# COURSE SPECIFICATION

## 1- Course Data

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|---|---|
| **Course Title** | Mathematics II Code: Math. 102 |
| **Academic year / Semester** | 2013 / 2014, Autumn |
| **Program on which the course is given** | All |
| **Major or Minor element of program** | Major |
| **Department offering the course** | Basic Science |
| **Prerequisites** | Math. 101 |
| **Credit hours** | 3 |
| **Contact hours per week** | Lecture: 4 Hours Tutorials: 2 Hours |

## 2- Course Aims

- To provide the students essential information and fundamentals of Algebra and Analytical Geometry and their applications in engineering.
- To apply mathematical techniques for modeling, solving and analyzing real problems.

## 3- Intended Learning Outcome (ILOs)

| | |
|---|---|
| **a- Knowledge and understanding** | a1- Identify theories and fundamentals of mathematics.<br>a2- Define mathematical methods for solving problems.<br>a3- Outline mathematical techniques for modeling real problems. |
| **b- Intellectual Skills** | b1- Analyze mathematical problems and categorize them.<br>b2- Solve practical problems using mathematical methods.<br>b3- Make mathematical models to real problems in the light of available data and information. |
| **c- Professional and Practical Skills** | c1- Apply mathematical logic and techniques for solving real life problems<br>c2- Diagnose solutions to real life problems.<br>c3- Prepare professional reports via mathematical logic. |
| **d- General and Transferable Skills** | d1- Communicate effectively using different means.<br>d2- Use information technology for obtaining information.<br>d3- Work in a group and lead a team.<br>d4- Manage time effectively and conduct self learning . |

## 4- Contents

| Topic | No. of Hours |
|---|---|
| **Algebra:** Introduction, matrices, algebra of matrices, linear independence. | 8 |
| Eigenvalues and eigenvectors, reduction of a matrix to diagonal form, quadratic form. | 4 |
| Linear systems | 4 |
| Mathematical induction, Binomial expansion. | 4 |
| Finite series, summation of series | 4 |
| Theory of equations, properties, cubic and quartic equations | 4 |
| **Analytical geometry:** Introduction, equation of two straight lines | 4 |
| Circle, equation of circle, tangent and normal, chord of contact, pole and polar, | 4 |

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|---|---|
| parametric form, coaxial circles. | |
| Parabola, equation of parabola, properties, parametric form, tangent and normal. | 4 |
| Ellipse, equation of ellipse, properties, parametric form, tangent and normal. | 4 |
| Hyperbola, equation of hyperbola, properties, parametric form, tangent and normal. | 4 |
| **Surfaces:** Plane, line in space, sphere, cone, paraboloid, ellipsoid. | 8 |

## 5- Teaching and Learning Methods for Students with Special Needs

White board, Prepared notes, Data Show.

## 6- Learning and Teaching Activities

| Tools | Intended Learning Outcomes Achieved |
|---|---|
| Interactive Lectures | ILOs: a1, a2, a3, b1, b2, b3, c1, c2, c3. |
| Tutorials | ILOs: b1, b2, b3, c1, c2, c3. |
| Assignments and Homework | ILOs: d1, d2, d3, d4. |

## 7- Student Assessment

- **Assessment Strategy**

| Tools | Intended Learning Outcomes Achieved |
|---|---|
| Quizzes | ILOs: a1, a2, b1, b2, c1, c2. |
| Written Exams | ILOs: a1, a2, a3, b1, b2, b3, c1, c2, c3. |
| Assignments and Homework | ILOs: d1, d2, d3, d4. |

- **Assessment Details**

| Methods of Assessment | Grading Mode | Weighting % | Minimum Pass Mark | Outline Details |
|---|---|---|---|---|
| Quizzes | 20 | 20 % | | Weeks: 4, 11 |
| Assignments | 10 | 10 % | | Weeks: 3, 5, 10, 12 |
| Mid-Term Exam | 30 | 30 % | | Week 8: 1 hour |
| Final Exam | 40 | 40 % | 13 | Week 15: 2 hours |

## 8- List of References

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| a- Course Notes | Lecture notes. |
| b- Required Books (text books) | • Linear Algebra And Its Applications, 3rd Edition, Gilbert Strang, Thomson Brooks / Cole, U.S.A, 1988.<br>• Exploring Analytic Geometry with Mathematica, Donaled L. Vossler, Academic Press, New York, 1981. |
| c- Recommended Books | • Analytical Geometry And Calculus, 2nd Edition, S.S.Keller and W.F. Knox, D.VAN Nostrand Co., New York, 1907. |
| d- Periodicals, web sites | www.mhhe.com<br>www.intmath.com<br>www.thomsonrights.com |

Course Instructor: Dr. Mohamed Husien Eid Date: 20 / 9 / 2013

Head of Department: