20PEB227P					Numerical Methods Practical					
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
0	0	2	1	2	--	--	--	50	50	100

COURSE OBJECTIVES

- To develop the mathematical skills of the students in the areas of numerical methods
- 2. To teach theory and applications of numerical methods in a large number of engineering subjects which require solutions of linear systems, finding eigen values, eigenvectors, interpolation and applications, solving ODEs, PDEs and dealing with statistical problems like testing of hypotheses.
- 3. To lay foundation of computational mathematics for post-graduate courses, specialized studies and research

UNIT 1 **07 Hrs.**

Data representation, error analysis, introduction to MATLAB, Applied MATLAB programming.
Numerical Solution of Algebraic & Transcendental equations: Bisection Method, Method of false position, Secant method, Iteration method, Extended method of iteration, Newton-Raphson method, Newton-Raphson method for multiple roots. Comparison of various methods.

UNIT 2 **10 Hrs.**

Interpolation: Newton Gregory Forward Interpolation Formula, Newton Gregory Backward Interpolation Formula, Gauss's Forward and Backward Interpolation Formula, Stirling'sCentral Difference Formula, Lagrange's Interpolation Formula for unevenly spaced Formula, Inverse Interpolation, Divided Differences, Newton's Divided Difference Formula.

UNIT 3 **08 Hrs.**

Numerical Integration: Trapezoidal rule, Simpson's one-third rule, Simpson's Three-Eighth rule, Weddle's rule, Romberg's method, Double Integration.
Solution of Simultaneous Algebraic Equations: Gauss-Jacobi's method, Gauss-Seidal method.
Numerical Solution of Ordinary Differential Equation: Taylor's method, Euler's method, Runge – Kuttamethod, Modified Euler's method, Predictor Corrector method: Adam's method& Milne's method.

UNIT 4 **04 Hrs.**

Numerical Solution of Partial Differential Equation: Bender-Schmidt method Crank- Nicholson method.

Total 29 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to
CO1 - Enable students to understand various concepts of numerical methods
CO2 - Enable students to understand the theoretical concepts of numerical methods
CO3 - Enable students to various applications of numerical methods in petroleum engineering
CO4 - Enable students to solve and applied differential equation by finite elements methods
CO5 - <>
CO6 - <>

TEXT/REFERENCE BOOKS

1. B.S. Grewal, Numerical Methods in Engineering and Science with Programs in C & C++, Khanna Publishers2010.
2. S.S. Sastry, Introductory Methods for Numerical Analysis, 4th Ed., Prentice Hall of India (2009).
3. M.K. Jain, S.R.K. Iyenger and R.K. Jain, Numerical Methods for Scientific and Engineering Computation, 5th Ed., New Age International (2007).
4. J N Reddy, An Introduction to Finite Element Method,McGraw Hill.
5. R.K. Jain & S.R.K. Iyenger, Advanced Engineering Mathematics, 3rd Ed., Narosa (2002).
6. S C Chapra, Raymond P. Canale, Numerical Methods for Engineers, Tata McGraw Hill Pub. Co. Ltd.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks: 100 **Exam Duration: 3 Hrs**

PART A: Evaluation Based on the class performance and Laboratory book **50Marks**

PART B: Viva Examination based conducted experiments **50 Marks**