CO 1**: Understand the concept of frequency distribution **CO 2**: Find the arithmetic mean, harmonic mean, mode, median, quartile **CO 3**: Find measure of dispersion, moments, skewness and Kurtosis etc. **CO 4**: Fit the data using curve fitting and least square method
Course Content	
Unit-I	**Frequency Distribution:** Construction and Graphical Representation of Frequency Distribution, Histograms, Frequency Polygon, Cumulative Frequency, Frequency Curve, Cumulative Frequency Curve.[10Hrs]
Unit-II	**Measures Of Central Tendency:** Arithmetic Mean, Geometric Mean, Harmonic Mean, Mode, Median, and Quartiles, Properties of arithmetic mean.[12Hrs]
Unit-III	**Measures of Distribution:** Various Measures of Dispersions, Coefficient of Dispersion and Variations, Moments, Skewness and Kurtosis.[13Hrs]
Unit-IV	**Curve Fitting and Principle of least Square :** What is curve fitting, Principles of least squares, Fitting a data to a line and to a parabola.[10Hrs]
Recommended Textbook	S. G. Gupta and V. K. Kapoor:Fundamentals of Mathematical Statistics,Sultan Chand and Co. New Delhi (9^{th} Edition) (2002).
Scope	Chapter 2: 2.1, 2.1.1, 2.1.2, 2.2.1, 2.2.2, 2.3, 2.4, 2.5, 2.5.1, 2.5.2, 2.5.3, 2.6, 2.6.1, 2.6.2, 2.7, 2.7.1, 2.7.2, 2.8, 2.8.1, 2.9, 2.9.1, 2.11. Chapter 3: 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.7.1, 3.7.2, 3.7.3, 3.8, 3.8.1, 3.9, 3.9.1, 3.10 Chapter 9: 9.1, 9.1.1, 9.1.2, 9.1.3, 9.1.4
Reference Books	1. Hogg and Craig: Introduction to Mathematical Statistics,Prentice Hall of India (1995). 2. Dennis D.Wackerly, WilliamMendenhallII, Richard L.Scheaffer: Mathematical Statistics with Applications, Seventh edition, Brooks/Cole Cengage Learning (2010). 3. David Lane:Introduction to Statistics, Rice University (2003) 4. Gregg Waterman: Mathematical Statistics, Oregon Institute of Technology (2015)

Course Code: **MAT505**	Course Name: **Programming in C-I [Skill/Elective course]**
Credits :**02**	Total Periods: **45**
Course Objectives	Student will learn programming in C language and execute a C program
Course Outcomes	**CO1**: Understand and apply the fundamentals of C Program **CO2**: Define and declare data types and variables **CO3**: Apply various types of operators and mathematical expressions **CO4**: Read and write the character , input and output
Course Content	
Unit-I	History of C, Importance of C, Sample C Programs, Basic structure of C programs, programming style, executing a C program.[10Hrs]
Unit-II	Introduction, Character set, C tokens, Keywords and identifies, Constants, variables, Data types, Declaration of Variables, Storage class assigning values to variables, Defining symbolic constants, case studies. [12Hrs]
Unit-III	Introduction, Arithmetic of operators, Relational operators, Logical operators, Assignment operators, Increment and decrement operators, Conditional operators, Bitwise operators, Special operators, Arithmetic expression, Evaluation of expressions, Precedence of arithmetic operators, Some computational problems, Type conversions in expression, Operators precedence and Associativity, mathematical functions. [13Hrs]
Unit-IV	Introduction, Reading a character, writing a character, formatted input: inputting integer numbers,inputting real numbers,inputting character strings, reading mixed data types, Formatted output: Output of integer numbers, output of real numbers, printing of single character, mixed data output, case studies.[10Hrs]
Recommended Textbook	E. Balagurusamy: Programming in ANSI C (Fourth Edition): Tata Mc-Graw Hill(2008)
Scope	Ch.1 : 1.1,1.2, 1.3,1.4,1.5,1.6, 1.8 to 1.10 Ch.2: 2.1,2.2,2.3,2.4,2.5,2.6,2.7,2.8,2.9,2.10, 2.11 Ch.3: 3.1 to 3.16 Ch.4: 4.1 to 4.5
Reference Books	1) YP. Kanetkar: Let us C: BPB Publication(2018) 2) Gottfried: Programmning in C: Schaum's Series(1996) 3) MoolishKooper: Spirit of "C"(1998) 4) D. Ravichandran Programming in C: New-Age International Publisher(1996) 5) J.B.Dixit Mastering C Programs(2013) 6) Pradip D Y and Manas Ghosh: Fundamentals of Computing and Programming in C(2013) 7) V.Rajaraman: Computer Programming in C: PHI Pvt Ltd, New Delhi (2005)

