

**BA223 Mathematics III****COURSE INFORMATION**

Prerequisites	Academic Year & Level		Teaching Methods			Credit Hrs.
	Year	Semester	Lecture	Tutorial	Lab.	
BA124	2	3	2	2		3

**COURSE AIM**

To study methods of solving ordinary differential equations which arise as a mathematical modelling in many topics of engineering. Also studying the Laplace Transforms and Fourier series.

**COURSE WEEKLY CONTENTS**

- 1 First order Differential Equations: Separable of variables- Initial value problem - Homogeneous Equations
- 2 First order Differential Equations: Total differential and Exact Equations - Linear Equations
- 3 First order Differential Equations: Bernoulli's Equation - Revision on First order Differential Equations
- 4 Second order Differential Equations with constant coefficients: Fundamental set of solutions - Linear independence of solutions: Wronskian - General solution of homogeneous equations
- 5 Second order Differential Equations with constant coefficients: Non-homogeneous Equations -Method of undetermined coefficients
- 6 Second order Differential Equations with constant coefficients: Non-homogenous Equations - Method of undetermined coefficients (Case of duplication) - The Method of variation of parameters
- 7 Second Order Differential Equation with variable coefficients: Euler-Cauchy Equations- Midterm Exam
- 8 Laplace transform: Basic definition - First Shifting Theorem (s-shifting)
- 9 Laplace transform: Transform Differentiation - Transform Integration
- 10 Laplace transform: Unit Step Function - Second Shifting Theorem - t-shifting - Convolution Theorem
- 11 Inverse Laplace Transform
- 12 Applications: Solution of D.E. using Laplace Transform - Solution of integral equation (Volterra Integral Eq.) using Laplace - Transform - 12th Assessment
- 13 Fourier series: Fourier series for functions of period 2P
- 14 Fourier series: Fourier series for Even and Odd functions - Fourier series for harmonic functions Fourier series for harmonic functions
- 15 General Revision

## STUDENT GRADING & ASSESSMENT

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Weeks	Exams	Assign.	Quizzes	Reports	Present.	Lab.	Total	
1 to 7	20 Midterm	←	10	M A R K S		→	30	
		To be freely distributed among possible assessments						
8 to 12	←		20	M A R K S		→	20	
13 to 15	←		10	M A R K S		→	10	
16 or 17	40 Final						40	
<b>Total</b>	<b>Exams</b>	<b>Assign.</b>	<b>Quizzes</b>	<b>Reports</b>	<b>Present.</b>	<b>Lab.</b>	100	

## REFERENCES

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Textbook      Advanced Engineering Mathematics, Fifth Edition 2014, Dennis G.Zill/Warren S.Wright - ISBN 978-1-4496-8980-33

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Other