



Course Descriptor
FPAM003 & APPLIED MATHEMATICS

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|-------------------------------|---------|------------------------------------|--------------|
| Proposed Academic Year | 2020-21 | Last Reviewed Academic Year | 2018-19 |
| Course Code | FPAM003 | Course Title | Applied Math |
| Credit hours | 0 | Level of study | Foundation |
| College / Centre | CLFS | Department | Mathematics |
| Co-requisites | N/A | Pre-requisites | Basic Math |

1. COURSE OUTLINE

[Applied Math course includes Functions and Graphs; Quadratic Functions, Exponential and Logarithmic Functions, Solving Quadratic, Exponential and Logarithmic Equations and logarithmic Inequalities. Solving simple real life problems involving linear, Quadratic and Exponential function graphically and algebraically and compare simple and compound interest and relates compound interest to exponential growth. System of linear equations and linear Inequalities and their graphical representation to determine the set of solutions, It also covers Basic Concepts of Statistics and Probability and formulas for permutations and combinations.]

2. AIMS

[This course aims to enable the students to develop the skills and knowledge of science facts and real world phenomena through the use of mathematical methods. Applied mathematics involves the application of mathematics, to problem which arises in various areas, e.g. applied science, economic analysis or other diverse areas. Applied Math develops new or improved methods to meet the challenges of new problems.]

3. LEARNING OUTCOMES, TEACHING, LEARNING and ASSESSMENT METHODS

| Learning Outcomes (Definitive) | Teaching and Learning methods (Indicative) | Assessment (Indicative) |
|--|---|---|
| Upon successful completion of this course, students will be able to: | | |
| 1. Describe the definition of a function and its graph. | <p>Lectures: Definition of function with real life example, Domain and range of function, Different types of symmetry and test for symmetry.</p> <p>Board Demonstration: Venn Diagram for function, function values, domain, range and graph of functions with related examples and tables from study materials. Types of symmetry with pictures and testing the equations for symmetry.</p> <p>Problem Solving Session: Exercise Questions; 1.1, 1.2, 1.3, Online activities.</p> <p>Self-Study: Homework and Assignments.</p> | <p>Quizzes, Mid-Term Test, Final Exam, Class Works, Home Works, online practice, presentation.</p> <p>Online activities</p> |
| 2. Solve linear, quadratic functions graphically and algebraically. | <p>Lectures: Definition of quadratic function, Explanation about graph of quadratic function, parabolas, axis of symmetry, vertex, maximum and minimum of quadratic function. Real</p> | <p>Assignments, Mid-Term Test, Final Exam, Class Works, Home Work, online</p> |



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| | <p>life problems; Explaining real life problem for given quantities and method to find missing quantity. Board Demonstration: Demonstrating parabolas, axis of symmetry, vertex, maximum and minimum of quadratic function with related examples. Explain and solve simple real life problems involving linear and quadratic functions. Explain and solve quadratic inequalities with related examples. Problem Solving Session: Exercise 2.1. Online: Work sheet of practice questions. Self-Study: Classwork, Homework and Assignments.</p> | <p>practice and Presentation.</p> |
| <p>3. Solve exponential and logarithmic functions graphically and algebraically. Solve exponential, logarithmic equations and inequalities.</p> | <p>Lectures: Define exponential functions and their graphs. Define exponential equation, inequality and solving method. Explaining about compound amount and compound interest with real life example. Definition of logarithmic function, Graph of logarithmic function. Properties of Logarithmic function and Laws of Logarithms. Logarithmic Inequalities. Exponential and Logarithmic equations with real life examples. Board Demonstration: Definition of exponential function, Rules of exponents, Graph of exponential functions, Properties of the exponential function, formula for compound amount, compound interest, Population Growth and Radioactive decay. Definition of logarithmic function, Graph of logarithmic functions. General shapes of logarithmic function. Properties of logarithmic function with related examples. Solve exponential and logarithmic equations with related examples. Problem Solving Session: Exercise Questions; 3.1, 3.2, 3.3, 3.4, 3.5 and 3.6. Online work: Work sheet of practice Questions.</p> | <p>Quizzes, Final Examination, Class Works, Home Work, participation and Presentation.</p> <p>Online activities</p> |



