Faculty Senate Course Form

Effective Date: **Fall 2025** Submission Date: November 2024

Department: SAET College of: **Technology**

Contact Person: David Miller Prefix: **MECET**

Create New, Revise, Inactivate, or Reactivate: **Revision** Course #: **682**

Course Form:
- Used to create new course numbers or new prefixes.
- Used to change Name, Grading, Hours, Description, Reactivate
- Used to inactivate a course from the current catalog. Courses are never deleted. They are made inactive and can be legislated to become active again.

1. Purpose/Justification for the Changes:
Lab activities require SolidWorks, which is taught in MECET 121

2. Is this related to, and/or affect, any other department/college/unit curricula or programs at Pittsburg State University? ***If "Yes", please provide an explanation. Provide documentation of any discussions (e.g. copies of emails, memos, etc.) that have occurred.***

○ Yes ◉ No

3. Is this course to be considered for General Education?
If "yes" this requirement will need approval of the General Education Committee after the revisions have been approved by Faculty Senate. The General Education Course Approval form will also need to be submitted.

○ Yes ◉ No

4. Will this course be required of any education majors?
If "yes," this requirement will need approval of the Council for Teacher Education before upload to " College Curriculum Legislation" in SharePoint.

○ Yes ◉ No

5. Will additional resources or costs be required?

○ Yes ◉ No

If so, what will be needed?

6. Will any additional course fees be required (e.g. equipment, clothing, travel, licensing, etc.)?
If "yes," complete the Course Fee Form on the Faculty Senate website, it will need to gain approval of the President's Council.

○ Yes ◉ No

7. Objectives/Student Learning Outcomes for NEW courses only, as it will appear in the syllabus:
Attach with upload.

8. Assessment Strategies (e.g. exams, projects, university rubric, etc.), as it will appear in the syllabus:
Attach with upload.

Course Numbers cannot be changed, only created.

	Exsisting	New/Proposed
Title:	Heat Transfer	Heat Transfer
Course Number:	**MECET 682**	**MECET 682**
Credits:	**3**	**3**
Grading System:	**A-F, IN**	**A-F, IN**
Pre/Co-Requisite(s):	Pre: MATH 150, Pre/Co MECET 524	Pre: MATH 150, MECET 121; Pre/Co MECET 524
Course Description:	Principles of heat transfer including conduction, convection, and radiation involved with materials and processing techniques. Manual and computer assisted calculations with applications in design.	Principles of heat transfer including conduction, convection, and radiation involved with materials and processing techniques. Manual and computer assisted calculations with applications in design.

Authorization Sign-Off

Checklist: Check once verifiied.

☐ Required fields completed.
☐ Syllabus attached for new courses
☐ Assignment Strategies Attached

-Approved: Department Chair/Director
Date: 12/6/2024 Signature, Chair/Director: _____

-Approved: College Curriculum Committee
Date: 1/13/25 Signature, Committee Chair: _____

-Approved: Dean of College
Date: 1/13/25 Signature, Dean: _____

-Approved: Council for Teacher Education (if applicable)
Date: _____ Signature, Council Chair: _____

-Approved: University Undergraduate Curriculum Committee
Date: _____ Signature, Committee Chair: _____

-Approved: Faculty Senate
Date: _____ Signature, Recorder Faculty Senate: _____

Originating Departments(s): After completing this form, please upload it to the SharePoint, within the appropriate College folder, "Preliminary Legislation", to allow for review and questions. Any modifications should be saved as "original file name.v2.docx" and uploaded as well.

Following final College Curriculum Committee approval, please apply the appropriate signatures, and send them to your College Administrator.

Pittsburg State University
Department of Engineering Technology
Mechanical Engineering Technology Program
(Prepared by: David Miller 11/2023)

COURSE TITLE: MECET 682 - Heat Transfer

COURSE SCHEDULE: Face-to-Face, Tuesday/Thursday, 9:30-10:45, Room KTC W202

INSTRUCTOR: David Miller, PhD
Office: KTC W224c
Office Hour: 9-10 MWF, 1-2 TTh
Phone: 620-235-6115
E-mail: djmiller@pittstate.edu

COURSE DESCRIPTION: MECET 682 - Heat Transfer. 3 Hours. (3 hours lecture). Principles of heat transfer including conduction, convection, and radiation involved with materials and processing techniques. Manual and computer assisted calculations with applications in manufacturing. Closed to students with credit in ETECH 682 Thermodynamics and Heat Transfer. Prerequisite: MATH 150 Calculus I. Prerequisite or corequisite: ETECH 524 Fluid Mechanics I. May be taken for honors.

