Fall 2013
Registration Announcement

The University of Tennessee Space Institute

411 B.H. Goethert Parkway
Tullahoma, TN 37388-9700
888-822-8874 x-37228
www.utsi.edu
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CALENDAR --- FALL SEMESTER 2013

Priority Registration ........................................................................................................... March 11, 2013 – August 19, 2013
Fall 2013 Graduation Application Deadline (submit online at myutk) ......................... August 9, 2013
Admission to Candidacy Forms due for Fall 2013 Commencement ................................. August 9, 2013
Late Registration and late fees begin ................................................................................ August 21 – 30, 2013
Classes begin ...................................................................................................................... August 21, 2013
Last Day to final register, add, change grading options or drop without a “W” ............. August 30, 2013
Labor Day Holiday .......................................................................................................... September 2, 2013
Last day to meet with consultant for Thesis/Dissertation Preliminary Review .......... October 10, 2013
Fall Break (No Classes) ...................................................................................................... October 17 – 18, 2013
Register to attend the Graduate Hooding Ceremony ................................................... October 29, 2013

http://gradschool.utk.edu/hooding/hoodinginfo.shtml

Last day to schedule final exam (non-thesis/thesis) ............................................................ November 1, 2013
Last day to schedule final exam (dissertation) ............................................................... November 1, 2013
Last day to take final exam (non-thesis/thesis/dissertation students) ....................... November 15, 2013
Last day to drop with a “W” ............................................................................................... November 12, 2013
Thesis/Dissertation Deadline 5:00 p.m. EST ................................................................. November 27, 2013
Thanksgiving Holiday ...................................................................................................... November 28 – 29, 2013
Deadline for submission of Admission to Candidacy for students graduating Spring 2014 .................................................................................................................. December 3, 2013
All “INCOMPLETES” must be removed for Graduation ................................................ December 3, 2013
Classes End ......................................................................................................................... December 3, 2013
Total withdrawal from the University Deadline ............................................................. December 3, 2013
Study Period ...................................................................................................................... December 4, 2013
Exam Period ...................................................................................................................... December 5, 6, & 9, 2013
Graduate Hooding Ceremony (UTK) ............................................................................. December 12, 2013
COMMENCEMENT (UTK) .......................................................................................... December 13, 2013
Official Graduation Date .................................................................................................. December 13, 2013
Second thesis/dissertation deadline .............................................................................. January 6, 2014
Student will receive diploma May 2014 but will not be required to register for Spring 2014 Defense Completed by December 3, 2013
Second Deadline application submitted to gradschool@utk.edu by December 3, 2013
Spring Graduation Application required in myutk by January 6, 2014

SPRING SEMESTER 2014

Priority Registration for Spring Semester 2014 ................................................................ TBD
Final Registration ................................................................................................................ TBD
Classes begin ..................................................................................................................... January 8, 2014
Martin Luther King Day (Holiday) ..................................................................................... January 20, 2014
Spring Recess .................................................................................................................... April 18, 2014
Spring Break ...................................................................................................................... March 17 – 21, 2014
Classes End ....................................................................................................................... April 25, 2014
Study Period ...................................................................................................................... April 28, 2014
Exam Period ..................................................................................................................... April 29, 30, & May 1, 2014
Graduate Hooding Ceremony (UTK) .............................................................................. May 8, 2014
University College Commencement Ceremonies (UTK) ............................................. May 7 - 10, 2014
Official Graduation Date ................................................................................................. May 10, 2014

Dates may be revised without notice. Please refer to the following sites for updates:
http://gradschool.utk.edu/ddategraduation.shtml
http://registrar.tennessee.edu/academic_calendar/index.shtml
# FALL SEMESTER 2013

## FINAL STUDY DAY AND EXAM SCHEDULE

**LAST DAY OF CLASSES** ................................................................. December 3, 2013

**STUDY DAY** ................................................................................. December 4, 2013

**FINAL EXAMS** - - - December 5, 6, & 9, 2013

<table>
<thead>
<tr>
<th>REGULAR CLASS TIME</th>
<th>(Same Classroom)</th>
<th>EXAM TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1st Day - Thursday, December 5, 2013</strong></td>
<td></td>
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</tr>
<tr>
<td>7:45 – 9:00</td>
<td>M/Th</td>
<td>7:45 – 9:45</td>
</tr>
<tr>
<td>10:45 – 12:00</td>
<td>M/Th</td>
<td>10:15 – 12:15</td>
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<tr>
<td>9:15 – 10:30</td>
<td>M/Th</td>
<td>1:00 – 3:00</td>
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<tr>
<td>2:30 – 3:45</td>
<td>M/Th</td>
<td>3:30 – 5:30</td>
</tr>
<tr>
<td><strong>2nd Day - Friday, December 6, 2013</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:15 – 10:30</td>
<td>Tu/Fri</td>
<td>7:45 – 9:45</td>
</tr>
<tr>
<td>10:45 – 12:00</td>
<td>Tu/Fri</td>
<td>10:15 – 12:15</td>
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<tr>
<td>1:00 – 2:15</td>
<td>Tu/Fri</td>
<td>1:00 – 3:00</td>
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<tr>
<td>2:30 – 3:45</td>
<td>Tu/Fri</td>
<td>3:30 – 5:30</td>
</tr>
<tr>
<td><strong>3rd Day - Monday, December 9, 2013</strong></td>
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<tr>
<td>7:45 - 9:00</td>
<td>Tu/Fri</td>
<td>7:45 - 9:45</td>
</tr>
<tr>
<td>1:00 - 2:15</td>
<td>M/Th</td>
<td>10:15 - 12:15</td>
</tr>
</tbody>
</table>

**** ATTENTION ****

ALL STUDENTS TAKING VIDEOTAPE COURSES
CONTACT INSTRUCTOR FOR DATE AND TIME OF FINAL EXAM

NO CLASSES WILL BE IN SESSION
AT THIS TIME
REGISTRATION ANNOUNCEMENT
FALL SEMESTER 2013

REGISTRATION PROCEDURE

GRADUATE ACADEMIC ADVISING

Graduate students should contact your departmental faculty to arrange an advising appointment. If you’re not accepted into a specific program, the assistant to the dean of graduate studies or the designee may act as your advisor. When the web registration system asks if you’ve discussed your program with your advisor, you must answer yes to continue with the registration process.

