# SETH NARSINGDAS MOR COLLEGE OF ARTS & COMMERCE & SMT. G. D. SARAF SCIENCE COLLEGE, TUMSAR.

## PROGRAMME OUTCOME DEPARTMENT OF MATHEMATICS

Dear sir,

Greetings of the day,

In criteria I: Curricular Aspects for an affiliated colleges –to ensure the outcomes of its programme is a primary responsibility of University. Moreover, at college level there is a question to formulate "Course outcome" and "programme outcomes". I am submitting "subject- learning objectives" and "programme outcomes". You please incorporate these things while finalizing programme outcomes. In criteria I there is a question on **programme outcomes**.

**Program outcomes describe what students are expected to know or be able to do by the time of graduation from the programme.** The learning objectives and program outcomes of UG with Mathematics as one of the course subject are:

**Department: Mathematics HoD : Dr S P Pawar**

At the end of the programme, the student will be able to:

| Programme | Paper Title | Learning (Course)Outcomes | Programme outcomes (B Sc-Maths) |
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| B Sc I, Sem I | M1<br>Algebra & Trigonometry | • Understanding Matrix and its elementary operations<br>• Linear equations expressed as Martix<br>• Its vital roll in solving any differential equations<br>• Numerical analysis->linear equations>Matrices<br>• Specic fields of applications are computer graphics, cryptography, MATLAB software<br>• Understanding D'Moivre"s Theorem and its application in solving tedious problems in geometry<br>• Logarithm of negative number<br>• Understanding Algebra is a science of operations<br>• It is widely used in Computer science and information technology<br>• It is also used for logic and fuzzy set theory<br>• To learn important concept of permutations | 1. To develop the skill to think in a critical manner<br>2. Formulate and develop mathematical argument in a logic manner.<br>1. Acquire good knowledge and understanding in advanced areas of mathematics chosen by the student from the given courses.<br>2. To understand, formulate and use quantitative models arising in social science, business and other context.<br>3. Create a hypotheses and appreciate how it relates to broader theories.<br>4. Solve complex problems by critical understanding, analysis and synthesis.<br>5. To understand the current research and development in the subject.<br>6. Critically interpret data write reports and apply the basics of rules of evidence.<br>7. Develop proficiency in the analysis of complex physical problems and the use of mathematical techniques |
| | M2<br>Calculus | • Understanding concept of differentiation<br>• Understanding concept of Integration<br>• It is used in all Engineering branches<br>• Studying science of physical changes<br>• Applications of differentiation like velocity, acc etc<br>• Understanding partial differential equations<br>• Understanding Talor 7 maclaurin series expansion<br>• Understanding definite integration and its applications | |
| B Sc Sem II | M3<br>Geometry, differential & difference equations | • Understanding distance between two points<br>• Mathematical (analytical) equations of sphere,cone,cylinder<br>• Understanding the concept of orthogonal curves, concept of tangent line to these curves | |