TEXTBOOK/MATERIALS:

- Bergman, T.L., Lavine, A.S., Incropera F.P. & DeWitt, D.P., *Introduction to Heat Transfer*., (6^{th} Edition), Wiley, ISBN 978-0-470-50196-2
- Kurowski, P.M. *Thermal Analysis with SolidWorks Simulation 2019*. SDC Publications. ISBN 978-1-630-57242-6
- *FE Supplied Reference Handbook*. Free PDF from NCEES website. (Optional, requires account)
- Scientific Calculator, Engineering Paper
- Electronic Data Storage Device (Jump Drive or Cloud Storage)

COURSE OBJECTIVES:

- Obtain knowledge of the fundamental principles of heat transfer
- Apply these principles to practical, real-world processes.
- Develop skills in the analysis of engineering design problems involving practical heat transfer systems.
- Apply differential and integral calculus, analytical techniques, spreadsheets and the finite difference method for problem solving. (ABET Objective 1)
- Apply fundamental knowledge of heat transfer by using various software simulation packages (ABET Objectives 2 & 4)

COURSE TOPICS:

- Fundamentals of heat-transfer modes
- Steady State and transient Conduction
- Convection including External and Internal flow and Free Convection.
- Boiling and Condensation
- Heat exchangers
- Radiation

GRADING SYSTEM: Grades will be based on the following scale and proportions:

90 – 100%	A
80 – 89%	B
70 – 79%	C
60 – 69%	D
59 – 0%	F

Attendance/Participation	10%
Tests	50%
Design Problems/Tutorials	40%

TENTATIVE SCHEDULE OF ACTIVITIES

Subject to change

WEEK	DATES	CLASS CONTENT	READING	ASSIGNMENTS
1	01/16 01/18	Introduction to heat transfer	Bergman Ch. 1	Kurowski Ch1 Syllabus Quiz
2	01/23 01/25	Introduction to conduction	Bergman Ch. 2	Kurowski Ch3
3	01/30 02/01	One dimensional steady state conduction	Bergman Ch. 3	Kurowski Ch5
4	02/06 02/08	Two dimensional steady state conduction	Bergman Ch. 4	Thermal Analysis of a Bi-Metal Loop
5	02/13 02/15	Transient Conduction	Bergman Ch. 5	Kurowski Ch8
6	02/20 02/22	Review ***Exam 1***		
7	02/27 02/29	Introduction to Convection	Bergman Ch. 6	Kurowski Ch6
8	03/05 03/07	External Flow	Bergman Ch. 7	Thermal Analysis of a Heat Sink
9	**03/12 03/14**	**Spring Break – No Class Meeting**		
10	03/19 03/21	Internal Flow	Bergman Ch. 8	Coffee Heater with Thermostat
11	03/26 03/28	Free Convection	Bergman Ch. 9	Heater with Fins
12	04/02 04/04	Review ***Exam 2***		
13	04/09 04/11	Boiling and Condensation	Bergman Ch. 10	Kurowski Ch9
14	04/16 04/18	Heat Exchangers	Bergman Ch. 11	Heat Exchanger
15	04/23 04/25	Radiation Heat Transfer & Exchange between surfaces	Bergman Ch.12, 13	Kurowski Ch13
16	04/30 **05/02**	Review **Lab Practical Exam**		
17	**05/09**	***Exam #3* – 9:30-11:20**		

Pittsburg State University encourages students to take full advantage of campus resources. Information about the campus resources and other information, notifications, and policies (academic integrity, dead week, etc.) students should be aware of, can be found through the syllabus supplement link for the current semester that can be found on PSU's web site at … https://www.pittstate.edu/registrar/syllabus-supplement.html

Additional Details/Descriptions:

Course Prerequisites: In order to succeed, students must be familiar with algebra, geometry, differential and integral calculus, as well as concepts of physical units (temperature, energy, area, length, time), orders of magnitude and scientific notation. Students should have a basic understanding of the Windows or Mac operating system (zipping and unzipping files, opening and saving files, etc). Use of Canvas and the Internet are required in this course. Prior knowledge about 3D modeling and simulation using SolidWorks is required.

Attendance/Participation: Attendance and meaningful participation in group work are considered in evaluating performance in the work place and will be considered in this class. The course meets for lecture one hour and 15 minutes twice a week. Attendance may be taken before each meeting; an absence is defined as not being present at the time of roll call. Students with more than 3 unexcused absences may have their grade lowered by a letter grade; after 6 absences they may be dropped from the class at the instructor's discretion. Students not participating in weekly group activities may receive no points for that activity; determination of meaningful participation is up to the instructor. In-person courses may shift to online activities in the event of campus closure/inclement weather; check Canvas for additional requirements should this become necessary.

Classroom Etiquette: Students are strongly encouraged to participate in the lectures through early preparation and questions or comments in class but are asked not to monopolize the entire class period. Students are required to behave in a professional manner and respect the learning environment of others. If students must come in late or leave early, please notify the instructor beforehand and do so in a quiet, non-disruptive manner. Please silence and store all electronic devices and refrain from engaging in distracting activities on the computers. The instructor reserves the right to remove any device deemed to be causing a disruption - this includes, but isn't limited to: cell phones, tablets, eReaders, eCigarettes.