B.A./B.Sc. Mathematics (Third Year) Semester-VI

Course Code: **MAT601**	Course Name: **Real Analysis-II [Core course]**
Credits :**02**	Total Periods: **45**
Course Objectives	1. To introduce basic concepts ofmetric spaces 2. To learn the properties of metric spaces **3.** To learn fundamental concepts of Riemann Integration and Fourier series
Course Outcomes	**CO1**: Describe several basic concepts of metric spaces and their properties **CO2**: Understand properties of Riemann integrable functions, and applications of the fundamental theorems of calculus **CO3**: Find the Fourier series of some standard functions and its applications.
Course Content	
Unit-I	**Metric Spaces** Metric spaces, Limits in metric spaces [1] [10Hrs]
Unit-II	**Continuous functions on Metric Spaces** Function continuous at a point on the real line, Reformulation,Functions Continuous on metric space, Open sets, Closed Sets.[1][12Hrs]
Unit-III	**Connectedness, Completeness, and Compactness** More about open sets, Connected sets, Bounded sets and totally bounded sets,Complete metric spaces, Compact metric spaces, Continuous functions on compact metric spaces.[1][13Hrs]
Unit-IV	**Calculus** Sets of measure zero, Definition of Riemann Integral, Existence of Riemann Integral , Properties of Riemann Integral, Fundamental theorem of calculus[1] Fourier series -Introduction[2][10Hrs]
Recommended Textbook	**1.**RichardR.Goldberg: Methods of Real Analysis ,Oxford and IBH Co.Pvt.Ltd,New Delhi (1976). 2.D.Somasundaram and B.Choudhary: A first course in Mathematical Analysis,Narsoba Publishing House, New Delhi (1996).
Scope	Chapter 4: 4.2, 4.3**[1]** Chapter 5: 5.3, 5.4, 5.5 **[1]** Chapter 6:6.1,6.2(A,B),6.3(A,B,C,D,E), 6.4(A,B,C,D,E,F), 6.5(A, B, C, D,E).6.6(A,B,C,D)**[1]** Chapter 7:7.1,7.2,7.3(Theorem Without proof),7.4,7.8**[1]** Chapter 10: 10.1**[2]**
Reference Books	1) J.N.Sharma and A.R.Vashistha:Real Analysis,KrishnaPrakashanMedia(P) Ltd,Meerut (2014). 2) Hari Kisan:Real Analysis,PragatiPrakashan,Meerut (2016). 3) S.K.Mittal and S.K.Pundir:Real Analysis, PragatiPrakashan,Meerut (2019).

Course Code: **MAT602**	Course Name: **Ordinary Differential Equations [Core course]**
Credits :**02**	Total Periods: **45**
Course Objectives	Student will be able to classify and solve ordinary differential equations
Course Outcomes	**CO1** : Classify and identify the types of functions **CO2** : Solve the first and second order differential equations **CO3** : Solve initial value problems and study properties of solutions of IVP. **CO4** : Find the Wronskian of the solutions
Course Content	
Unit-I	Introduction, Complex numbers, Functions, Polynomials,Complex series and the exponential function,Determinants[10Hrs]
Unit-II	Introduction, Differential equations, Problems associated with differential equations,Linear equations of the first order, The equation $y'+ ay=0$, The equation $y'+ay=b(x)$[12Hrs]
Unit-III	Introduction, The second order homogeneous equation, Initial value problems for second order equations,Linear dependence and independence [13Hrs]
Unit-IV	A formula for the Wronskian, The non-homogeneous equation of order two, The homogeneous equation of order n[10Hrs]
Recommended Textbook	Earl A. Coddington: An Introduction to Ordinary Differential Equations, Prentice Hall of India,New Delhi (2009)
Scope	Chapter 0: Article 1 ,2,3,4,5,6 Chapter 1: Article 1,2,3,4,5,6 Chapter 2: Article 1,2,3,4,5,6,7,8
Reference Books	**1.** William F.Boyce, Richard C.DiPrima: Elementary Differential Equations, John Wiley & Sons, Seventh edition (2000) **2.** M.D.Raisinghania: Advanced Differential Equations, S. Chand Publishing (2018). **3.** G.F.Simmons: Differential Equations with Applications and Historical Notes, Third Edition, Taylor and Francis Group (2017). **4.** H.K.Dass: Advanced Engineering Mathematics, S.Chand and Company Ltd. (2019).

