TO: The Engineering Faculty

FROM: The Faculty of the School of Mechanical Engineering

RE: Course Modification - ME 41500 Energy Systems Engineering

The Faculty of the School of Mechanical Engineering has approved the following modification to an existing course. The course description and prerequisites of ME 41500 will be changed will be changed as shown below. This action is now submitted to the Engineering Faculty with a recommendation for approval.

FROM:

ME 41500 Energy Systems Engineering, Sem. 2, Lecture 3, cr. 3. Prerequisites: ME 30000, ME 31500 or equivalents.

Combined application of thermodynamics, fluid mechanics, and heat transfer fundamentals to the design of energy systems. Important applications such as thermal regulation in buildings, nuclear/fossil fuel power plants, internal combustion engines, gas turbines, electronic equipment, processing of primary metals and plastics, and manufacturing processes will be presented. Computer-assisted design calculations considering optimization techniques, energy costs, and economics, including environmental issues, will be discussed.

TO:

ME 41500 Energy Systems Engineering, Sem. 2, Lecture 3, cr. 3. Prerequisites: ME 20000, ME 30800 or equivalents.

Application of Thermodynamics, fluid mechanics, and heat transfer fundamentals to the design of energy systems. Applications include thermal regulation in buildings, electronic equipment, energy generation, conversion, and storage, manufacturing processes, and combustion processes. Beyond the fundamentals, this course will focus on design and analysis techniques, including analysis of energy costs, economics, and environmental issues.

Reason: ME 41500 is being offered again after over a 20-year gap in offering this course. The proposed description and prerequisite changes are updates for new ME 41500. Also the newly formulated course profile is provided below so that you can more clearly see the framework of the revised ME 41500 course.

