

SCHOOL OF BIOLOGICAL AND PHYSICAL SCIENCES

Course outline

DEPARTMENT: MATHEMATICS & PHYSICS

PHONE NUMBER: 0763949512 or 0720949512

COURSE CODE: MAT 316

Email address: koech80@gmail.com

COURSE TITLE: METHODS I

CAMPUS: MAIN/KITALE

YEAR OF STUDY: III

Prepared by: _____
(Signature) *Koech w. Cheruiyot*

ACADEMIC YEAR: 2015/2016

Submission Date: 20/04/2016

COURSE LECTURER: Mr. Koech W. Cheruiyot

SEMESTER: II

SESSION: MAY – AUGUST 2016

DEGREE PROGRAMME: BSC, BSE & BAE

Course Purpose

This course is designed to:

- Introduce the learner to skills and methods of solving problems involving ordinary differential equations, partial differential equations in addition to series.

Course Objectives

The objectives of this course are:

- To introduce methods of solving some special ODEs
- To introduce special functions like Gamma and Beta functions
- To introduce methods of solving some PDEs

Expected Learning Outcome

By the end of this course, the learner should be able to:

- Compute series solutions for higher order differential equations.
- Transform one plane into the other using Laplace's transformations.
- Apply method of separation of variables to solve problems involving cylindrical symmetry.

Course Description

Series solution of some selected second order linear ODE'S. Special functions: Bessel, Legendre hyper-geometric, Gamma and Beta-functions; Fourier series and its applications; Laplace-transformation and its application; Introduction to partial differential equations; Classification of Second order linear partial differential equations; Solution by separation of variables; Application to problems involving cylindrical symmetry

Course Assessment

Continuous assessment Tests	30%
End of semester examination	70%
Total	100%

Learning and Instructional Methods

- Lectures
- Tutorials
- Demonstrations
- Group Discussions
- Exercise solving

Learning Resources

- Textbooks
- Chalkboard or whiteboards and pieces of chalk or whiteboard marker pens.
- Internet resources

WEEK	TOPICS WITH SUMMARY OF CONTENT
1	Series solution of selected Second order linear ordinary differential equations;
2	Special functions: Bessel, Legendre, Hyper-geometric, Gamma and Beta functions;
3	Fourier series and its applications
4	C.A.T 1
5	Laplace transform and its applications
6	Introduction to partial differential equations;
7	Classification of second order linear partial differential equations;
8	Solution by separation of variables;
9	Application to problems involving cylindrical and spherical symmetry
10	CAT 2
11 – 13	END OF SEMESTER EXAMINATIONS

References

- (i) **C. T: Kelley and Siam I.**, Iterative Methods for linear and Non-Linear Equations, Wiley, New York (2015)
- (ii) **S. C. Chapra and R. P. Canale**, Numerical Methods for Engineers, 6th Edition, Mc Graw-Hill (2013)
- (iii) **Richard Haberman**, Applied Partial Differential Equations, 4th Edition, Prentice Hall, (2011)
- (iv) **Stanley Farlow**, Partial Differential Equations for Scientists and Engineers, Dover publications, (2013)
- (v) **George Simmons**, Differential Equations and Applications and Historical Notes, 2nd edition, Mc Graw-Hill, (2014)

HOD: _____
(Signature) **Dr. Nyamwala F.**

Date _____