Fayoum University  Faculty of Engineering

Course Specifications

Programme(s) on which the course is given   all programmes
Major or Minor element of programmes        Major
Department offering the programme           Engineering Mathematic and physic
Department offering the course              Engineering Mathematic and physic
Academic year / Level                       preparatory
Date of specification approval

A- Basic Information

Title: Mathematic                 Code: Math .001(a)
Credit Hours:                    Lecture: 4
Tutorial:                       Practical: 3          Total: 7

B- Professional Information

1 – Overall Aims of Course
   a – Be familiar with the fundamental concepts and properties of different functions in one variable.
   b – Identify the concept of limits and continuity of functions.
   c - Identify the concept and rules of differentiations.
   d – Use rules of differentiations in some applications.
   e - Identify basic topics in Algebra such as: Mathematical Induction, The Binomial Theorem, Partial Fractions, Theory of Equations and Vectors and Vector Spaces.

2 – Intended Learning Outcomes of Course (ILOs)
By the end of the course, the student should me familiar with:

a- Knowledge and Understanding:

a1 - Identify differential calculus techniques and methods including limits and continuity of functions in one variable.
a2- Mention how differential calculus is applied in some engineering problems such as optimization, cure sketching, The Mean value Theorem and Maclurain and Taylor Series.

a3- Mention basic topics in Algebra which may encounter in the future engineering study such as : Determinant and Matrices, The Binomial Theorem, Theory of Equations, Vectors and Vector Spaces.

b) Intellectual Skills

b1- Solve problems.

b2- compute different variables.

c) Professional and Practical Skill

c1- Provide accurate and logical solution.

c2- Apply those techniques to different fields of applied science such as applying mathematical induction techniques as problem solver.

d) General and Transferable Skills

d1- Solve problems in small team

d2- Use integral calculus in engineering application

d3 – Use basic analytic geometry concepts in engineering application

3- Contents

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<th>No. of hours</th>
<th>Lecture</th>
<th>Tutorial/Practical</th>
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<td>Pre calculus: Analytic Geometry, Trigonometry, Exponential and Logarithmic Functions</td>
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<tr>
<td>Limits of functions : Introduction, The number e as a limit of a function, Continuity.</td>
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<td>Topic</td>
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<tr>
<td>The Derivative: Introduction, Derivatives of the Trigonometric</td>
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<td>Functions, Inverse Trigonometric Functions, Exponential Functions</td>
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<td>and Logarithmic Functions, Hyperbolic Functions, Inverse Hyperbolic</td>
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<td>Functions.</td>
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<td>Applications on Differentiation: Repeated Differentiation and</td>
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<td>Libniz Theorem, Extrema of Functions, The Mean Value Theorem, The</td>
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<td>First and the Second Derivative Tests and Concavity, Curve Sketching,</td>
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<td>Optimization Problem, Maclurain and Taylor Expansions, Indeterminate</td>
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<td>Forms and L’Hopital Rule.</td>
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<td>Mathematical Induction: Introduction, Principal of Mathematical</td>
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<td>Induction, Generalized Principal of Mathematical Induction.</td>
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<tr>
<td>The Binomial Theorem: Introduction, The Binomial Theorem with</td>
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<td>Fractional and Negative Indices and Its Applications.</td>
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Theory of Equations: Polynomials, Numerical Solution of Algebraic and Transcendental Equations, System of Linear Equations

Vectors and Vector Spaces: Vectors in Plane, n-Vector, Cross product in 3 dimensions, Vector Spacers and Subspaces, Linear Independence and Basis, Orthnormal Bases in R.

<table>
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<tr>
<th>Topic</th>
<th>Credit Hours</th>
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<th>Weekly</th>
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<tr>
<td>Theory of Equations</td>
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<td>8</td>
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<td>6</td>
<td>4</td>
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4- Teaching and Learning Methods

4.1-lecture

4.2-tutorial

4.3-office hour for extra explanation

5- Student Assessment Methods

5.1 mid term exam. To assess (a1, a3, b1 to b2, c1 to c2 and d1, d3).

5.2 final exams to assess (a1, a3, b1 to b2, and c1 to c2).

Assessment Schedule

Assessment 1 mid term Week 9

Assessment 2 Final term exam week 14

Weighting of Assessments

Mid-Term Examination 29 %
Final-term Examination 71 %
Oral Examination 0 %
Practical Examination 0 %
Semester Work 0 %
Other types of assessment 0 %
Total 100%

Any formative only assessments

6- List of References

6.1- Course Notes
Course Notes prepared by staff members…..

6.2- Essential Books (Text Books)
"Mathematics for Engineers" Samy El Badaway Yehia "calculus 'swokowski, olinick, pence….

6.3- Recommended Books
Calculus and analytic " Geometry " Thomas and Finny

6.4- Periodicals, Web Sites … etc
http://www.math...hmc.edu/calculus/tutorial……
http://www.wtamu.edu/academic/anns/mps/math/mathab/col algebra

7- Facilities Required for Teaching and Learning
Lecture room, sound system, data show with computer

Course Coordinator: Prof.Dr. Samy El Badaway Yehia

Head of Department: Prof. Dr. Magdy T. Hanna

Date:   /   /