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|  logo College: Engineering Department: Civil Engineering Course Title: **Structural Analysis 2** Course No: **-**0901402 Credit Hours: 3 C.H.Semester : First - 2019/2020**About The Course** Course Title: **Structural Analysis 2** Class : A Course No: **-**0901402 Credit Hours: 3 C.H. Lecture Room: 409 Obligatory/ Optional : Obligatory Text Book: 1. *Structural analysis, Russell Hibbeler , 8th edition, Prentice Hall.*  *2. Structural analysis, Aslam Kasamili, 4theitition. Cengage learning,*  *international. Cengage.com/region 2011, ISBN-13-978-0-495- 29567- 9.*  *ISBN-10: 0-495-29567-1***The Instructor** Name : Dr. Shehdeh Mohammad Ghannam Title : C. E. Department Member Office Tel :  Office No : 309 Office Hours: 2-3 Sunday &Tuesday and 12-1,1-2 Monday  E. mail : sh.ghanam @ jpu.edu.jo ; E. mail : shehdeh\_ghannam @yahoo.com |

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| **Course Description** |

*Introduction to Analysis of statically indeterminate structures, Methods for member end moment`s calculations : Method of consistent displacement, Unit load method, least work method, three moment`s equation method, slope deflection method, moment distribution method.*

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| **Course Objectives** |

*To introduce civil engineering students to analyze indeterminate beams, frames and trusses. by Method of consistent displacement. To analyze indeterminate beams, using three moments equation. To analyze indeterminate beams, frames in order to determine fixed End moments by slope deflection method, to analyze indeterminate beams, frames using moment distribution method.*

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| **Learning Outcome** |

Making students aware of how language works to convey meaning as its basic function

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| **Course Outline and Time schedule** |

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| **Course Outline** | **Week** |
| Revision of determinate structuresChapter 1 | 1st Week( 1/3- 4/*3*) |
| Introduction to Indeterminate StructuresChapter 2 | 2ed week( 8/3- 11/3) |
| Methods of consistent displacement methodUnit load method , Least work methodChapter 3.  | 3ed week( 15/3- 18/3) |
| Methods of consistent displacement methodFor beams, frames and trussesChapter 4 | 4th week( 22/3- 25/3) |
| **Exam 1** –Chapter 1 and Chapter2 and Chapter 3+4 | 5th week( 29/3- 1/4) |
| Three moment equationsChapter 5 | 6th week( 5/4- 8/4) |
| Slope Deflection method for beams Chapter 6 | 7th week( 12/4- 15/4) |
| Slope Deflection method for non sway frames Chapter 6 | 8th week( 19/4- 22/4) |
| Slope Deflection method for sway framesChapter 6 | 9th week(26/4- 29 /4 ) |
| Moment Distribution method for beams Chapter7.1 | 10th week( 3/5 - 6/5 ) |
| **Exam 2** –Chapter 5and Chapter 6+7.1  | 11th week( 10/5 – 13 /5 ) |
| Moment Distribution method for beams Chapter 7.2 | 12th week( 17/5 - 20/5 ) |
| Moment Distribution method for frames Chapter 7.2 | 13th week(24/5 - 27/5 ) |
| Final Exam | 14th week( 31/5 - 4/5 ) |

**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.

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| Sources of information and Instructional Aids |

* Computer soft wear … power point
* Using white board.

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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 and quizzes are permanent tools & assessment, in addition to the activity file which contains curricular and the co-curricular 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 | 19/11/2019 | First Exam  |
| 20 | 31/12/2019 | 2nd Exam |
| 20 | Students should be notified about their marks | Activities & ParticipationAnd Quizzes |
| 40 | 19/1 - 26/1/2020 | Final Exam |

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| **Activities and Instructional Assignment** |

1. Practical assignments to achieve the syllabus objectives.
2. Group Activity and demonstrations.

**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.

1. Allowed Absence percentages is ( 15%).

**References :**

* + - 1. *Theory of Structures, Timoshenko, S. P., and Young, D. H. 2nd Ed. McGraw-Hill New York, 1965.*
			2. *Structural analysis, Aslam Kasimali, 4theitition. Cengage learning, international Cengage.com/region 2011, ISBN-13-978-0-495-29567-9. ISBN-10: 0-495- 29567-1.*
			3. *Structural Analysis, Mc-Cormac, J.C., Elling, R.E., Harber and Row, New York, 1988.*
			4. *Elementary Structural Analysis, Norris, C.H. Wilbur, J.B., Utku S., 4th Ed.McGraw-Hill New York, 1991.*

