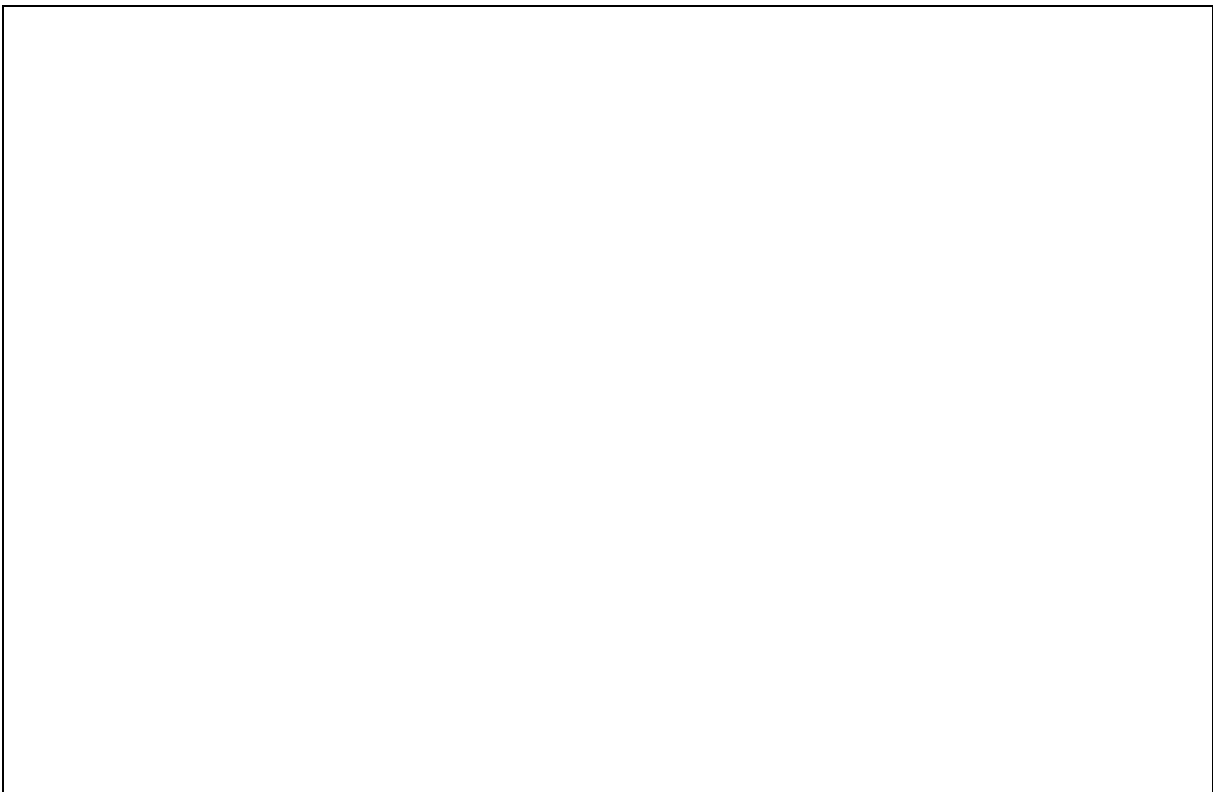


Course Code	EM 203		
Course Title	Numerical Methods in Chemical & Process Engineering		
No. of Credits	3		
Pre-requisites	-		
Compulsory/Optional	Compulsory for Chemical & Process Engineering specialization		
Aim(s):			
Intended Learning Outcomes:			
On successful completion of the course, the students should be able to;			
<ul style="list-style-type: none"> • Use of modern computational and mathematical techniques in chemical and process engineering. • Acquiring the knowledge, understanding and skills required for the use of pertinent software and appropriate programming language. • Ability to solve sets of linear and nonlinear algebraic equations, ordinary differential equations, and differential-algebraic (DAE) systems in chemical and process engineering. • Ability to solve partial differential equations obtained from transport phenomena in chemical and process engineering. 			
Time Allocation (Hours): Lectures 32 Tutorials Practical Assignments 13			
Course content/Course description:			
<ul style="list-style-type: none"> • Introduction to computing software • Introduction to numerical methods: Error analysis. • Numerical solutions to systems of linear equations: Gaussian elimination, Iterative methods, Relaxation methods • Numerical solutions to non-linear equations: Fixed point iteration, Newton-Raphson method, System of non-linear equations • Numerical calculus: Differentiation, Interpolation method, Finite difference integration, Newton-Cotes methods, Gaussian integration methods. • Numerical solutions to ordinary differential equations:Initial value problems: Euler method, Runge-Kutta methods. Boundary value problems: Finite difference Method. Solving system of ordinary differential equations and higher order differential equations. Adaptive step size mechanisms • Numerical solutions to partial differential equations:Explicit and implicit finite difference methods; Basics of finite element methods • Assignments / Projects in chemical & process engineering(Assignments / Projects component must be coordinated and examined by the Department of C&PEng. since this components deal with examples from chemical and process engineering) 			



Recommended Texts :

- Steven C Chapra, Raymond P Canale. Numerical Methods for Engineers, 6th edition (2010)ISBN : 0073401064

Assessment	Percentage Mark
In-course	
Assignments / Projects	40
Mid Semester Examination	20
End-semester	40