REGISTRATION

Students will register at http://my.utk.edu. You will need to log in using your NetID and your NetID password. If you do not know your NetID and NetID password, go to http://onestop.utk.edu/your-classes/registering-for-classes/.

*Log in to MyUTK. You can find a link by looking under “M” on the A-Z index (http://www.utk.edu/alpha/) or by typing myutk.utk.edu directly into your browser. You will need to log in by typing utk\your NetID in the “username” field and then your NetID password in the “password” field.

*Before you attempt to register, clear and pay any financial holds (parking tickets, library fines, fees, etc.).

*Look under the “For Your Review” heading on the MyUTK portal page (located in the upper right-hand corner) for notification of any holds you may have.

*Once you are logged into “My UTK,” scroll down to “UTK Student Registration Links.” Click on “Search for Classes” to look up sections and then register.

*Print a copy of your schedule when you are finished registering.

If you have any questions, call the Office of the University Registrar at 865-974-2101 or contact Charlene Hane in Student Services room D-100, phone 931-393-7228, email chane@utsi.edu.

TOLL-FREE NUMBERS

For a specific office: 1-888-822-UTSI (8874) and the extension number.
For general information: 1-888-822-UTSI (8874)
Admissions Office: 1-888-822-UTSI (8874)-37213
Budget and Finance Office: 1-888-822-UTSI (8874)-37297
Student Services 1-888-822-UTSI (8874)-37228

APPLICATION FOR ADMISSION

No student will be allowed to register unless a completed Application for Admission to the Graduate School of the University of Tennessee, Knoxville (UTK) is on file in the Registrar's Office. An Application for Admission to the UTK Graduate School must be accompanied by a $60.00 non-refundable application fee, payable to The University of Tennessee Space Institute. Applicants are required to provide one official transcript of all undergraduate and graduate records. Students may apply on-line at http://admissions.utk.edu/graduate/apply.shtml [click on APPLY ONLINE and Follow Directions]. Send Applications for Admission, transcripts, GRE
TOTAL WITHDRAWAL FROM THE UNIVERSITY

If, after registering for classes and either returning your fee payment or your Confirmation of Attendance form to the Bursar’s Office, you decide not to enroll for this term, you must immediately notify Charlene Hane, Student Services, at UTSI. If you withdraw officially on or before a Change of Registration deadline, but after the no “W” deadline for a particular session, the grade of “W” will be issued.

GRADES

Students may obtain their grades through the web at MyUTK or contact Charlene Hane, Student Services, Office D-100, (931) 393-7228.

GRADUATE STUDENTS CHANGE OF REGISTRATION AFTER THE DEADLINE

To change registration in any way after the deadline, a graduate student must present a request, signed by the instructor(s) and adviser as evidence of their knowledge of the request to Charlene Hane, Student Services at UTSI. Graduate students must verify that ALL changes have been approved by their academic adviser. If the Office of Graduate Student Services approves the change of registration, the change will be noted on the student’s permanent record. THE DROP DEADLINE FOR GRADES AND THE DROP DEADLINE FOR FEE REFUNDS ARE NOT THE SAME.

FULL-TIME STUDENTS

Students enrolled in at least 9 semester hours during the Fall/Spring semesters or 6 hours in the Summer Term are considered full-time students. Research Assistants must be full-time students and also enroll in one of the MABE 595 seminars or a PHYS 599 seminar each term, unless a waiver is granted by the Associate Executive Director.

REMOVAL OF INCOMPLETE GRADES

All Incomplete Grades (I) must be removed prior to graduation. The instructor, in consultation with the student, decides the terms for the removal of the I, including the time limit for removal. If the I is not removed within one calendar year, the grade will be changed to an F. The course will not be counted in the cumulative grade point average until a final grade is assigned. No student may graduate with an I on the record. Students planning to graduate Fall Semester 2012 must remove all INCOMPLETE GRADES by December 3, 2013. Contact Charlene Hane, Student Services, to remove an Incomplete Grade.

REPEATING A COURSE

No graduate student may repeat a course for the purpose of raising a grade already received, with the exception of a NC course. A graduate student cannot do additional work nor repeat an examination to raise a final grade.
ADMISSION TO CANDIDACY

MASTER OF SCIENCE DEGREE:
Each M.S. student, including IE Capstone Project students, is responsible for submitting a completed and signed Admission to Candidacy Application at least one semester prior to receiving the degree.

Candidacy committee changes or course changes must be submitted to the committee chairman using a Revision form. If changing from a thesis option to a non-thesis option or vice versa, a new Admission to Candidacy Application must be submitted. All forms must be processed through Student Services.

DOCTORAL DEGREE:
A Doctoral Committee should be formed during the student's first year of doctoral study. Any changes to the doctoral committee (deletions or additions) must be submitted to the Committee Chairman using a Revision form for approval. Each doctoral student is responsible for submitting a completed Admission to Candidacy form signed by the doctoral committee at least one semester prior to receiving the degree. All forms must be processed through Student Services.

CONTINUOUS REGISTRATION OF DOCTORAL STUDENTS
Course 600 is reserved for doctoral research and dissertation hours. Initial registration for 600 should be determined by each department and generally corresponds to the time at which a student begins work actively on dissertation research. From this time on, students are required to register continuously for at least 3 hours of 600 each semester, including summer term. A minimum total of 24 hours of course 600 is required.

A student who will not be using faculty services and/or university facilities for a period of time may request leaves of absence from dissertation research up to a maximum of six terms (including summer terms). The request (form found online at http://gradschool.utk.edu/forms/leaveofabsence_reader.pdf) should be completed by the student and then sent to the major professor (advisor) for endorsement. The completed form is then submitted to Graduate School for review and processing.

FINAL EXAM FOR NON-THESIS, CAPSTONE PROJECT STUDENTS, THESIS AND DISSERTATION STUDENTS
A candidate presenting a thesis or dissertation must pass a final oral examination on all work offered for the degree. The examination is scheduled through Student Services. Failure to notify Student Services of the examination date will put the student at risk for graduating that semester. Final examinations not properly scheduled MUST be repeated. The final draft of the thesis must be distributed to the committee members at least two weeks prior to the date of the final examination. In case of a grade of "Fail", the candidate may not apply for re-examination until the following semester. The result of the second examination is final.

UT POLICY ON INSURANCE FOR INTERNATIONAL STUDENTS
All foreign national students registered with the University of Tennessee, Knoxville, are required to have comprehensive medical insurance. The policy for the 2011-2012 academic year is provided by Aetna. The premium must be paid before registration. Contact the Human Resources Office (A-104 ext. 37267) for further information.
GENERAL SEMINAR

A number of seminars of interest to all UTSI students and general public will be offered throughout the semester.

