

PURDUE UNIVERSITY
REQUEST FOR ADDITION, EXPIRATION,

EFV 3113

ME 43400

201610

DEPARTMENT Mechanical Engineering EFFECTIVE SESSION Fall 2015

INSTRUCTIONS: Please check the items below which describe the purpose of this request.

<input type="checkbox"/> 1. New course with supporting documents (complete proposal form)	<input type="checkbox"/> 7. Change in course attributes
<input type="checkbox"/> 2. Add existing course offered at another campus	<input type="checkbox"/> 8. Change in instructional hours
<input type="checkbox"/> 3. Expiration of a course	<input checked="" type="checkbox"/> 9. Change in course description
<input checked="" type="checkbox"/> 4. Change in course number	<input type="checkbox"/> 10. Change in course requisites
<input checked="" type="checkbox"/> 5. Change in course title	<input checked="" type="checkbox"/> 11. Change in semesters offered
<input type="checkbox"/> 6. Change in course credit/type	<input type="checkbox"/> 12. Transfer from one department to another

PROPOSED: Subject Abbreviation <u>ME</u> Course Number <u>43400</u> Long Title <u>Gas Turbines for Power and Propulsion</u> Short Title <u>Gas Turbines Pwr/Propulsion</u> <small>Abbreviated title will be entered by the Office of the Registrar if omitted. (30 CHARACTERS ONLY)</small>	EXISTING: Subject Abbreviation <u>ME</u> Course Number <u>43800</u>	TERMS OFFERED Check All That Apply: <input type="checkbox"/> Summer <input type="checkbox"/> Fall <input checked="" type="checkbox"/> Spring CAMPUS(ES) INVOLVED <input type="checkbox"/> Calumet <input type="checkbox"/> N. Central <input type="checkbox"/> Cont Ed <input type="checkbox"/> Tech Statewide <input type="checkbox"/> Ft. Wayne <input checked="" type="checkbox"/> W. Lafayette <input type="checkbox"/> Indianapolis
---	--	---

CREDIT TYPE 1. Fixed Credit: Cr. Hrs. <u>3</u> 2. Variable Credit Range: Minimum Cr. Hrs. _____ (Check One) To <input checked="" type="checkbox"/> Or <input type="checkbox"/> Maximum Cr. Hrs. _____ 3. Equivalent Credit: Yes <input type="checkbox"/> No <input type="checkbox"/> 4. Thesis Credit: Yes <input type="checkbox"/> No <input type="checkbox"/>	COURSE ATTRIBUTES: Check All That Apply 1. Pass/Not Pass Only <input type="checkbox"/> 2. Satisfactory/Unsatisfactory Only <input type="checkbox"/> 3. Repeatable <input type="checkbox"/> Maximum Repeatable Credit: _____ 4. Credit by Examination <input type="checkbox"/> 5. Special Fees <input type="checkbox"/> 6. Registration Approval Type Department <input type="checkbox"/> Instructor <input type="checkbox"/> 7. Variable Title <input type="checkbox"/> 8. Honors <input type="checkbox"/> 9. Full Time Privilege <input type="checkbox"/> 10. Off Campus Experience <input type="checkbox"/>
---	--

Schedule Type	Minutes Per Mtg	Meetings Per Week	Weeks Offered	% of Credit Allocated	Cross-Listed Courses
Lecture	50	3	16		
Recitation					
Presentation					
Laboratory					
Lab Prep					
Studio					
Distance					
Clinic					
Experiential					
Research					
Ind. Study					
Pract/Observ					

COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):
ME 43400 Gas Turbines for Power and Propulsion
 Sem. 2, Class 3, cr. 3.
 Prerequisite: ME 30000 - Thermodynamics and ME 30900 - Fluid Mechanics

Basic operating principles and analysis of performance characteristics of gas turbine engines for aircraft and vehicular propulsion and stationary power. Turbojet, turbofan, turboshaft cycle analysis. Analysis of flow through compressors, turbines, combustors, inlets, nozzles, and regenerators. Component matching and off-design performance. Coursework in thermodynamics and fluid mechanics. Typically offered Spring.

Calumet Department Head _____ Date _____	Calumet School Dean _____ Date _____	Calumet Undergrad Curriculum Committee _____ Date _____
Fort Wayne Department Head _____ Date _____	Fort Wayne School Dean _____ Date _____	Fort Wayne Chancellor _____ Date _____
Indianapolis Department Head _____ Date _____	Indianapolis School Dean _____ Date _____	Undergrad Curriculum Committee _____ Date _____
North Central Faculty Senate Chair _____ Date _____	Vice Chancellor for Academic Affairs _____ Date _____	Date Approved by Graduate Council _____
<i>James D. Jones</i> _____ Date _____	<i>Michael Y. Harris</i> 2/12/15 _____ Date _____	Graduate Council Secretary _____ Date _____
West Lafayette Department Head _____ Date _____	West Lafayette College/School Dean _____ Date _____	<i>Opie Holloway</i> 6/29/15 _____ Date _____

Opie

TO: The Faculty of the College of Engineering
FROM: The Faculty of the School of Mechanical Engineering
RE: ME 43800 Changes in Course Number, Title, and Description

The Faculty of the School of Mechanical Engineering has approved the following change in ME 43800 (now to be known as ME 43400). This action is now submitted to the Engineering Faculty with a recommendation for approval.