Course Code: **MAT-603P**	Course Name: **Lab Course-IV [Core course] (Based on MAT601 and MAT602)**
Credits :**03**	Total Periods: **120**
Course Objectives	Student will be able to apply the basic concepts and results of real analysis and ordinary differential equations
Course Outcomes	**CO1**: Describe several basic concepts of metric spaces and their properties. **CO2**:Understand properties of Riemann integrable functions, and applications of the fundamental theorems of calculus **CO3**: Find the Fourier series of some standard functions and its applications **CO4**: Classify and identify the types of functions **CO5**:Solve the first and second order differential equations **CO6**:Solve initial value problems and study properties of solutions of IVP **CO7**:Find the Wronskian of the solutions
Course Content	
Section-A (Based on MAT 601) [Conduct at least five practicals from the following list of practicals)	
Practical- IA	To solve examples/results on metric spaces
Practical-IIA	To solve examples/exercise of continuous functions on metric spaces
Practical-IIIA	To solve examples/exercise on open sets, closed sets and more about open sets
Practical-IVA	To solve examples/exercise on connected sets and bounded sets
Practical-VA	To solve examples/exercise on complete metric spaces and compact metric spaces
Practical-VIA	To solve examples/exercise on Riemann integrals
Practical-VIIA	To solve examples/exercise on fundamental theorem of calculus and Fourier series
Section-B (Based on MAT602) [Conduct at least five practicals from the following list of practicals)	
Practical-IB	To solve examples/exercise/ properties on functions, complex series and exponential function
Practical-IIB	To solve examples/exercise/ results on determinants
Practical-IIIB	To solve examples/exercise on linear equations of first order
Practical-IVB	To solve examples/exercise on the equation $y'+ay=b(x)$
Practical-VB	To solve examples/exercise on initial value problems for second order equations
Practical-VIB	To solve examples/exercise on linear dependence and linear independence
Practical-VIIB	To solve examples/exercise on homogeneous equation of order n.
Recommended Textbook	**1.**RichardR.Goldberg: Methods of Real Analysis,Oxford and IBH Co.Pvt.Ltd,New Delhi (1976). 2.D.Somasundaram and B.Choudhary:A first course in Mathematical Analysis,Narsoba Publishing House, New Delhi (1996). 3.Earl A. Coddington: An Introduction to Ordinary Differential Equations, Prentice Hall of India,New Delhi (2009)
Scope	As mentioned in course content of MAT601 and MAT 602

Reference Books	1.J.N.Sharma and A.R.Vashistha:Real Analysis,Krishna PrakashanMedia(P) Ltd,Meerut (2014). 2. Hari Kisan:Real Analysis,PragatiPrakashan,Meerut (2016). 3.S.K.Mittal and S.K.Pundir:Real Analysis, PragatiPrakashan,Meerut (2019). 4.WilliamF.Boyce, Richard C.DiPrima: Elementary Differential Equations, John Wiley & Sons, Seventh edition (2000). 5.M.D.Raisinghania: Advanced Differential Equations, S. Chand Publishing (2018). 6.G.F.Simmons: Differential Equations with Applications and Historical Notes, Third Edition, Taylor and Francis Group (2017). 7..H.K.Dass: Advanced Engineering Mathematics, S.Chand and Company Ltd. (2019).

Course Code: **MAT604**	Course Name: **Mathematical Statistics-II [Skill/Elective course]**
Credits :**02**	Total Periods: **45**
Course Objectives	Student will learn the concept of probability, random variables, variance and moment generating functions.
Course Outcomes	**CO1**: Understand the basics of probability and operations of probability **CO2**:Understand and identify the random variables, probability density function **CO3**:Determine the mathematical expectation, variance and moment generation function **CO4**: Study and apply various distributions to analyze the data
Course Content	
Unit-I	**Theory of Probability:** Deterministic and non-deterministic experiments, Trial and events, Mathematical and Statistical definition of probability, Axiomatic approach to a Probability, Laws of addition and multiplication of Probability (Extensions without Proof) [10Hrs]
Unit-II	**Random Variables:** Discrete and Continuous Random Variables, Probability Density Functions, Distribution Function and its Properties.[12Hrs]
Unit-III	**Mathematical Expectations:** Definition, Addition and Multiplication, Theorems on Mathematical Expectation, Covariance, Expectation and Variance of Linear Combination of random Variables, Moment Generating Function, Cumulants.[13Hrs]
Unit-IV	**Probability Distributions:** Binomial Distribution, Poisson Distribution, Uniform Distribution, Normal and Exponential Distribution [10Hrs]
Recommended Textbook	S. G. Gupta and V. K. Kapoor:Fundamentals of Mathematical Statistics,Sultan Chand and Co. New Delhi (9^{th} Edition)
Scope	Chapter 4: 4.1, 4.3, 4.3.1, 4.3.2, 4.6, 4.6.1 (Theorems 4.2 to 4.6) 4.6.2, 4.7 (Theorems 4.9 to 4.12) 4.7.3 (Theorems 4.13 to 4.17). Chapter 5: 5.1 (Theorems Without Proof) 5.2, 5.2.1, 5.3, 5.3.1, 5.4, 5.4.2, 5.4.3 Chapter 6: 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.6.1, 6.7, 6.10, 6.10.1, 6.10.2, 6.11, 6.11.1, 6.11.2. Chapter 7: 7.2, 7.2.1, 7.2.2, 7.2.6, 7.2.7, 7.2.9, 7.2.10, 7.3, 7.3.1, 7.3.2, 7.3.4, 7.3.5, 7.3.7, 7.3.8. Chapter 8: 8.1, 8.1.1, 8.1.2, 8.2, 8.2.2, 8.2.3, 8.2.4, 8.2.5, 8.2.6, 8.2.7, 8.6, 8.6.1.
Reference Books	1.Hogg and Craig: Introduction to Mathematical Statistics,Prentice Hall of India 2.Dennis D.Wackerly, William Mendenhal III, Richard L.Scheaffer: Mathematical Statistics with Applications, Seventh edition, Brooks/Cole Cengage Learning 3.David Lane:Introduction to Statistics, Rice University (2003) 4.Gregg Waterman: Mathematical Statistics, Oregon Institute of Technology (2015)