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| | Self-Study: Classwork , Homework and Assignments | |
| 4. Solve system of linear equations and inequalities in two variables. | <p>Lectures: Different methods to solve system of two variable linear equations, Definition of linear inequality in two variables with examples. Graphical method to solve Linear inequality in two variables.</p> <p>Board Demonstration: Method of Substitution and Graphical Method with example. Graph of inequality Solve System of Linear inequalities with Examples.</p> <p>Problem Solving Session: Exercise 4.1 and 4.2.</p> <p>Online work: solving inequality, making graph and finding the solution of system of linear inequality.</p> <p>Self-Study: Classwork , Homework and Assignments.</p> | <p>Assignments, Final Examination, Class Works, Home Works and Presentation.</p> <p>Online activities</p> |
| 5. Describe the basic concepts of statistics and probability. | <p>Lectures: Introduction of statistics, lecture about data and its types, class limit, class interval, Mean, Mode, Median. Introduction to probability, Tree diagram, Permutation and combination.</p> <p>Board Demonstration: Mean, Mode, Median Standard Deviation, Variance Formula. Probability, permutation and combination formulas, Data representation with Pie chart, Bar Diagram and Histogram.</p> <p>Problem Solving Session: Exercise 5.1, 5.2, 5.3, 5.4 and 5.5.</p> <p>Online work: Worksheet of practice Questions.</p> <p>Self-Study: Classwork, Homework and Assignments.</p> | <p>Final Examination, Class Works, Home Works and Presentation.</p> <p>Online activities</p> |
| 6. Manage Time, accept responsibility, carry out research skills, Take notes and develop presentation skills. | <p>Study Skills: Follow class room rules, class attendance and punctuality, meet deadlines, use a variety of study techniques and maintain portfolio with required information, online educational programs.</p> <p>a) Use the library system or internet facility in assignments and for reference in studies.</p> <p>b) Write down learning outcomes, main ideas, formulas, equations, process and solving techniques,</p> | <p>Portfolio: online attendance, participation, presentation and using online program such as Moodle, Microsoft team etc.</p> |



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| | <p>organize lesson wise information, daily reflection and summarize the lessons and glossary.</p> <p>a) Outline and define main concepts, enhance mode of presentation, address questions from audience and invite constructive feedback.</p> | |
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4. ASSESSMENT WEIGHTING

| Assessment | Percentage of final mark (%) |
|-----------------|------------------------------|
| Participation | 05 |
| Portfolio | 10 |
| Quizzes | 15 |
| Assignments | 10 |
| Mid-Term Exam | 20 |
| Final-Term Exam | 40 |
| TOTAL | 100% |

5. ACHIEVING A PASS

Students will achieve **No** credit hours for this course by passing **ALL** of the course assessments [alternatively, list the compulsory pass assessments*] and achieving a **minimum overall score of 60%**

NB *Ensure that ALL learning outcomes are taken into account

6. COURSE CONTENT (Indicative)

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| 1. Learning outcomes (blended learning) |
| a) Describe the definition of a function and its graph. Calculate the value of functions. |
| b) Use three types of symmetry of an equation to sketch its graph. |
| 2. Learning outcomes (online learning) |
| a) Determine the zeros and the maximum or minimum of a quadratic function, Sketch the graphs of a quadratic function and solve related problems, including those arising from real world applications. |
| b) Solve simple real life problems involving linear, and quadratic functions graphically and algebraically. |
| c) Solve quadratic inequalities. |
| 3. Learning outcomes (blended learning) |
| a) Sketch the graphs of exponential functions. Compare simple and compound interest and relate compound interest to exponential growth. Solve exponential equations and inequalities Solve simple real life problems involving exponential functions graphically and algebraically. |
| b) Sketch the graphs of logarithmic functions Identify the inverse relationship between exponents and logarithms and use this relationship to solve related problems. Solve logarithmic equations and inequalities. |
| 4. Learning outcomes (online learning) |



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- a) Solve two variables linear equations and inequalities and sketch their graph. Interpret a series of three simultaneous inequalities of two variables, display them graphically and determine the solution set.

5. Learning outcomes (blended learning)

- a) Define the basic concepts of Statistics-Measures of Central tendency (Mean, Median, Mode) and Measure of dispersion (Variance and Standard Deviation).
b) Summarize data into tables and simple graphs (bar chart, histogram and pie chart)
c) Define the basic probability concepts and compute the probability of simple events using tree diagrams.
d) Formulas for permutations and combinations.

TOTAL HOURS

64

Plus **RECOMMENDED INDEPENDENT STUDY HOURS**

04

TOTAL COURSE HOURS

68

7. RECOMMENDED REFERENCES

Core text/s: Applied Math Study Material

Library + online resources:

Library Resources:

- (1). **Title of book:** Introductory Mathematical Analysis 13th –Edition; Authors: ERNEST F. HAEUSSLER, RICHARD S. PAUL AND RICHARD J. WOOD.
- (2). **Title of book:** Active Mathematics; Authors: B.V. HONY AND D.A TURNER.
- (3). **Title of book:** Mathematics for the Future; Authors: JIM MILLER AND GRAHAM NEWMAN.
- (4). **Title of book:** Extended Mathematics; Author: COLIN NYE.
- (5). **Title of book:** Applied Calculus 11th – edition: Authors: HOFFMANN, BRADLEY, SOBECKI AND PRICE.

Online Resources:

- (1). <http://www.purplemath.com/modules/index.htm>
- (2). <http://www.coolmath.com/precalculus-review-calculus-intro/index.html>
- (3). <http://www.freemathhelp.com/>
- (4). <http://www.khanacademy.org/math/algebra/algebra-functions>
- (5). <http://www.brightstorm.com/math/precalculus/>
- (6). <http://www.mathsisfun.com/index.htm>

Open Educational Resources:

1. <https://www.futurelearn.com/search?q=Mathematics>
2. <https://drive.google.com/file/d/12b2cwH7afXhsYSDB-QCWKmFK2QCq7UfY/view>
3. https://d3bxy9euw4e147.cloudfront.net/oscms-prodcms/media/documents/Precalculus-OP_9wwF7YT.pdf