

# Spring 2013 Registration Announcement



## The University of Tennessee Space Institute

411 B. H. Goethert Parkway  
Tullahoma, TN 37388-9700  
888-822-8874 ext. 37228

[www.utsi.edu](http://www.utsi.edu)



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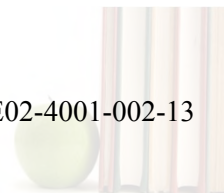
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## CALENDAR --- SPRING SEMESTER 2013

Priority Registration.....	October 8, 2012 – January 7, 2013
Spring 2013 Graduation Application Deadline (submit online) .....	December 4, 2012
Admission to Candidacy Forms due for Spring 2013 Commencement.....	December 4, 2012
Late Registration and late fees begin .....	January 9 – 18, 2013
<b>Classes begin.....</b>	<b>January 9, 2013</b>
Last Day to final register, add, change grading options or drop without a “W” .....	January 18, 2013
Martin Luther King Holiday .....	January 21, 2013
Graduation Fee Payment Deadline (MS \$30, PhD \$75) .....	March 1, 2013
Last day to meet with consultant for Thesis/Dissertation Preliminary Review .....	March 1, 2013
Last day to schedule final exam (non-thesis/thesis/dissertation) .....	March 21, 2013
Register to attend the Graduate Hooding Ceremony ( <a href="http://gradschool.utk.edu">http://gradschool.utk.edu</a> ).....	March 21, 2013
Purchase cap and gown and order hood.....	March 21, 2013
Spring Break (No Classes).....	March 22 – 28, 2013
Spring Recess (No Classes) .....	March 29, 2013
Drop with a “W” .....	April 2, 2013
Last day to take final exam (non-thesis/thesis/dissertation) .....	April 5, 2013
<b>Thesis/Dissertation Deadline 5:00 p.m. EST .....</b>	<b>April 19, 2013</b>
Report of non-thesis/thesis/dissertation defense (Pass/Fail Form) .....	April 19, 2013
Deadline for submission of Admission to Candidacy for students graduating Summer 2013.....	April 26, 2013
All “INCOMPLETES” must be removed for Graduation .....	April 26, 2013
Classes End .....	April 26, 2013
Total withdrawal from the University Deadline .....	April 26, 2013
Study Period.....	April 29, 2013
Exam Period.....	April 30, May 1, 2, 2013
Graduate Hooding Ceremony (UTK) .....	May 9, 2013
COMMENCEMENT (UTK) .....	May 8 – 11, 2013
Official Graduation Date.....	May 11, 2013
Second thesis/dissertation deadline (Student will receive diploma August 2013 but will not be required to register for Summer 2013) .....	May 24, 2013 (Defense Completed by April 26, 2013)

## SUMMER SEMESTER 2013

Priority Registration for Spring Semester 2013.....	TBD
Final Registration.....	TBD
Memorial Day Holiday .....	May 27, 2013
Classes begin.....	May 30, 2013
July 4 <sup>th</sup> Holiday .....	July 4, 2013
Classes End.....	August 9, 2013

**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](http://registrar.tennessee.edu/academic_calendar/index.shtml)

**SPRING SEMESTER 2013  
FINAL STUDY DAY AND EXAM SCHEDULE**

**LAST DAY OF CLASSES..... April 26, 2013**

**STUDY DAY ..... April 29, 2013**

**FINAL EXAMS - - - April 30, 2013 – May 1 - 2, 2013**

**REGULAR CLASS TIME      (Same Classroom)                      EXAM TIME**

**1st Day - Tuesday, April 30, 2013**

<b>7:45 – 9:00</b>	<b>M/Th</b>	<b>7:45 – 9:45</b>
<b>10:45 – 12:00</b>	<b>M/Th</b>	<b>10:15 – 12:15</b>
<b>9:15 – 10:30</b>	<b>M/Th</b>	<b>1:00 – 3:00</b>
<b>2:30 – 3:45</b>	<b>M/Th</b>	<b>3:30 – 5:30</b>