FINAL EXAM DATES

STUDY PERIOD – December 4, 2013
FINAL EXAMS – December 5, 6, & 9, 2013

FINANCIAL CALENDAR, FEES, REFUNDS, AND TUITION

Please click the FEES link to the most current information. You may also contact Jennifer Boyles in the Business and Finance Office at jboyles@utsi.edu or phone number 931-393-7297.

HONOR STATEMENT

The following Honor Statement is signed by all students applying to The Graduate School:

"An essential feature of The University of Tennessee, Knoxville is a commitment to maintaining an atmosphere of intellectual integrity and academic honesty. As a student of the University, I pledge that I will neither knowingly give nor receive any inappropriate assistance in academic work, thus affirming my own personal commitment to honor and integrity."

For official information on all UTK Graduate School policies, refer to the current UTK Graduate Catalog available at http://catalog.utk.edu. The student handbook “Hilltopics” is available in Student Services, D-100 or online at http://dos.utk.edu/files/HT2011revised.pdf.

The University of Tennessee Space Institute reserves the right to cancel any class with an insufficient number of students, or for other reasons.

THE UNIVERSITY OF TENNESSEE POLICY ON A DRUG-FREE CAMPUS AND WORKPLACE

In support of the Drug-Free Workplace Act of 1998 (Public Law 100-690) and the Drug-Free Schools and communities Act of 1989, the University of Tennessee is notifying all students, faculty, and staff of the following university policy approved by the UT Board of Trustees on 21 June 1990.

It is the policy of the University of Tennessee to maintain a safe and healthful environment for its students and employees. Therefore, university policy prohibits the unlawful use, manufacture, possession, distribution, or dispensing of drugs ("controlled substances" as defined in the Controlled Substances Act, 21 U.S.C. 812) and alcohol on university property or during university activities.

Violation of this policy is grounds for disciplinary action—up to and including immediate discharge for an employee and permanent dismissal of a student. Federal and state laws provide additional penalties for such unlawful activities, including fines and imprisonment (21 U.S.C. 841 et seq.; T.C.A. 39-6-401 et seq.). Local ordinances also provide various penalties for drug- and alcohol-related offenses. The university is bound to take all appropriate actions against violators, which may include referral for legal prosecution or requiring the individual to participate satisfactorily in an approved drug use or alcohol abuse assistance or rehabilitation program.
THE UNIVERSITY RESERVES THE RIGHT TO REVISE ANY INFORMATION LISTED IN THIS TIMETABLE OF CLASSES

The University of Tennessee Space Institute
Fall 2013 Course Listings

AEROSPACE ENGINEERING

AE  500  Master’s Thesis (1-15)
SEC.  001 CRN 42997  Abedi
       009 CRN 43013  Antar
       010 CRN 43017  Anusonti-Inthra
       011 CRN 43019  Flandro
       012 CRN 43022  Majdalani
       013 CRN 43023  Moeller
       014 CRN 43024  Solies
       015 CRN 43027  Vakili
       021 CRN 43037  Zhang

AE  502  Registration for Use of Facilities (1-15)
SEC.  002 CRN 43042  Moeller

Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.

Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.
Credit Level Restriction: Graduate credit only.
Registration Restriction(s): Minimum student level – graduate

AE  511  Inviscid Flow (3)
SEC.  002 CRN 47242
TIME: Tuesday & Thursday      2:40 – 3:55       E-211
PROFESSORS: Dr. Ahmad Vakili & Dr. Feng-Yuan Zhang

Kinematics and dynamics of inviscid fluids; potential flow about body, conformal mapping.
(DE) Prerequisite(s): 541 and Mathematics 425.

AE  515  Air Vehicle Aerodynamics and Performance (3)
SEC.  001 CRN 46081  (Video Recorded)
TEXT: M. Asselin; An Introduction to Aircraft Performance; AIAA Education Series, Reston, VA 1997; ISBN 1-75-623241-X
TIME: Tuesday & Friday       1:00 – 2:15       E-111
PROFESSORS: Dr. Peter Solies
propulsion systems, vehicle performance characteristics, and trajectory optimization.

AE  521  Aerodynamics of Compressible Fluids (3)
SEC.  001  CRN  46993

TIME:  Tuesday & Thursday  10:10 – 11:25      E-110
PROFESSOR:  Dr. Trevor Moeller

One-dimensional internal and external flow; waves; small perturbation theory; slender body theory; similarity rules; method of characteristics.

AE  535  Mechanical Vibrations (3)
SEC.  003  CRN  48689
TEXT: TBD
TIME:  Monday & Wednesday  1:10 – 2:25       F-252
PROFESSOR:  Dr. Phuriwat Anusonti-Inthra

Vibrations of linear, discrete, undamped and damped systems. Lagrange’s equations for holonomic systems. Modal analysis. Laplace transform. Response to mechanical transients. *Cross-listed: (Same as Biomedical Engineering 534; Mechanical Engineering 534.)*
*Recommended Background: An undergraduate vibrations course.*

AE  557  Aerospace Vehicle Flutter and Vibration (3)
SEC.  001  CRN  49566  (Video Recorded)
TEXT: *Aircraft Vibration and Flutter*; Scanlan, R.H. and Rosenbaum, R.; Dover Publications, New York, NY; 1968
TIME:  Thursday  2:30 – 5:00       E-113
PROFESSOR:  Dr. Peter Solies

Aeroelastic phenomena. Structural and aerodynamic operators. Stability criteria for airfoils operating in oscillating stream. Two- and three-dimensional flutter of wings, control surfaces and empennages. *(DE) Prerequisite(s): 551.*

*AE  565  Structural Dynamics (3)  CANCELLED
SEC.  001  CRN  49704
TEXT: TBD
TIME:  Tuesday & Thursday  11:40 – 12:55      E-110
PROFESSOR:  Dr. Reza Abedi

Dynamic analysis of flexible structures, elasticity and Green’s strain tensor, partial differential equations. Variational mechanics, Hamilton’s principle, energy methods, eigenvalue and forced response problems, separation of variables. Approximate solution techniques: collocation methods, Rayleigh-Ritz, finite element method. Applications in beam-cable structures, rotordynamics and composite materials. *Cross-listed: (Same as Mechanical Engineering 565 and Biomedical Engineering 565.)*

*Recommended Background: 321 and 463.*
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 6 hours.
Comment(s): Enrollment limited to students in problems option.
Registration Permission: Consent of advisor.

