**Syllabus**

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| **MAE 454 – Machine Design and Manufacturing (CRN: 81121)**  **Fall 2018** | |
| Meeting Time & Room: | MWF 12:00 to 12:50, ESB G102 |
| **Instructor Office, Phone and Email:** | **Dr. Gregory J. Thompson,** Office ESB-733, Ph. (304) 293-3254,  e-mail: gregory.thompson@mail.wvu.edu |
| **Office Hours:** | MF 11 am-12 pm, W 3-4 pm (other times by appointment). |
| **Textbook:** | Shigley's Mechanical Engineering Design, 10th Edition, McGraw-Hill, New York, USA, 2015. |
| **Author/ISBN:** | Budynas, R.G. and Nisbett, R., ISBN 978-0-07-339820-4 |
| **Prerequisites:** | MAE 342 and 343; Math 261 with a grade of C or better. |
| **Supplies/Other:** | SolidWorks, SolidEdge, or any three-dimensional CAD program. Access to the Internet on a PC or laptop. Matlab, Excel, or similar program will be needed. |

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| **Course Objectives** | |
| This course continues the knowledge gained in the MAE 342 and 343 courses through the use of analytical analyses, empirical formulas and manufacturers’ data in the design and selection of machine elements, as well as design for manufacturability considerations.  The student will: | |
| 1. | Work in a group environment, individually analyze a specific machine design problem, and then integrate each student’s analysis into an overall machine design problem solution. |
| 2. | Demonstrate and understanding for the need to engage in lifelong learning. |

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| **Course Learning Outcomes** |
| Students are expected to gain the knowledge necessary to undertake independent mechanical design projects which make use of traditional mechanical elements to design a system, component, or process to meet desired needs. Upon successful completion of this course, the student should be able to design a system, component, or process to meet desired needs (ABET C) and be able to formulate engineering problems related to machine design (ABET E). Additionally, the student should demonstrate knowledge of recognition of the need for, and an ability to engage in life-long learning (ABET I). |

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|  | | **ABET Outcomes\*** |
|  | Work in a group environment to arrive at an open-ended design problem solution. | C |
|  | Integrate multiple machine design concepts to solve a complex system problem. | C |
|  | Solve statically loaded machine design problems. | E |
|  | Solve cyclically loaded (fatigue) machine design problems. | E |
|  | Demonstrate an ability to search for and understand technical literature. | I |

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| **Term Project** |
| Students will develop a project in teams of four to six students. The project will be assigned during the first week of the course. The project will require students to make use of the computational tools such as Solidworks, SolideEdge, MATLAB, EXCEL, etc. A final report (word processor narrative, computer sketches, engineering calculations, etc.) will be required at the end of the course. The project will be due the last week of class. Individual chapter projects will be used to guide the students in the development of the term project report. |

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| **Class Attendance Policy** |
| Class attendance is strongly recommended but not mandatory. Attendance may be used to determine borderline grades. |
| **Class Rules** |
| 1. Professional attitude in class is expected from all students. 2. No cell phones or other media players allowed to be used during class unless asked to be used by the instructor. 3. Disruptive behavior in class will not be allowed (that includes reading newspaper, talking to others, or using media players). 4. Assignments must be submitted at the time they are due. 5. Late assignments will not be accepted after solutions are presented or discussed in class. 6. All assignment problems must be presented on individual pages on plain white paper or engineering pad paper (each page must have date and name, see assignment format handout). 7. Missing an exam without prior approval will result in a zero grade for that exam. 8. Completeness, neatness and legibility in assignments, exams and projects are mandatory. Sloppiness will result in a lower grade. |

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| **Grading** | **Weight** |
| Chapter Projects | 25% (Lowest of the 100 point assignments will be dropped.) |
| Exams (2) | 25% |
| Term Project\* | 25% |
| Final Exam | 25% |
| *\* Peer evaluation may be factored in the individual grade for the term project.* | |

