Scheme of Examination B.E. First year (All Branches of Engineering)

Second Semester

Sub Code	Subjects	Workload in hrs			Credits	Marks					Minimum Passing Marks	
		L	T/A	P		Theory		Practical		Total		
						Internal	Uni	Internal	Uni		Theory	Practical
BSE2-1T	Mathematics-II	3	1	-	4	30	70	-	-	100	45	-
BSE2-2T	Advanced Engineering Materials	2	2	-	3	30	70	-	-	100	45	-
BSE2-3T	Applied Chemistry	3	2	-	4	30	70	-	-	100	45	-
BSE2-4T	Computational Skills	2	-	-	2	15	35	-	-	50	23	-
BSE2-6T	Basics of Electrical Engineering	2	-	-	2	15	35	-	-	50	23	-
BSE2-7T	Engineering Mechanics	2	-	-	2	15	35	-		50	23	-
BSE2-8T	Indian Culture & Constitution	2	-	-	Audit	50	-	-	-	Audit	-	-
BSE1-5P	Workshop Practices	-	-	4	2	-	-	50	50	100	-	50
BSE2-2P	Advanced Engineering Materials	-	-	2	1	-	-	25	25	50	-	25
BSE2-3P	Applied Chemistry			3	1.5	-	-	25	25	50	-	25
BSE2-4P	Computational Skills			2	1	-	-	25	25	50	-	25
Three weeks Induction Program												
	Total	**16**	**5**	**11**	**22.5**	**135***	**315**	**125**	**125**	**700**		

- L- Lecture , P-Practical, T- Tutorial, A- Activity (Half Credit per Hour)

* Audit course marks are not counted in total marks

Guidelines

- Energy and Environment shall be taught by faculty of Chemistry and will come under board of Applied Science and Humanities (only by Chemistry Dept)
- Advance Engineering Materials shall be taught by faculty of Physics and will come under board of Applied Science and Humanities (only by Physics Dept)

Faculty of Science and Technology

R.T.M Nagpur University, Nagpur

Syllabus for B. Tech. Second Semester

Mathematics – II

Total Credits: 4
Teaching Scheme
Lectures: 3 Hours/Week
Tutorial: 1 Hour/Week

Subject Code: BES2-1
Examination Scheme
Theory T (U): 70 Marks, T (I): 30 Marks
Duration of University Exam: 3 hours

Course Objectives:

1. The objective of the course is to inculcate and strengthen analytic ability among the engineering students and to create zeal of working with higher mathematics and its applications in the extensive field of engineering.
2. The topics covered will serve as basic tools for specialized studies in many fields of engineering and technology.

Course Outcomes:

After completing the course, students will be able to

1. Analyze real world scenarios to recognize when integrals are appropriate, formulate problems about the scenarios, creatively model these scenarios (using technology, if appropriate) in order to solve the problems using multiple approaches, judge if the results are reasonable, and then interpret and clearly communicate the results.
2. Define and understand the geometry of vector differential operators and line and surface integrals.
3. Explain and apply principles of study design and data collection.
4. Develop an ability to identify, formulate and/or solve real world problems.
5. Understand the impact of scientific and engineering solutions in a global and societal context.

Unit 1: Integral Calculus (13 Hours)

Evaluation of Definite and Improper Integrals: Beta and Gamma functions and their properties, Differentiation of definite integral, Mean value, Mean square value and Root mean square value.

Curve Tracing: Tracing of curves (Cartesian), Applications of definite integrals to find length of curve, area, volume and surface area of solids of revolution (Cartesian, Polar and Parametric curves).

Unit 2: Multivariable Calculus (Integration) (13 Hours)

Multiple Integration: Double integrals (Cartesian and Polar), Change of order of integration in double integrals, Change of variables (Cartesian to Polar).

Applications: Area, Mass, Volume and Center of Gravity (constant and variable densities), Elementary triple integrals.

Unit 3: Vector Calculus **(10 Hours)**

Vector Calculus: Vector triple product, Product of four vectors, Scalar point function,Vector point function,Vector differentiation, Gradient, Divergence and Curl, Directional derivatives, Solenoidal and Irrotational motions

Vector Integration: Line integrals and Work done.

Unit 4: Statistics **(6 Hours)**

Fitting of a Curve by Method of Least Squares: Straight line $y = a+bx$, Second degree parabola $y = a+bx+cx^2$ and curves of the type $y = ae^{bx}$, $y = ab^x$ and $y = ax^b$, Coefficient of correlation and Lines of regression, Rank correlation.

Unit 5: Finite Differences **(6 Hours)**

Operators E & Delta, Factorial polynomial, Lagrange's interpolation formula for unequal intervals of arguments.

Numerical Integration: Trapezoidal rule, Simpson's 1/3rd rule and Simpson's 3/8th rule, Difference equations with constant coefficients.

Text/Reference Books:

(1) Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
(2) Ramana B.V., Higher Engineering Mathematics, Tata Mc-Graw Hill, New Delhi, 11th Reprint, 2010.
(3) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
(4) B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
(5) P. N. Wartikar and J. N. Wartikar, Applied Mathematics, Volume I and II.
(6) H.K Dass, Rama Verma, Rajnish Verma, V.J. Dagwal, Sajid Anwar and D.F. Shastrakar, Engineering Mathematics, Volume I and II, S. Chand.