AE  595  Aerospace Engineering Seminar (1)
SEC.  001 CRN 43054
TEXT: None
TIME: Will be announced through email
PROFESSOR: Dr. Ahmad Vakili

All phases of aerospace engineering, reports on current research at the University of Tennessee, Knoxville, and UTSI.

Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 20 hours.

AE  599  Special Topics in Aerospace Engineering: Computational Fluid Dynamics (3)
SEC.  001 CRN 43057 (Same as ME 599 001 CRN 43762)
TEXT: Handouts provided by instructor
TIME: Monday & Wednesday 11:40 – 12:55 E-110
PROFESSOR: Dr. Greg Power

This course uses a commercial CFD code that is widely accepted and used in industries and government labs as a hands-on introduction to computational fluid dynamics. After a brief review of the fundamentals, the course will cover various aspects of the simulation process including geometry modeling, grid generation, solution strategy and post processing primarily through practical examples that bring out the importance of proper understanding of the underlying physics for the problem. Examples will also attempt to cover a wide range of problems that cover different types of flow conditions (incompressible/compressible, laminar/turbulent, steady/unsteady flows, free surface flows, flows with heat transfer and possibly reacting flows).

Repeatability: May be repeated. Maximum 6 hours.

AE  599  Special Topics in AE: Micro/Nano Electro Mechanical Systems (3)
SEC.  002 CRN 43058 (Same as BME 599 001 CRN 43101, ME 599 008 CRN 48741, and Phys 599 006 CRN 50075)
The lectures will cover fundamentals and elements of micro/nano-scale design, fabrication, integration, and systems, including lithography, deposition, etching, thin film, surface modification, bonding, and characterization. The videos/movies will be presented to introduce the state-of-the-art fabrication process and integration. Their applications to energy systems, power/propulsion devices, biomedical applications, transducers and actuators will be discussed.

Repeatability: May be repeated. Maximum 6 hours.

<table>
<thead>
<tr>
<th>AE</th>
<th>600</th>
<th>Doctoral Research/Dissertation (3-15)</th>
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<tbody>
<tr>
<td>SEC.</td>
<td>004</td>
<td>CRN 43068 Abedi</td>
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<tr>
<td></td>
<td>005</td>
<td>CRN 43070 Antar</td>
</tr>
<tr>
<td></td>
<td>006</td>
<td>CRN 43072 Anusonti-Inthra</td>
</tr>
<tr>
<td></td>
<td>007</td>
<td>CRN 43074 Flandro</td>
</tr>
<tr>
<td></td>
<td>008</td>
<td>CRN 43076 Majdalani</td>
</tr>
<tr>
<td></td>
<td>014</td>
<td>CRN 43082 Moeller</td>
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<tr>
<td></td>
<td>015</td>
<td>CRN 43083 Solies</td>
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<tr>
<td></td>
<td>017</td>
<td>CRN 47251 Vakili</td>
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<tr>
<td></td>
<td>018</td>
<td>CRN 47252 Zhang</td>
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<table>
<thead>
<tr>
<th>AE</th>
<th>690</th>
<th>Advanced Topics in Aerospace Engineering: PhD Qualifying Exam (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEC.</td>
<td>001</td>
<td>CRN 43084</td>
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</tbody>
</table>

TIME: TBD

PROFESSOR: Dr. Matthew Mench

Repeatability: May be repeated. Maximum 9 hours.
Registration Restriction(s): Minimum student level – graduate.
Registration Permission: Consent of instructor.

<table>
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<tr>
<th>AE</th>
<th>690</th>
<th>Advanced Topics in Aerospace Engineering: Advanced Radiation Heat Transfer (3)</th>
</tr>
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<tbody>
<tr>
<td>SEC.</td>
<td>003</td>
<td>CRN 49891 (Video Recorded) (Same as ME 613 001 CRN 49634)</td>
</tr>
<tr>
<td>TEXT:</td>
<td></td>
<td>Thermal Radiation Heat Transfer; Robert Siegel and John R. Howell; Publisher: Taylor and Francis; Edition 3rd, 4th, or 5th; ISBN #: 1-56032-839-8</td>
</tr>
</tbody>
</table>

TIME: Tuesday & Friday 1:00 – 2:15 E-113

PROFESSOR: Dr. Trevor Moeller

Radiation heat transfer in absorbing, emitting and scattering media; interaction of thermal radiation with conduction and convection heat transfer.
(DE) **Prerequisite(s):** 511 and 512.
**Registration Restriction(s):** Minimum student level – graduate.

## AVIATION SYSTEMS

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Sections</th>
<th>CRN</th>
<th>Instructor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS 500</td>
<td>Master’s Thesis (1-15)</td>
<td>001</td>
<td>47001</td>
<td>Martos</td>
</tr>
<tr>
<td></td>
<td></td>
<td>004</td>
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<td>Solies</td>
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<thead>
<tr>
<th>Course</th>
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<th>Sections</th>
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<tbody>
<tr>
<td>AS 502</td>
<td>Registration for Use of Facilities (1-15)</td>
<td>001</td>
<td>47006</td>
<td>Martos</td>
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<tr>
<td></td>
<td></td>
<td>004</td>
<td>47009</td>
<td>Solies</td>
</tr>
</tbody>
</table>

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**Grading Restriction:** Satisfactory/No Credit grading only.

**Repeatability:** May be repeated.

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**Credit Level Restriction:** Graduate credit only.

