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| logoCollege: Engineering Department: Civil EngineeringCourse Title: Engineering Mechanics-StaticsCourse No: : **0901203**Credit Hours: 3Semester:Second /2018-2019**About The Course**Course Title: Statics Class: second yearCourse No: **0901203**Credit Hours: 3 Lecture Room: 411Obligatory/ Optional: ObligatoryText Book: Engineering Mechanics: Statics (14th edition) by Russell C. Hibbeler.**The Instructor**Name: Dr. Essam Ali Mahmood Title:Assistant ProfessorOffice Tel:Office No: Office Hours: **12:30-1:30**E-maile: e.a.alnuaimy@gmail.com |
| C**ourse Description** |

Force systems (2D and 3D), equilibrium of particles and rigid bodies (2D and 3D), structures (trusses, frames and machines), distributed forces (centroids and centers of mass), beams (shearing force and bending moment diagrams), friction, moments of inertia and virtual work.

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| **Course Objectives** |

 The student will be able to solve vector operations

 Student will be able to analyse force systems (2D and 3D)

 Student will be able to analyse equilibrium problems of particles and rigid bodies (2D and3D)

 Student will be able to analyse structures (trusses, frames and machines)

 The student will be able to solve and analyse problems incorporating distributed forces.

 Student will be able to analyse beams and draw shearing force and bending moment diagrams

 Student will be able to calculate moment of inertia, centroids and centre of mass of rigid bodies

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| **Learning Outcome** |

• An ability to apply knowledge of mathematics, science, and engineering [ABET: 3a]

 • An ability to identify, formulate and solve engineering problems [ABET: 3e].

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| **Course Outline and Time schedule** |

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| Course Outline | Week |
| Mechanics, Fundamental Concept | First week |
| Units of Measurement, The International System of Units |
| Scalars and Vectors |
| Vector Operations | 2nd week |
| Vector Addition of Forces |
| Addition of a System of Coplanar Forces |
|  Cartesian Vectors | 3rd week |
| Addition of Cartesian Vectors |
| Position Vectors |
| Force Vector Directed Along a Line | 4th week |
| Dot Product |
| Condition for the Equilibrium of a Particle |
| The Free-Body Diagram | 5th week |
| Coplanar Force Systems |
| Three-Dimensional Force Systems |
| Moment of a Force—Scalar Formulation | 6th week |
| Cross Product |
| Moment of a Force—Vector Formulation |
|  Principle of Moments | 7th week |
|  Moment of a Force about a Specified Axis |
|  Moment of a Couple |
| Simplification of a Force and Couple System | 8th week |
| Further Simplification of a Force and Couple System |
|  Reduction of a Simple Distributed Loading |
|  Conditions for Rigid-Body Equilibrium | 9th week |
| Free-Body Diagrams |
| Equations of Equilibrium |
|  Two- and Three-Force Members | 10th week |
| Free-Body Diagrams |
| Equations of Equilibrium |
| Constraints and Statically Determinacy | 11th week |
| Simple Trusses |
| The Method of Joints |
| Zero-Force Members | 12th week |
| The Method of Sections |
|  Frames and Machines |
| Internal Loadings Developed in Structural Members | 13th week |
| Shear and Moment Equations and Diagrams |
| Relations between Distributed Load, Shear, and Moment |
| Centre of Gravity, | 14th week |
| Centre of Mass, and centroids |
| Composite Bodies |
| Definition of Moments of Inertia for Areas, Parallel-Axis Theorem for an Area | 15thweek |
| Radius of Gyration of an Area |
| Moments of Inertia for Composite Areas |

**Presentation methods and techniques**

Methods of teaching varied according to the type of text, student and situation. The following techniques are usually used:

1. Lecturing with active participations.

Involve the civil engineering students in asking some questions related to the target topic of the course.

1. Problem solving.

Encourage the students to solve the given assignments and submit them at the definite time,

1. Cooperative learning.

By enhancing the students studying in groups .

1. Discussion.

To discuss the results and the answers of the target problems.

1. Learning by activities.

To encourage the students to some group activity.

1. Connecting students with different sources of information.
2. Connecting students with different sources of information

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| Sources of information and Instructional Aids |

Computer

power point

Wihte Board

Library sources

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| **Assessment Strategy and its tools** |

The assigned syllabus is assessed and evaluated

Through: feed back and the skills that are acquired by the students

The tools:

1. Formal (stage) evaluation

a) Class Participation 10%

b) Ist Exam 20%

c) 2nd Exam 20%

d) Group activity and Quizzes 10%

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| **Tool & Evaluation** |

Tests are permanent tools & assessment, in addition to the activity file which contains curricular and the co-cussiculor activities, research, report papers and the active participation of the student in the lecture.

The following table clarifies the organization of the assessment schedule:

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| **Grade** | **Date** | **Test** |
| 20% | 4/4/2019 | First Exam |
| 20% | 1/5/2019 | 2nd Exam |
| 20% | Students should be notified about their marks | Activities & Participation and Quizzez |
| 40% |  | Final Exam |

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| **Activities and Instructional Assignment** |

1. Practical assignments to achieve the syllabus objectives.
2. Quizes

**Regulations to maintain the teaching-Learning Process in the Lecture:**

1- Regular attendance.

2- Respect of commencement and ending of the lecture time.

3- Positive relationship between student and teacher.

4- Commitment to present assignments on time.

5- High commitment during the lecture to avoid any kind of disturbance and distortion.

6- High seuse of trust and sincerity when referring to any piece of information and to mention the source.

7- The student who absents himself should submit an accepted excuse.

8- University relevant regulations should be applied in case the studen,s behavior is not accepted.

9- Allowed Absence percentages is ( 15%).

**References :**

**1** Engineering Mechanics: Statics (7th edition) by J.L. Meriam and L. Kraige.

**Syllabus Classification**

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| **Objectives** | ***Learning outcome*** | ***Assessment tools*** |
|  The student will be able to solve vector operations | ABET 3a & 3e | Quize+Exams |
|  Student will be able to analyse force systems (2D and 3D) | ABET 3a & 3e | Quize+Exams |
|  Student will be able to analyse equilibrium problems of particles and rigid bodies (2D and3D) | ABET 3a & 3e | Quize+Exams |
|  Student will be able to analyse structures (trusses, frames and machines) | ABET 3a & 3e | Quize+Exams |
|  The student will be able to solve and analyse problems incorporating distributed forces. | ABET 3a & 3e | Quize+Exams |
|  Student will be able to analyse beams and draw shearing force and bending moment diagrams | ABET 3a & 3e | Quize+Exams |
|  Student will be able to calculate moment of inertia, centroids and centre of mass of rigid bodies | ABET 3a & 3e | Quize+Exams |