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| **Grading Schedule** | |
| Grade is assigned based on **performance, NOT on “effort.”** Projects are assessed based on overall quality of document and engineering considerations as well as on relative comparison with the rest of the class. | |
| 90 – 100 | A |
| 80 – <90 | B |
| 70 – <80 | C |
| 60 – <70 | D |
| <60 | F |

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| **ADDITIONAL StatementS** |
| Academic Standards - <https://provost.wvu.edu/governance/academic-standards-resources>  Academic Policies - <https://tlcommons.wvu.edu/syllabus-policies-and-statements> |

MAE 454 – Machine Design and Manufacturing

MWF 12:00 – 12:50 PM ESB G102

Course Outline Fall 2018

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| Month | Date | Day | Period | Topic | Assignment Due |
| August | 15 | W | 1 | Intro., Review | Status Quiz |
|  | 17 | F | 2 | Review |  |
|  | 20 | M | 3 | Review |  |
|  | 22 | W | 4 | Review |  |
|  | 24 | F | 5 | Review |  |
|  | 27 | M | 6 | Ch. 8 | Review Problems |
|  | 29 | W | 7 | Ch. 8 | Project Email |
|  | 31 | F | 8 | Ch. 8 |  |
| September | 3 | M | Labor Day Recess | | |
|  | 5 | W | 9 | Ch. 8/9 | CAD/ Research Project |
|  | 7 | F | 10 | Ch. 9 |  |
|  | 10 | M | 11 | Ch. 9 |  |
|  | 12 | W | 12 | Ch. 10 | Ch. 8 & 9 Design Project |
|  | 14 | F | 13 | Ch. 10 |  |
|  | 17 | M | 14 | Ch. 10 |  |
|  | 19 | W | 15 | Review | Ch. 10 Design Project |
|  | 21 | F | 16 | Exam 1 |  |
|  | 24 | M | 17 | Ch. 7 |  |
|  | 26 | W | 18 | Ch. 7 |  |
|  | 28 | F | 19 | Ch. 7 | SOP Draft |
| October | 1 | M | 20 | Ch. 7 |  |
|  | 3 | W | 21 | Ch. 11 |  |
|  | 5 | F | 22 | Ch. 11 |  |
|  | 8 | M | 23 | Ch. 11 |  |
|  | 10 | W | 24 | Ch. 12 |  |
|  | 12 | F | Fall Break | | |
|  | 15 | M | 25 | Ch. 12 | SOP Peer Evaluation |
|  | 17 | W | 26 | Ch. 13 |  |
|  | 19 | F | 27 | Ch. 13 | Ch. 7, 11, & 12 Design Project |
|  | 22 | M | 28 | Ch. 13 |  |
|  | 24 | W | 29 | Ch. 13 | Memo |
|  | 26 | F | 30 | Ch. 14 |  |
|  | 29 | M | 31 | Ch. 14 | Draft Report, Peer Eval. |
|  | 31 | W | 32 | Ch. 15 |  |
| November | 2 | F | 33 | Ch. 15 |  |
|  | 5 | M | 34 | Ch. 16 | Ch. 13-15 Design Project |
|  | 7 | W | 35 | Exam 2 |  |
|  | 9 | F | 36 | Ch. 16 |  |
|  | 12 | M | 37 | Ch. 16 | SOP Measurement |
|  | 14 | W | 38 | Ch. 16 |  |
|  | 16 | F | 39 | Ch. 17 |  |
|  | 19 | M | Thanksgiving Recess | | |
|  | 21 | W |
|  | 23 | F |
|  | 26 | M | 40 | Ch. 17 | Rapid Prototype Project Report |
|  | 28 | W | 41 | Ch. 17 |  |
|  | 30 | F | 42 | Manufacturing | Ch. 16 & 17 Design Project |
| December | 3 | M | 43 | Manufacturing |  |
|  | 5 | W | 44 | Review | Project Report and Peer Eval. |
|  | 12 | W | Final, 2:00 – 4:00 PM, ESB G102 | | |