**Registration Restriction(s):** Minimum student level – graduate.

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<tbody>
<tr>
<td>AS 503</td>
<td>Air Vehicles (3)</td>
<td>001</td>
<td>48351</td>
<td>(Video Recorded)</td>
</tr>
<tr>
<td>TEXT:</td>
<td>M. Asselin; <em>An Introduction to Aircraft Performance</em>; AIAA Education Series, Reston, VA, 1997; ISBN 1-75-623241-X</td>
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</tr>
<tr>
<td>TIME:</td>
<td>Tuesday &amp; Friday</td>
<td>1:00 – 2:15</td>
<td>E-111</td>
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<tr>
<td>PROFESSOR:</td>
<td>Dr. Peter Solies</td>
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Focuses on the study of air vehicles as they evolved to enable human flight or unmanned flight missions. In a historical review the development of aviation technology, mission requirements, and economical aspects are emphasized. Fundamentals of aerodynamic principles and their application to air vehicles will be developed to determine performance in level flight, climb, glide and maneuvering flight, as well as characteristic parameters as range and endurance. The state of the art of present air vehicles is investigated, as well as current problems in aviation and possible solutions. A technology forecast will be offered.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Sections</th>
<th>CRN</th>
<th>Instructor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS 510</td>
<td>Special Topics in Aviation Systems: Introduction to Avionics I (3)</td>
<td>001</td>
<td>47011</td>
<td>(Video Recorded)</td>
</tr>
<tr>
<td>TIME:</td>
<td>Tuesday &amp; Friday</td>
<td>9:15 – 10:30</td>
<td>E-113</td>
<td></td>
</tr>
<tr>
<td>PROFESSOR:</td>
<td>Dr. Monty Smith</td>
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</tbody>
</table>

Electronic instrumentation, navigation, communication, guidance and control systems used in aviation. The primary topics to be covered in the first semester include: review of electronics fundamentals, terrestrial en route radio navigation systems, terrestrial landing aids, and satellite navigation systems.

Current problems.

**Repeatability:** May be repeated. Maximum 15 hours.
Credit Restriction: Maximum of 12 hours may be applied toward degree requirements. Registration Permission: Consent of instructor.

AS  522  Experimental Flight Mechanics: Fixed Wing Stability & Control (3)
SEC. 001  CRN 47012  (Video Recorded)
TIME: Tuesday & Friday 10:30 – 11:45 E-111
PROFESSOR: Dr. Borja Martos

Fundamental theories, flight test techniques, and data collection and analyses for fixed wing aircraft stability and control. Topics: static and dynamic longitudinal stability, longitudinal maneuvering stability and control, static and dynamic lateral-directional stability, lateral control power, and departure testing. Weekly classroom academics with approximately 4-6 flight labs. 
(DE) Prerequisite(s): 516 and 521.

AS  550  Project in Aviation Systems (3)
SEC. 001  CRN 47013  Martos
004  CRN 47016  Solies

BIOMEDICAL ENGINEERING

BME  500  Master’s Thesis (1-15)
SEC. 012  CRN 48366  Johnson

BME  534  Mechanical Vibrations (3)
SEC. 003  CRN 48690
TEXT: TBD
TIME: Monday & Wednesday 1:10 – 2:25 F-252
PROFESSOR: Dr. Phuriwat Anusonti-Inthra

Cross-listed: (Same as Aerospace Engineering 535; Mechanical Engineering 534.) 
Recommended Background: An undergraduate vibrations course.

*BME  565  Structural Dynamics (3) CANCELLED
SEC. 001  CRN 49705
TEXT: TBD
TIME: Tuesday & Thursday 11:40 – 12:55 E-110
PROFESSOR: Dr. Reza Abedi

Cross-listed: (Same as Aerospace Engineering 565 and Mechanical Engineering 565.)

Recommended Background: 321 and 463.
BME  595 Biomedical Seminar (1)
SEC.  002 CRN 47846
TEXT: None
TIME: Will be announced through email
PROFESSOR: Dr. Jacqueline Johnson

BME  599 Special Topics in BME: Micro/Nano Electro Mechanical Systems (3)
SEC.  001 CRN 43101 (Same as AE 599 002 CRN 43058, ME 599 008 CRN 48741, and Phys 599 006 CRN 50075)
TIME: Tuesday & Thursday 1:10 – 2:25 E-110
PROFESSOR: Dr. Feng-Yuan Zhang

The lectures will cover fundamentals and elements of micro/nano-scale design, fabrication, integration, and systems, including lithography, deposition, etching, thin film, surface modification, bonding, and characterization. The videos/movies will be presented to introduce the state-of-the-art fabrication process and integration. Their applications to energy systems, power/propulsion devices, biomedical applications, transducers and actuators will be discussed.

Repeatability: May be repeated. Maximum 6 hours.

BME  600 Doctoral Research/Dissertation (3-15)
SEC.  011 CRN 47849 Johnson

BME  610 Advanced Topics in BME: Luminescent Materials (3)
SEC.  002 CRN 47657
TEXT: Luminescent Materials; G. Blasse and B. C. Grabmaier; Springer-Verlag; ISBN 3-540-58019-0; 0-387-58019-0 (US)
TIME: Monday & Wednesday 1:10 – 2:25 F-253
PROFESSOR: Dr. Jacqueline Johnson


Current research topics of interest in biomedical engineering.
Repeatability: May be repeated. Maximum 9 hours.
Registration Restriction(s): Minimum student level – graduate.
Registration Permission: Consent of instructor.
ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

ECE 500 Master’s Thesis (1-15)
SEC. 027 CRN 48367 Smith

ECE 600 Doctoral Research/Dissertation (3-15)
SEC. 026 CRN 47656 Bomar

ENGINEERING MANAGEMENT

EM 500 Master’s Thesis (1-15)
SEC. 001 CRN 49862 Simonton

EM 501 Capstone Project (3-6)
SEC. 001 CRN 43426
PROFESSOR: Dr. James L. Simonton

Application-oriented project to show competence in major academic area.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 6 hours.
Comment(s): Requires enrollment in engineering management.
Credit Level Restriction: Graduate credit only.
Registration Restriction(s): Minimum student level – graduate.

EM 502 Registration for Use of Facilities (1-15)
SEC. 001 CRN 43428 Simonton

Required for the student not otherwise registered during any semester when student uses university
facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.
Credit Level Restriction: Graduate credit only.
Registration Restriction(s): Minimum student level – graduate.

EM 532 Productivity and Quality Engineering (3)
SEC. 001 CRN 46146 UTSI students participating at Tullahoma
002 CRN 46147 UTSI students participating elsewhere
003 CRN 46148 UTK students participating at Knoxville DE classrooms
004 CRN 46149 UTK students participating elsewhere

Cambridge, MA; ISBN# 0738203807; Corporate Cultures: The Rites and Rituals of Corporate
0262541165

TIME: Wednesday 4:00 – 6:35 E-113
PROFESSOR: Dr. Andrew Yu
Productivity and quality measures defined and used to analyze current competitive position of important sectors of American industry with respect to national and international competition. Study of management theorists and systems which promote or inhibit productivity or quality improvements.