From:

ME 43800 – Gas Turbine Engines

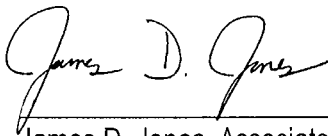
Credit Hours: 3.00. Basic operating principles and analysis of performance characteristics of gas turbine engines for aircraft and vehicular propulsion and stationary power. Turbojet, turbofan, turboshaft cycle analysis. Analysis of flow through compressors, turbines, combustors, inlets, nozzles, and regenerators. Component matching and off-design performance. Coursework in thermodynamics and fluid mechanics. Not open to students with credit in A&AE 37200. Typically offered Fall.

To:

ME 43400 – Gas Turbines for Power and Propulsion

Credit Hours: 3.00. Basic operating principles and analysis of performance characteristics of gas turbine engines for aircraft and vehicular propulsion and stationary power. Turbojet, turbofan, turboshaft cycle analysis. Analysis of flow through compressors, turbines, combustors, inlets, nozzles, and regenerators. Component matching and off-design performance. Coursework in thermodynamics and fluid mechanics. Typically offered Spring.

Reason: The change in course number is being requested so that the sequence of ME 43300 Principles of Turbomachinery (typically offered in fall) and ME 43400 Gas Turbines for Power and Propulsion (typically offered in spring) will be more obvious to students. This change will also help delineate the differences between the ME 43400 Gas Turbine for Power and Propulsion and AAE 37200 (soon to be changed to AAE 43800) Jet Propulsion Power Plants. Finally, the statement “Not open to students with credit in AAE 37200” is no longer necessary since the two courses are sufficiently different.



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

Approved for the faculty of the Schools
of Engineering by the Engineering
Curriculum Committee
ECC Minutes 10 Date 2-9-15
Chairman ECC [Signature]

ME 43400

GAS TURBINES FOR POWER AND PROPULSION

Course Outcomes [Related ME Program Outcomes in brackets]

1. Basic performance characteristics of *shaft power gas turbine engines*. [A2, A3]
2. Basic performance characteristics of *gas turbines for aircraft propulsion*. [A2, A3]
3. *Cycle analysis*. [A2, A3]
4. *Component performance analysis*. [A2, A3]
5. *Design and off-design operation*. [A2, A3]

Fundamental Concepts
(3 wks)

1. Basic Equations
2. Stagnation Properties
3. Continuity relationships
4. Compressible flow

Shaft Power Cycles (5 wks)

1. Simple Cycle
2. Cycle Variations
3. Cycle Definition and Analysis
4. Component Performance
5. Power Balance
6. Design Point Performance

Aircraft Propulsion Cycles
(4 wks)

1. Turbojet Cycle
2. Thrust
3. Engine Performance Parameters
4. Turbojet Performance
5. Turbofan Cycle and Performance
6. Design and Off-Design Performance

Aerodynamics of Compressors and Turbines (3 wks)

1. Energy Transfer
2. Velocity Diagrams
3. Radial equilibrium
4. Degree of Reaction
5. Axial and Radial Compressors
6. Axial Turbines
7. Wind Turbines

<p>1. COURSE NUMBER AND NAME: ME 43400 Gas Turbines for Power and Propulsion</p>	
<p>2. CREDITS AND CONTACT HOURS: 3 credits a. Lecture – 3 days per week at 50 minutes for 16 weeks</p>	
<p>3. COURSE COORDINATOR OR INSTRUCTOR: S. Fleeter</p>	
<p>4. TEXTBOOK: H. Cohen, G.F.C. Rogers and H.I.H. Saravanamutto, Gas Turbine Theory, 5th ed, John Wiley & Sons</p>	
<p>5. SPECIFIC COURSE INFORMATION: a. Catalog Description: Basic operating principles and analysis of performance characteristics of gas turbine engines for aircraft and vehicular propulsion and stationary power. Turbojet, turbofan, turboshaft cycle analysis. Analysis of flow through compressors, turbines, combustors, inlets, nozzles, and regenerators. Component machine and off-design performance. Inspection trip to industrial plant required. Typically offered in spring. b. Prerequisites: ME 30000 – Thermodynamics ME 30900 – Fluid Mechanics c. Status: Elective</p>	
<p>6. SPECIFIC GOALS FOR THE COURSE a. Course Outcomes: [Related ME Program Outcomes in Brackets] 1. Basic performance characteristics of <i>shaft power gas turbine engines</i>. [A2, A3] 2. Basic performance characteristics of <i>gas turbines for aircraft propulsion</i>. [A2, A3] 3. <i>Cycle analysis</i>. [A2, A3] 4. Component <i>performance analysis</i>. [A2, A3] 5. Design and <i>off-design operation</i>. [A2, A3]</p> <p>b. Related ME Program Outcomes: [Related ABET Outcomes Listed in Brackets] A1. Engineering Fundamentals; B3. Prof/Ethical Responsibility; A2. Analytical Skills; B4. Contemporary Issues; A3. Experimental Skills; B5. Life-Long Learning; A4. Modern Engr Tools; C1. Leadership, A5. Design Skills; C2. Global Engineering Skills; A6. Impact of Engr Solns; C3. Innovation; B1. Communication Skills; C4. Entrepreneurship B2. Teamwork Skills</p>	
<p>7. LIST OF TOPICS: See following page.</p>	
<p>PREPARED BY: S. Fleeter</p>	<p>REVISION DATE: Oct 6, 2014</p>