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| | | • To understand the higher order differential equations, Bernoulli's diff equation, claurit's form,method of variation of parameter and its applications in Engineering<br>• Understanding difference equation and its applications | to solve them.<br>8. Demonstrate skills in the use of computers for control, data acquisition, and analysis in experimental investigation.<br>9. Provide a synthetic understanding of the concepts and theories of mathematics and their applications in the real world-to an advanced level, and enhance career prospects at large.<br>10. By the end of programme student will have mastered the main tools used by mathematician working in the modern world of science and technology.<br>11. Use the language of mathematics in the physical world confidently to deal with problems.<br>12. Communicate complex mathematical ideas clearly to satisfy the people and present its applications effectively.<br>13. Central role of mathematics in the study and understanding science and technology.<br>14. Technique, adaptability, analytical thinking, communication and context. When possessed together they give each student the abilities and understanding to function in any environment where the precision and clarity of mathematical thinking are valuable. |
| | M4<br>Vector calculus and Improper integrals | • Understanding scalar and vector fields<br>• Rate of change of vector quantity i.e. to know velocity, acc and magnitudes & vector calculus<br>• To understand concept of gradient, divergence and curl<br>• Solenoidal, irrotational,line integral and work done<br>• It is widely used in Physics and Mechanics<br>• Surface & volume integrals and understanding importance Green,Stoke and gauss theorems and its physical and geometrical meaning<br>• To learn convergence of integral and method to solve improper integral<br>• To study the properties of Beta and Gamma function with applications. | |
| B Sc II Sem III | M5<br>Advanced calculus, sequence and series | • To understand mean value theorem<br>• To understand the importance Taylor's series<br>• To understand maxima and minima of function , saddle point and lagranges's multiplier method<br>• To understand sequence, Bounded and monotonic sequence, Cauchy sequence, Cauchy convergence criterion<br>• Series of nonnegative term, convergence test, Alternating series, Absolute and conditional convergence | |
| | M6<br>Differential equation and group homomorphism | • To understand the solution of differential equation in the form of infinite convergent series.<br>• To know Bessel's and Legendre's differential equations<br>• To understand the Bessel's and Legendre's special function and its importance<br>• Physical problems of many fields lead to these type of function and their properties<br>• To know the Laplace transform is a essential part of higher research for Engineers and scientist<br>• To know method of changing equations from on form to another easier form<br>• It is used to solve both ordinary and partial differential equations<br>• Applications are in all branches of engineering<br>• Importance of fourier transform are in all the branches of engineering<br>• To learn homomorphism and isomorphism is an impotant part of operatiom mathematics | |

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| B Sc II Sem IV | M7<br>Partial differential Equation & calculus of variation | • Partial differential equation is the big part of Engineering and field of more than one variable.<br>• To understand Lagrange's equation, surface passing through given curve, charpit's method and Jacobi's method<br>• Solution of P D E<br>• Variational calculus | |
| | M8<br>Mechanics | • To study the forces remain in one plane<br>• To know simple harmonic motion<br>• To understand equilibrium of forces<br>• Application in Engineering sciences<br>• Motion of particle and system of particle<br>• Conservation theorem of linear momentum, angular momentum,energy, etc.<br>• Potential energy, conservative forces, External and internal forces<br>• D Alemberts principle and equation of motion for system of particle<br>• Constraints of system,Lagrange's equation of motion<br>• To learn higher concepts in solid mechanics<br>• Use of mechanical simulation software | |
| B Sc Sem V | M9<br>Mathematical analysis | • To learn Fourier series as the wave like function as the sum of simple oscilating function. To study half range series.<br>• It has many applications in electrical engineering, vibrating acoustics, optics, signal processing, image processing, quantum mechanics, electrodynamics etc<br>• To learn Riemann-stiltjes integral<br>• To understand the use of complex numbers in the field of calculus. To learn conformal mapping.<br>• Cauchy-riemann relation<br>• Complex number and geometrical concept | |
| | M10<br>Metric space, complex Integration & Algebra | • A metric space is a set for which distance between the points is defined<br>• To study continuous functions on metric space<br>• To learn compactness, completeness and connectedness<br>• To learn concept of ring, Integral domain, Ideals, fields, quotient ring, Ring homomorphism<br>• It is a science of operations<br>• It is widely used in computer science and IT<br>• To learn importance analytic functions. To gain the knowledge of singularities and residues<br>• To apply the knowledge of residues in complex integration<br>• It is widely used in Fluid Mechanics and electrical engineering | |

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| B Sc Sem VI | M 11<br>Abstract Algebra | • It is a branch of algebra<br>• To learn about Vector space & subspace<br>• To understand the concept of L I & L D<br>• To understand the concept of Basis and dimension<br>• The matrix associated with Lenear map and Linear map associated with matrix<br>• To know about eigen values and eigen vectors<br>• It is used in computer Science, Electric engineering etc | |
| | M 12<br>Special theory of Relativity | • To understand the special theiry of relativity and related subject | |