**EM 533 Theory and Practice of Engineering Management (3)**

SEC. 001 CRN 43430 UTSI students participating at Tullahoma
SEC. 002 CRN 43431 UTSI students participating elsewhere
SEC. 003 CRN 43432 UTK students participating at Knoxville DE classrooms
SEC. 004 CRN 43433 UTK students participating elsewhere


**TIME:** Tuesday 4:00 – 6:35 E-113

**PROFESSOR:** Dr. James L. Simonton

Principles of engineering management, including: business and organization design, culture, leadership, marketing and competition in global economy, motivation and performance management, empowerment, organizational behavior, and diversity. Systems thinking, learning organizations, and systems dynamics modeling. Principle application to work settings and case studies.

**EM 537 Analytical Methods for Engineering Managers (3)**

SEC. 001 CRN 46150 UTSI students participating at Tullahoma or Oak Ridge
SEC. 002 CRN 46151 UTSI students participating elsewhere
SEC. 003 CRN 46152 UTK students participating at Knoxville DE classrooms
SEC. 004 CRN 46153 UTK students participating elsewhere


**TIME:** Monday 4:00 – 6:35 E-113

**PROFESSOR:** Dr. Denise Jackson

Survey of management analysis and control systems through industrial engineering techniques. Qualitative and quantitative systems: methods analysis, work measurement, incentive systems, wage and salary development, production and inventory control, facility layout, linear programming, and applied operations research techniques.

**Credit Restriction:** No credit for student with undergraduate degrees in industrial engineering.

**EM 539 Strategic Management in Technical Organizations (3)**

SEC. 001 CRN 46154 UTSI students participating at Tullahoma or Oak Ridge
SEC. 002 CRN 46155 UTSI students participating elsewhere
SEC. 003 CRN 46156 UTK students participating at Knoxville DE classrooms
SEC. 004 CRN 46157 UTK students participating elsewhere

**TEXT:** TBD

**TIME:** Wednesday 1:00 – 3:30 E-113

**PROFESSOR:** Dr. James Simonton

Strategic planning process and strategic management in practice; corporate vision and mission; product, market, organizational, and financial strategies; external factors; commercialization of new technologies; and competition and beyond.

**(RE) Prerequisite(s):** 533 and Industrial Engineering 518 or consent of instructor.

**EM 595 Special Topics in Engineering Management: Project Management (3)**

SEC. 001 CRN 43434
EM  595 Special Topics in Engineering Management: New Venture Formation (3)
SEC.  002 CRN  49942
TEXT:  TBD
TIME:  TBD
PROFESSOR:  Dr. James Simonton
Problems and topics relevant to current issues in the field.
Repeatability: May be repeated if topic differs. Maximum 6 hours.

EM  595 Special Topics in Engineering Management: Theory of Engineering Management (3)
SEC.  003 CRN  50020
TEXT:  TBD
TIME:  TBD
PROFESSOR:  Dr. James Simonton
Problems and topics relevant to current issues in the field.
Repeatability: May be repeated if topic differs. Maximum 6 hours.

EM  600 Doctoral Research/Dissertation (3-15)
SEC.  001 CRN  46160  Simonton
MATHEMATICS
MATH  404 Applied Vector Calculus (3)
SEC.  001 CRN  43600
TEXT:  *Vector Calculus*; Paul C. Matthews; Springer; ISBN-10: 3540761802;
TIME:  Tuesday & Thursday       1:15 – 2:30       F-253
PROFESSOR:  Dr. Jan Zijlstra
Topics from multivariable and vector calculus; line and surface integrals, divergence theorem and the
theorems of Gauss and Stokes.
(RE) Prerequisite(s): 241 or 247.

MATH  511 Methods in Applied Mathematics I (3)
SEC.  001 CRN  48393  (Video Recorded)
        *Essential Mathematical Methods for the Physical Sciences*; K.F. Riley and M.P. Hobson;
        Cambridge University Press.
TIME:  Monday & Thursday      10:45 – 12:00      E-113
PROFESSOR:  Dr. Horace Crater
Fundamentals and techniques associated with discrete models of physical, engineering and biological systems: difference equations, networks and graphs, optimization, and other topics.

*Recommended Background: Courses in advanced calculus and linear algebra.*

This is a two-semester course targeted for engineering students who have taken Math 404 and 435 (vector analysis and partial differential equations) and who need additional math courses for their research or advanced courses. Math Methods (Physics 571,573(2) or Math 517-518s) is currently a two semester course with the second (573(2)) being a numerical methods course for solutions of physical problems. Below I list the math topics together with likely applications (Topics & Applications)

Topics include: Calculus of variations & Euler Lagrange equations; Vector spaces & finite difference methods for solutions of eigenvalue equations; Tensors & elastic and viscous media; Complex variable, Fourier series and transforms & the forced and damped and coupled harmonic oscillators; Special Functions & Classical Field Theories (Plasmas, Electrodynamics and Gravity), Perturbation theory and nonperturbative methods & scattering theory; Complex variables (conformal mapping) & fluid flow and problems in potential theory; Perturbation theory and Classical Chaos, other topics to be included depending on interests.

The physics needed will be introduced as the corresponding math topics are introduced. Focus will be on the mathematics.

**MECHANICAL ENGINEERING**

<table>
<thead>
<tr>
<th>ME</th>
<th>500</th>
<th>Master’s Thesis (1-15)</th>
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</thead>
<tbody>
<tr>
<td>SEC.</td>
<td>001</td>
<td>CRN 43720 Abedi</td>
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<tr>
<td></td>
<td>021</td>
<td>CRN 43740 Antar</td>
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<td></td>
<td>022</td>
<td>CRN 43741 Anusonti-Inthra</td>
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<td>023</td>
<td>CRN 43742 Flandro</td>
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<td>024</td>
<td>CRN 43743 Majdalani</td>
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<td>025</td>
<td>CRN 43744 Moeller</td>
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<td></td>
<td>034</td>
<td>CRN 47018 Solies</td>
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<td></td>
<td>035</td>
<td>CRN 47019 Vakili</td>
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<td>036</td>
<td>CRN 47020 Zhang</td>
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<table>
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<tr>
<th>ME</th>
<th>502</th>
<th>Registration for Use of Facilities (1-15)</th>
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</thead>
<tbody>
<tr>
<td>SEC.</td>
<td>002</td>
<td>CRN 47021 Moeller</td>
</tr>
</tbody>
</table>

Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.