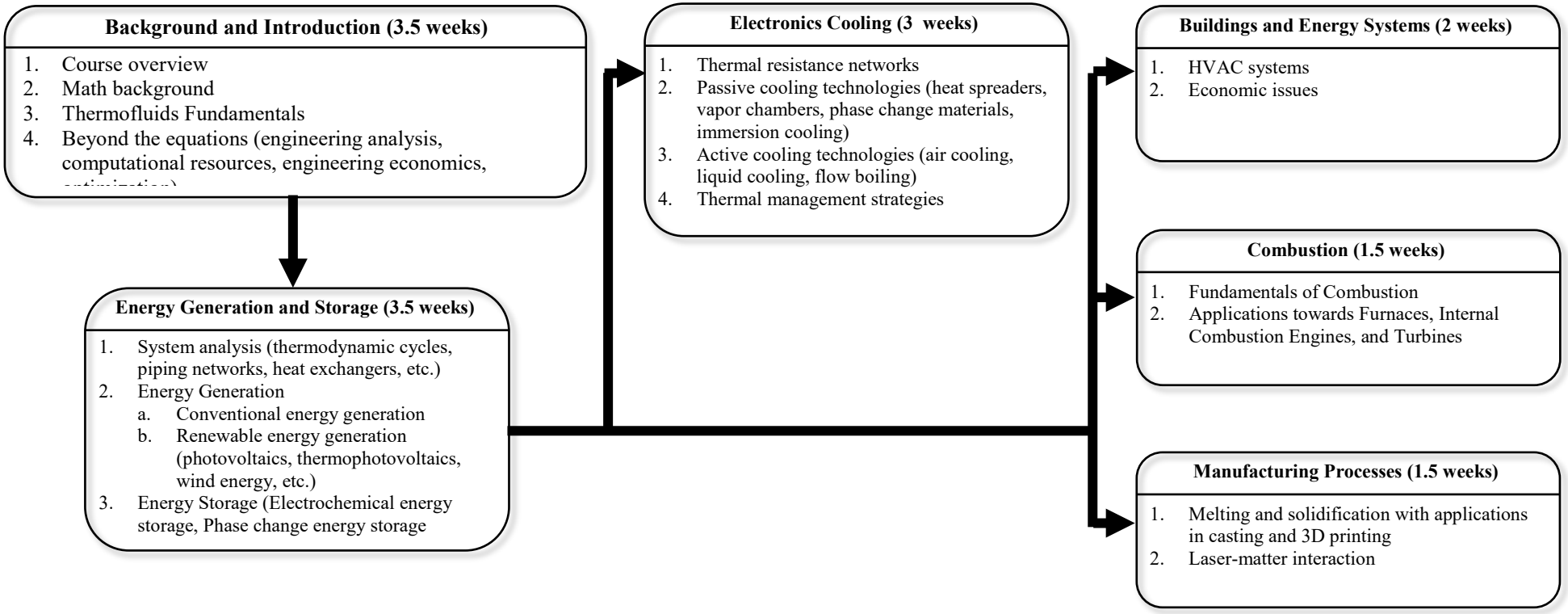
James D. Jones

James D. Jones, Associate Professor and Associate Head
School of Mechanical Engineering

ME 41500
ENERGY SYSTEMS ANALYSIS

Course Outcomes [Related ME Program Outcomes in brackets]

1. Apply the fundamentals of thermodynamics, fluid mechanics, and heat transfer to calculate the performance of energy systems [1,6]
2. Analyze and optimize the performance of energy systems including both the thermofluid performance and other aspects including energy cost and environmental issues [1,2,6]
3. Design energy systems using the fundamental thermofluids concepts and computer-assisted design tools [1,2,3,4,5,6]



COURSE NUMBER: ME 30800

COURSE TITLE: Fluid Mechanics

REQUIRED COURSE OR ELECTIVE COURSE: Elective

TERMS OFFERED: Fall and Spring

RECOMMENDED TEXTBOOKS:

None. Reference material provided for each module.

PRE-REQUISITIES:

ME 20000 – Thermodynamics I
ME 30800 – Fluid Mechanics

COORDINATING FACULTY: A. Marconnet

COURSE DESCRIPTION: Application of thermodynamics, fluid mechanics, and heat transfer fundamentals to the design of energy systems. Applications include thermal regulation in buildings, electronic equipment, energy generation, conversion, and storage, manufacturing processes, and combustion processes. Beyond the fundamentals, this course will focus on design and analysis techniques, including analysis of energy costs, economics, and environmental issues.

COURSE OUTCOMES [Related ME Program Outcomes in brackets]:

1. Apply the fundamentals of thermodynamics, fluid mechanics, and heat transfer to calculate the performance of energy systems [1, 6]
2. Analyze and optimize the performance of energy systems including both the thermofluid performance and other aspects including energy cost and environmental issues [1,2, 6]
3. Design energy systems using the fundamental thermofluids concepts and computer-assisted design tools [1,2,3,4,5,6]

ASSESSMENTS TOOLS:

1. Homework
2. Case studies
3. Design projects
4. Lecture quizzes

NATURE OF DESIGN CONTENT:

Two to three design projects that integrate fundamentals from thermofluids courses and new topics covered in this course (engineering economics, environmental issues, etc.) to analyze/design complicated physical systems.

RELATED ME PROGRAM OUTCOMES:

1. Engineering fundamentals
2. Engineering design
3. Communication skills
4. Ethical/Professional responsibilities
5. Teamwork skills
6. Knowledge acquisition skills

PROFESSIONAL COMPONENT:

1. Engineering Topics: Engineering Science – 50%
   Engineering Design – 50%

COMPUTER USAGE: Knowledge of word processing, spreadsheet software, basic programming (for example, MATLAB). Students will be introduced to finite element/computational fluid dynamics analysis (e.g., Ansys, COMSOL) for homework and design assignments.

COURSE STRUCTURE/SCHEDULE:

Lectures – 3 days per week at 50 minutes

PREPARED BY: A. Marconnet

REVISION DATE: January 28, 2020