**Syllabus Classification**

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| **Objectives** | ***Learning outcome*** | ***Assessment tools*** |
| * ***Revision***  *of deflection and rotation by displacement method –unit load and least work methods .*
 |  *To produce student in civil engineering to be familiar with different types of determinate structures and methods.* | *By using solved problems.**Power point and weight board.*  |
| * ***Analysis of statically indeterminate structures****, using virtual work method such as unit load and least work methods.*
 | *To develop the students skills in order to differentiate between structures related with determinate and /or indeterminate .*  | *By using solved problems.* |
| * ***Cal****culations of deflection of beams by 3 moment equation*
 | *To help student to investigate and analysis continuous beams*  | *Solving problems on the board.* |
| * ***Most*** *popular methods for calculations of deflection and slope for indeterminate structures : beams and frames. Using slope deflection method*
 | *To make the student to have capability in determining :* * *deflection*
* *the slope (rotation angle)*
* *end moments*
* *support reactions*
 | *Power point and weight board.*  |
| * ***Analysis of statically indeterminate structures****, using* ***moment distribution*** *for beams and frames*
 | *To develop the students skills in order to have a capability in solving beams and frames using moment distribution method. .*  | *By using solved problems.* |



***JARASH UNIVERSITY***

***CIVIL ENGINEERING DEPARTMENT
Course Syllabus***

***0901402 STRUCTURAL ANALYSIS 2*** *(3credit hours)*

***Description****: Introduction to Analysis of statically indeterminate structures, Methods for member end moment`s calculations : Method of consistent displacement, Unit load method, least work method, three moment`s equation method, slope deflection method, moment distribution method.*

***Text book****: "structural analysis, Russell Hibbeler , 8th edition, Prentice Hall.*

***Reference****s:*

*1. Fundamentals of Structural Analysis ", Second Edition, by West, H., and Gesch winder, L. John Wiley & Sons 2002.*

*2. Theory of structures, Timoshenko, S.P., Young, D.H. 2nd Ed. McGraw-Hill New York, 1965.*

*3. Structural Analysis, Mc-Cormac, J.C., Elling, R.E., Harber and Row, New York, 1988.*

*4.Elementary Structural Analysis, Norris, C.H.,Wilbur,J.B., Utku S.,4th Ed. MGraw-Hill N.York 1991.*

***Coordinator*** *: Dr. Shehdeh Ghannam*

***Prerequisites*** *: 0901306 Structural Analyses 1 (DETERMINATE STRUCTURES)*

***Course Objectives****:*

*To introduce civil engineering students to analyze indeterminate beams, frames and trusses. by Method of consistent displacement. To analyze indeterminate beams, using three moments equation. To analyze indeterminate beams, frames in order to determine fixed End moments by slope deflection method, to analyze indeterminate beams, frames using moment distribution method.*

***Topics Covered****:*

*1. Review of theories of deflection of determinate structures.*

*2. Introduction to Analysis of statically indeterminate structures by Force method.*

*3. Strain energy method.*

*3. Methods for member for end moment's calculations.*

*4. Method of consistent displacement for beams frames and trusses. Analyze the*

 *indeterminate beams and truss by unit load and least work method.*

*5. Three moment's equation for indeterminate beams.*

*6. Slope deflection method for indeterminate beams and frames*

*7.Column Analogy.*

*8. Moment distribution method.*

*9.Stiffness Method.*

***Class****: Two lectures per week on Sun., and Tues.*

*Professional Component Contribution : This course contributes to the engineering analysis topics.*

***How assessed****: -Home works, quizzes and class contribution……………………… 20%*

 *-Two-monthly class examinations (20%+10%)………………….... 30%*

 *- Final examination……………………………………………………..50%*

***Exam Dates****: First Exam on ……….. / 2020.*

 *Second Exam on …….. / 2020.*