*Grading Restriction: Satisfactory/No Credit grading only.*

*Repeatability: May be repeated.*

*Credit Restriction: May not be used toward degree requirements.*

*Credit Level Restriction: Graduate credit only.*

*Registration Restriction(s): Minimum student level – graduate.*

<table>
<thead>
<tr>
<th>ME</th>
<th>511</th>
<th>Heat Transfer I</th>
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<tbody>
<tr>
<td>SEC.</td>
<td>001</td>
<td>CRN 46409 (Pre-recorded)</td>
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</tbody>
</table>

**Recommended Background:** Undergraduate heat transfer course.

### ME 521 Thermodynamics I (3)

**TEXT:** TBD

**TIME:** Monday & Wednesday 2:40 – 3:55 E-110

**PROFESSOR:** Dr. Joseph Wehrmeyer

Macroscopic thermodynamics, including First and Second Law analyses, availability, phase and chemical equilibrium criteria, combustion, gas mixtures, and property relations, determination of thermodynamic properties from molecular structure, spectroscopic data, kinetic theory, statistical mechanics, quantum physics, Schroedinger equation.

**Recommended Background:** Undergraduate thermodynamics.

### ME 534 Mechanical Vibrations (3)

**TEXT:** TBD

**TIME:** Monday & Wednesday 1:10 – 2:25 F-252

**PROFESSOR:** Dr. Phuriwat Anusonti-Inthra


*Cross-listed: (Same as Aerospace Engineering 535; Biomedical Engineering 534.)*

**Recommended Background:** An undergraduate vibrations course.

### ME 540 Perturbation Methods in Engineering (3)

**TEXT:** Class Notes and *Perturbation Methods in the Computer Age*; DCW Industries, Inc.; 1995

**TIME:** Monday & Wednesday 10:10 – 11:25 E-110

**PROFESSOR:** Dr. Joseph Majdalani

Solution of nonlinear problems in solid and fluid mechanics and dynamics by use of asymptotic perturbation techniques. Asymptotic expansions, regular and singular perturbations and applications in dynamics, celestial mechanics, potential, viscous and compressible flows. Uniformly valid approximations in various physical problems. Generalized boundary-layer techniques. Coordinate straining techniques; Poincar’s method. Matched asymptotic expansions and multiple scales. Problems with several time or length scales. Examples taken from various fields of science.

**Registration Permission:** Consent of instructor.

*ME 565 Structural Dynamics (3) CANCELLED*

Cross-listed: (Same as Aerospace Engineering 565 and Biomedical Engineering 565.)

Recommended Background: 321 and 463.

ME 581 Rocket Propulsion I (3) CANCELLED
SEC. 001 CRN 43757
TIME: Monday & Wednesday 10:10-11:25 TBD
PROFESSOR: Dr. Joseph Majdalani
Rocket propulsion fundamentals; thermodynamics of nonreacting and chemically reacting ideal gases, rocket nozzle design; ideal rocket performance parameters; rocket heat transfer; chemistry of propellants; liquid rocket engine systems; ground testing; introduction to solid propellant rockets.
**Registration Permission:** Consent of instructor.

ME 584 Turbomachinery Systems I (3)
SEC. 001 CRN 46420 (Video Recorded)
TIME: Tuesday & Thursday 4:00 – 5:15 E-111
PROFESSOR: Dr. Milt Davis
Ideal cycle analysis of turbine engines, real cycle analysis, component performance analysis, component design and systems integration (inlets, nozzles, combustors, compressors, turbines), flowthrough theory, turbine engine component matching, transient operation, surge and rotating stall, engine control systems, structural considerations.
**Comment(s):** First-year graduate standing required.
**Registration Permission:** Consent of instructor.

ME 590 Selected Engineering Problems (3)
SEC. 001 CRN 43758 Abedi
002 CRN 43759 Antar
003 CRN 46426 Anusonti-Inthra
004 CRN 47022 Flandro
005 CRN 47023 Majdalani
006 CRN 47024 Moeller
007 CRN 47025 Solies
008 CRN 47026 Vakili
009 CRN 47027 Zhang

**Grading Restriction:** Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 6 hours.
Comment(s): Enrollment limited to students in problems option.
Registration Permission: Consent of advisor.

ME  595  Mechanical Engineering Seminar (1)
SEC.  001  CRN  43760
TEXT:  None
TIME:  Will be announced through email
PROFESSOR:  Dr. Ahmad Vakili

All phases of aerospace engineering, reports on current research at the University of Tennessee,
Knoxville, and UTSI.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 20 hours.

ME  599  Special Topics in Mechanical Engineering: Computational Fluid Dynamics (3)
SEC.  001  CRN  43762  (Same as AE 599 001 CRN 43057)
TEXT:  Handouts provided by instructor
TIME:  Monday & Wednesday  11:40 – 12:55  E-110
PROFESSOR:  Dr. Greg Power

This course uses a commercial CFD code that is widely accepted and used in industries and government
labs as a hands-on introduction to computational fluid dynamics. After a brief review of the fundamentals,
the course will cover various aspects of the simulation process including geometry modeling, grid
generation, solution strategy and post processing primarily through practical examples that bring out the
importance of proper understanding of the underlying physics for the problem. Examples will also
attempt to cover a wide range of problems that cover different types of flow conditions
(incompressible/compressible, laminar/turbulent, steady/unsteady flows, free surface flows, flows with
heat transfer and possibly reacting flows).

Repeatability: May be repeated. Maximum 6 hours.

ME  599  Special Topics in ME: Advanced Finite Element Methods (3)
SEC.  003  CRN  50045
TEXT:  TBD
TIME:  Tuesday & Thursday  11:40 – 12:55  E-110
PROFESSOR:  Dr. Reza Abedi

Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

ME  599  Special Topics in ME: Micro/Nano Electro Mechanical Systems (3)
SEC.  008  CRN  48741  (Same as AE 599 002 CRN 43058, BME 599 001 CRN 43101,
and Phys 599 006 CRN 50075)
Reference:
The lectures will cover fundamentals and elements of micro/nano-scale design, fabrication, integration, and systems, including lithography, deposition, etching, thin film, surface modification, bonding, and characterization. The videos/movies will be presented to introduce the state-of-the-art fabrication process and integration. Their applications to energy systems, power/propulsion devices, biomedical applications, transducers and actuators will be discussed.

*Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.*

ME 599 Special Topics in ME: Introduction to Fluid-Structure Interaction Simulations (1)
SEC. 010 CRN 50074
TEXT: TBD
TIME: Monday & Wednesday 2:30 – 4:30 E-210
PROFESSOR: Dr. Phuriwat Anosonti-Inthra

*Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.*

ME 600 Doctoral Research/Dissertation (3-15)
SEC. 015 CRN 43779 Abedi
016 CRN 43780 Antar
018 CRN 43782 Anusonti-Inthra
019 CRN 43783 Flandro
027 CRN 43791 Majdalani
028 CRN 43792 Moeller
026 CRN 43790 Solies
029 CRN 49569 Vakili
030 CRN 49570 Zhang
026 CRN 43790 Solies
029 CRN 49569 Vakili
030 CRN 49570 Zhang

ME 613 Advanced Radiation Heat Transfer (3)
SEC. 001 CRN 49634 (Video Recorded)
TEXT: *Thermal Radiation Heat Transfer*; Robert Siegel and John R. Howell; Publisher: Taylor and Francis; Edition 3rd, 4th, or 5th; ISBN #: 1-56032-839-8
TIME: Tuesday & Friday 1:00 – 2:15 E-113
PROFESSOR: Dr. Trevor Moeller

Radiation heat transfer in absorbing, emitting and scattering media; interaction of thermal radiation with conduction and convection heat transfer.

(DE) Prerequisite(s): 511 and 512.
Registration Restriction(s): Minimum student level – graduate.
ME 621 Advanced Topics in Mechanical Systems: PhD Qualifying Exam (3)
SEC. 003 CRN 49794
TEXT: TBD
TIME: TBD
PROFESSOR: Dr. Matthew Mench
Advanced theory and applications in control systems, dynamics, mechanics, strength of materials and vibrations.
Repeatability: May be repeated. Maximum 9 hours.
Registration Restriction(s): Minimum student level – graduate.
Registration Permission: Consent of instructor.

PHYSICS

PHYS 500 Master’s Thesis (1-15)
SEC. 002 CRN 42086 Chen
003 CRN 42168 Crater
004 CRN 42170 Davis
005 CRN 42173 Parigger

PHYS 503 Physics Colloquium (1)
SEC. 002 CRN 42189
TEXT: None
TIME: 2nd & 4th Thursday 3:30 – 5:00 H-111
PROFESSOR: Dr. Lloyd Davis
Lectures and discussion on current research topics. Continuous registration required for current graduate students.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 6 hours.

PHYS 513 Problems in Theoretical Physics I (3) (Video Recorded)
SEC. 002 CRN 48793
TEXT: TBD
TIME: Wednesday 10:15 – 11:30 E-113
PROFESSOR: Dr. Marianne Breinig
Fundamentals of physics: classical mechanics (Newtonian mechanics, Lagrangian and Hamiltonian dynamics) and electrostatics and magnetostatics.

PHYS 521 Quantum Mechanics (3)
SEC. 002 CRN 47028
TIME: Tuesday & Friday 1:00 – 2:15 F-252
PROFESSOR: Dr. Lloyd Davis
Fundamental principles of quantum mechanics, angular momentum, electron spin, particles in electric and magnetic fields, perturbation theory, variational methods, scattering theory; second quantization, quantization of electromagnetic field, emission, absorption, and scattering of light, bremsstrahlung, pair creation and annihilation. Application of quantum mechanics to problems of atomic, molecular, nuclear, and solid state physics.
Variational formulation, Lagrange’s and Hamilton’s equations, constraints, canonical transformations, Hamilton-Jacobi theory and action-angle variables.

PHY 593 Independent Study (3)
SEC. 004 CRN 48873
TEXT: TBD

TIME: TBD
PROFESSOR: Dr. Lloyd Davis

Repeatability: May be repeated. Maximum 15 hours.

PHY 594 Special Problems (3)
SEC. 003 CRN 49992
TEXT: TBD

TIME: TBD
PROFESSOR: Dr. Lloyd Davis

Especially assigned theoretical or experimental work on problems not covered in other courses.
Repeatability: May be repeated. Maximum 9 hours.

PHY 599 Seminars (1)
SEC. 005 CRN 42223
TEXT: None
TIME: 2nd & 4th Thursday 3:30 – 5:00 H-111
PROFESSOR: Dr. Lloyd Davis

(a) Mechanics; (b) Radiation; (c) Heat and Thermodynamics; (d) Electricity and Magnetism; (e) Modern Physics.
Repeatability: May be repeated with consent of department. Maximum 18 hours.

PHY 599 Special Topics in BME: Micro/Nano Electro Mechanical Systems (3)
SEC. 006 CRN 50075 (Same as AE 599 002 CRN 43058, BME 599 001 CRN 43101, and ME 599 008 CRN 48741)

Reference:
TIME: Tuesday & Thursday 1:10 – 2:25 E-110
The lectures will cover fundamentals and elements of micro/nano-scale design, fabrication, integration, and systems, including lithography, deposition, etching, thin film, surface modification, bonding, and characterization. The videos/movies will be presented to introduce the state-of-the-art fabrication process and integration. Their applications to energy systems, power/propulsion devices, biomedical applications, transducers and actuators will be discussed.

*Repeatability: May be repeated. Maximum 6 hours.*

PHYS 600 Doctoral Research/Dissertation (3-15)
SEC. 002 CRN 42227 Chen
SEC. 003 CRN 42228 Crater
SEC. 004 CRN 42229 Davis
SEC. 005 CRN 42230 Parigger

PHYS 605 Laser Spectroscopy (3) CANCELLED
SEC. 001 CRN 49572

Applications of lasers to spectroscopy of atomic and molecular systems; absorption, laser-induced fluorescence, and Raman spectroscopy; molecular and atomic coherence, quantum beats, resonance fluorescence, photon echoes, self-induced transparency; saturation and Doppler-free spectroscopy; laser cooling and trapping.

(DE) Prerequisite(s): 521 and 541.
Registration Restriction(s): Minimum student level – graduate

PHYS 642 Advanced Topics in Modern Physics (3)
SEC. 001 CRN 49571

In fall 2013, Phys642 will focus on modeling of laser-induced optical breakdown, interaction of femtosecond laser pulses with tissue, and aspects of atomic and molecular line-shape considerations with applications to astrophysics.
Advanced theoretical or experimental topics not covered in other courses.
Repeatability: May be repeated with consent of department. Maximum 9 hours.
Registration Restriction(s): Minimum student level – graduate.