# ENGR 225: Mechanics of Materials

# Syllabus Spring 2021

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building #4 office #210

Credits: 5

Class Time: TBD, & Canvas online classroom

Office Hours:

***NWIC MISSION STATEMENT***

*Through education, Northwest Indian College promotes indigenous self-determination and knowledge*

**Course Prerequisites:** ENGR 214.

# Required Text

None.

# Course Description

Provides engineering students with the fundamental principles used in the study of the engineering behavior of structures and mechanical members. Covers basic relationships between axial, torsion, bending and shear loading acting on solid elements and their allowable stresses, strains and deformations, and Mohr’s circle of stresses and strains. Includes lab.

# Course Outcomes

# At the completion of this course students will be able to:

1. Apply statics, properties of materials, and basic mathematics to analyze the stress-strain behavior of structural members
2. Apply various static loading conditions of simple structures and formulate progressive solutions to quantify their stress-strain behavior
3. Work individually and function as part of a team to apply engineering principles.

# Institutional Outcomes

1. Effectively communicate in diverse situations, from receiving to expressing information, both verbally and non-verbally

1. Meet the technological challenges of a modern world
2. Work cooperatively toward a common goal

**Course Requirements and Expectations**

Students who have a valid issue that prevents them from attending class need to notify the instructor prior to the start of class, email messaging is preferred but phone message is acceptable. It is understood in some situations an absence will be unavoidable. In those situations students will be given the opportunity to make up attendance and participation by watching recordings of the class session that has been missed. Embedded in the recorded class session will be participation questions. If those questions are answered and submitted to the instructor within 1 week of the scheduled class session, attendance and participation points will be awarded based on the agreement reached between student and instructor.

Any exceptions to this attendance policy must be approved by the Department Chair and the instructor in writing before the start of the quarter.

***It will not be possible to earn a passing grade if a student misses more than 30% of this class without notifying the instructor.***

**Evaluation & Assessment**

|  |  |
| --- | --- |
| Homework Problem Presentations | 15% |
| Labs | 10% |
| Projects | 10% |
| Mastering Engineering Homework/Canvas | 15% |
| Quizzes | 10% |
| Midterms | 20% |
| Final Exam | 20% |

Grading will be on a percentage system as detailed below:

* 1. Homework Problem Presentations – Each homework assignment will require that select problems are worked out in detail and submitted in class. Late assignments will receive a 10% deduction for each late day past the due date. weight – 15%
  2. Labs – There will be approximately 5 lab assignments throughout the quarter. Students must be present for the lab and submit a report in order to receive credit. weight – 10%
  3. Projects - There will be a group project with bi-weekly individual assignments due. This project will be a continuation of work done in Statics and will continue through Dynamics. weight – 10%
  4. Mastering Engineering Homework/Canvas – Homework will be completed online via MyLab. See calendar for due dates. Online assignments in Canvas will be included in this grade. See Canvas for due dates. weight – 15%
  5. Quizzes – There will be daily quizzes at the beginning of class covering topics from the previous class period, excluding exam days. Tuesdays will be individual and Thursdays will be team quizzes with the exception of the first Thursday of class, which will be individual. Students must be in class to take the quiz, including team quizzes. The lowest score will be dropped at the end of the quarter. No makeups. weight – 10%
  6. Midterm Exams – There will be 3 midterm exams throughout the quarter – see Canvas for expected dates. No makeups will be allowed without prior permission given by instructor. weight – 30%
  7. Final Exam – Comprehensive exam at the end of the quarter. No makeups will be allowed without prior permission given by instructor. weight – 20%

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# Course and Assignment Schedule:

|  |  |
| --- | --- |
| Tentative Schedule | |
| **Week** | **Topic** |
| 1 | Units, Vector Mathematics |
| 2 | Position Vectors, Force Vectors, Dot Products |
| 3 | Particle Equilibrium, Free-Body Diagrams, Coplanar Force Systems, 3-D Force Systems, Moments, Cross Products |
| 4 | Moment About an Axis, Moment of a Couple  **Midterm Exam #1** |
| 5 | Simplification of Force and Moment Systems, Distributed Loads, Rigid Body Equilibrium, Free-Body Diagrams, Equations of Equilibrium, 2- and 3-Force Systems |
| 6 | 3-D Free-Body Diagrams and Equilibrium, Constraints, Statical Determinacy, Method of Sections, Method of Joints  **Midterm Exam #2** |
| 7 | Frames and Machines, Internal Forces |
| 8 | Sheer and Bending Moment Diagrams, Friction |
| 9 | Center of Gravity, Center of Mass, Centroids, Composite Bodies  **Midterm Exam #3** |
| 10 | Moment of Inertia, Parallel Axis Theorem |
| Finals | **Final Exam** |

**Instructor(s) Discretion:**

Should it be deemed necessary, the instructor(s) of this course reserves the right to make alterations, at any time, to the course materials or what is contained within this syllabus in order to improve the course itself, the learning environment or the opportunity for student success. If such a change is made, it will be made in a timely manner so as not to impede the learning process or interfere, in any way, with student success.