Homework: Homework problems will be posted covering each topic and discussed in class. Homework will not be graded; rather they are meant for students to complete prior to a given class period to aid in the discussion. A student having difficulty with a homework problem is encouraged to discuss the problem with fellow students, tutors and the instructor. It is strongly recommended that students KEEP UP WITH THE HOMEWORK!!!

Methods: Solutions to problems solved on tests and homework must be logical and based on the subjects of the course. A solution must be understood by the student, fellow students, instructor, and other individuals, today and in the future. A standard solution approach will be required to support clear and concise communication of information. A solution will include: **name** and **date**, **design conditions** (given), **assumptions**, **formula**, **sketch** (dimensions & orientation, temps, material properties) and clearly identified **answer** (with units). Illegible solutions may result in no credit.

Quizzes: There are no scheduled quizzes; however, the instructor reserves the right to give quizzes at his discretion.

Design Problems/Tutorials: Short real-world problems or software tutorials in simulation and analysis software packages will be assigned most weeks throughout the semester to familiarize students with state-of-the-art tools used in heat transfer analysis. Some class time may be given for work on tutorials, but it is expected that students spend time outside of class to complete the required work. Specific instructions for deliverables from each tutorial will be provided at the time they are assigned; deliverables may include (but aren't limited to): a Canvas quiz, a written report, SolidWorks documentation.

Tests: Three equally weighted tests will be given to evaluate the student's understanding of the course topics. Tests are comprehensive and administered on CANVAS. Students will be allowed to use the *FE Supplied Reference Handbook* during tests; other than this reference, all tests will be closed book, closed notes and closed homework. Partial credit MAY be given based on student's hand written calculations at the instructor's discretion. Calculation sheets must be turned in at the

conclusion of the exam and must follow the guidelines outlined in the Methods section above. Rescheduling tests will only be done under special circumstances and only by notifying the instructor ahead of time via email.

Final Practical Exam: A practical SolidWorks exam will be administered during one of the last class periods using SolidWorks and will consist of topics covered in the tutorials.

Grading Policy: In addition to the policy on Attendance grades discussed above, students must maintain a passing grade in the following course categories: Design Problems/Tutorials, Tests, and the Lab Practical Exam. A failing grade in any of these categories will result in a final grade of D in the class, regardless of the grades in the other class categories. Grading policies and rubrics for individual assignments will be provided at the time of announcement.

Missed and Late Work: No work will be accepted after the given due date unless due to a documented medical necessity or a documented school event. With the exception of medical emergencies, any missed work must be discussed in advance through email.

Software: The course will be administered with the Canvas system. The site will maintain course materials and be used for communications, problem submissions and grading. The site should be checked frequently. Exams use the Respondus Browser, so please make sure you are set up beforehand. The design problems/tutorials require students to have access to SolidWorks. This software is available in many labs in the KTC, but in many cases there are versions available for use on personal computers. Contact the instructor if you wish to obtain software for your own personal machine.

Academic Dishonesty: Submitting someone else's work as your own will not be tolerated in this class. Working together on homework assignments is encouraged, but EACH individual must show ALL work for EVERY problem themselves. Examples of academic dishonesty include, but aren't limited to: cheating on assignments or tests, submitting someone else's work as your own, giving your work to someone else, use of solution manuals/assignments from previous semesters, not citing sources on a writing assignment. Plagiarism includes copying from printed solution manuals, from other students, from the web, etc. Determination of what is or is not academic dishonesty is at the discretion of the instructor. If your work is considered to be an act of academic dishonesty all parties will automatically receive a zero on that assignment. Your actions could also cause you to receive an 'F' in the course and could result in severe penalties, up to and including dismissal from the university.

Communication Policy: Students are encouraged to interact with the instructor outside of class in person, via phone conversations and over the Internet; the preferred method of communication is via email. Questions sent via Canvas or email will typically be answered within less than 24 hours if received between 8:00am Mondays and 4:00pm Fridays; however, any questions asked outside of the "normal business week" may result in longer than normal response times. The instructor will not discuss homework/tests/assignments within 24 hours of the due date or 24 hours of when they are handed back. Feedback on quizzes and assignments will usually be based on the scope of the assignment; the rule of thumb is "however long you had to do it, expect it to take that long to get feedback."

SPECIAL CONCERNS: Any student who, because of a disabling condition, may require some special arrangements in order to meet course requirements should contact the instructor as soon as possible to make necessary accommodations; 7-10 days prior notice prior to an exam is appreciated to allow time to provide necessary materials to the Testing Center. Information about academic support services can also be obtained from the PSU Center for Student Accommodations.