Course Code: **MAT605**	Course Name: **Programming in C-II [Skill/Elective course]**
Credits :**02**	Total Periods: **45**
Course Objectives	Student will learn programming in C language and execute a C program
Course Outcomes	**CO1**: Understand and apply various types of statements **CO2**: Understand and apply loops in C program **CO3**: Understand and apply one dimensional, two dimensional and multidimensional arrays
Course Content	
Unit-I	Introduction, Decision making with ifstatement, Simple if statement, Examples, The if else statement, Examples, Nesting of ifelse statement, Examples, The elseif ladder,Examples,The switch statement [10Hrs]
Unit-II	The ?: Operator, Examples, The goto statement,Examples, Case studies,Introduction, The while statement, Examples, The do statement, Examples.[12Hrs]
Unit-III	The for statement, Examples, Jumps in loops, Examples, Case studies,Introduction. One dimensional arrays, Declaration of one dimensional arrays, Initialization of one dimensional arrays[13Hrs]
Unit-IV	Two dimensional arrays, Examples, Initializing two-dimensional arrays, Examples,Multidimensional arrays[10Hrs]
Recommended Textbook	E. Balagurusamy: Programming in ANSI C (Second Edition): Tata McGraw Hill (2008)
Scope	Ch-5: 5.1 to 5.9 Ch-6: 6.1 to 6.5 Ch-7: 7.1 to 7.7
Reference Books	1.Y.P. Kanetkar: Let us C: BPB Publication (2018) 2. Gottfried: Programmning in C: Schaum's Series(1996) 3.MoolishKooper: Spirit of "C"(1998) 4. D. Ravichandran Programming in C: New-Age International Publisher(1996) 5.J.B.Dixit:Mastering C Programs(2013) 6.Pradip D Y and Manas Ghosh: Fundamentals of Computing and Programming in C(2013) 7.V.Rajaraman: Computer Programming in C: PHI Pvt Ltd, New Delhi (2005)

Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar

Faculty of Science and Technology

B.Sc. Mathematics Third Year (Vth/VIth Semester)

Model Question Paper (Pattern_CBC & GS) for Theory examinations

Time-1.30Hours Max.Marks-40

Instructions:

1. All questions arecompulsory
2. Figurestotheright indicatefullmarks

Q.No.1. Choose the correct alternative. Eachquestioncarries02 marks **10**

(i) ----------

(ii) ----------

(iii)----------

(iv)----------

(v) ----------

Q.No. 2. (A) Attempt any one of the following: **8**

(a) Showthat----------

(b) Provethat---------

(B) Attempt any one of the following: **7**

(c) Solve---------

(d) Obtain the solution of---------

Q.No. 3. (A) Attempt any one of the following: **8**

(a) Showthat----------

(b) Provethat---------

(B) Attempt any one of the following: **7**

(c) Solve---------

(d) Obtain the solution of---------

Note: Sub-questions may be set in Q.No.2 and Q.No.3

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B.Sc. Mathematics Third Year (Vth/VIth Semester)

Model Question Paper (Pattern_CBC & GS) for Practical examination

Time-ThreeHours Max.Marks-40

Instructions:

1. All questions arecompulsory
2. Figures to the right indicate full marks

Q.No.1. Attempt any Three of the following: **15**

a) ----------

b) ----------

c) ----------

d) ----------

e) ----------

Q.No. 2. Attempt any Three of the following: **15**

a) ----------

b) ----------

c) ----------

d) ----------

e) ----------

Q.No. 3. Record/Practical book **5**

Q.No. 4. Oral/ Viva-Voce **5**