**2nd Day - Wednesday, May 1, 2013**

<b>9:15 – 10:30</b>	<b>Tu/Fri</b>	<b>7:45 – 9:45</b>
<b>10:45 – 12:00</b>	<b>Tu/Fri</b>	<b>10:15 – 12:15</b>
<b>1:00 – 2:15</b>	<b>Tu/Fri</b>	<b>1:00 – 3:00</b>
<b>2:30 – 3:45</b>	<b>Tu/Fri</b>	<b>3:30 – 5:30</b>

**3rd Day - Thursday, May 2, 2013**

<b>7:45 - 9:00</b>	<b>Tu/Fri</b>	<b>7:45 - 9:45</b>
<b>1:00 - 2:15</b>	<b>M/Th</b>	<b>10:15 - 12:15</b>

**\*\*\*\* 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  
SPRING SEMESTER 2013**

**REGISTRATION PROCEDURE**

**ADVISING**

Graduate students should contact their departmental faculty to arrange an advising appointment. For students not accepted into specific programs, the Assistant to the Dean of Graduate Studies or his/her designee may act as advisor. The web registration system will ask if you have discussed your program with your advisor. Answer ‘yes’ if you have; otherwise, you cannot continue with the registration process. Graduate School Web Page: <http://gradschool.utk.edu>.

**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://registrar.utk.edu/registration.shtml>.

\*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 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](mailto:chane@utsi.edu).

**FINANCIAL CALENDAR**

Statement information available on MyUTK.....	December 17, 2012
Spring 2013 Fees Due for Priority Registered Student by 4:30 p.m. (EST).....	January 7, 2013
Late Registration/Late Fees Begin.....	January 9, 2013
Spring 2013 Late/Final Registration Fees Due by 4:30 p.m. (EST).....	January 18, 2013

NOTE: PAYMENT AND THE CONFIRMATION OF ATTENDANCE FORM MUST BE RECEIVED BY THESE DEADLINES WHETHER OR NOT YOU HAVE RECEIVED A VolxPress e-STATEMENT. You may view your account at MyUTK.

## **FINAL/LATE REGISTRATION PERIOD**

January 9 – 15, 2013	\$20 Fee
January 16 – 22, 2013	\$40 Fee
January 23 – 29, 2013	\$60 Fee
January 30 – February 5, 2013	\$80 Fee
February 6, 2013 – forward	\$100 Fee

## **CREDIT CARD PAYMENTS**

**NOTE:** If you pay your fees using MyUTK with a credit/debit card (Discover, VISA, Mastercard) you will be assessed a 2.5% service fee. To avoid this service fee you will need to make payment to the UTSI Budget and Finance Office.

## **SPECIAL BILLING – THIRD PARTY BILLING:**

The Budget and Finance Office will generate a billing after the student has provided a letter of authorization from the third party sponsor. Authorization must include the sponsor's name and address as well as the maximum amount which will be paid for each specific term. The authorization can be mailed to UTSI Budget and Finance Office, MS#12, 411 B.H. Goethert Parkway, Tullahoma, TN 37388-9700 or email it to [jboyles@utsi.edu](mailto:jboyles@utsi.edu). Since students are responsible for all University fees and charges, use of the third-party address as the student's billing address is strongly discouraged.

STUDENTS ARE ULTIMATELY RESPONSIBLE FOR ALL CHARGES. THEY MUST COMPLETE A CONFIRMATION OF ATTENDANCE FORM AND MAKE CERTAIN MINIMUM PAYMENT AMOUNTS CREDITED OR AUTHORIZED ON OR BEFORE THE PAYMENT DUE DATE IN ORDER TO AVOID LATE PAYMENT FEE ASSESSMENT AND SCHEDULE CANCELLATION.

If you have any questions concerning third-party billing please call Jennifer Boyles at 931-393-7297 or 888-822-8874 ext. 37297 or by email [jboyles@utsi.edu](mailto:jboyles@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 scores (if required); and if international application, TOEFL scores to the Admissions Office, A-200, Mail Stop 1, UTSI, Tullahoma, TN 37388-9700.

## FEES

Late fees will begin on January 9, 2013. The only credit/debit cards The University of Tennessee Space Institute accepts are Visa, MasterCard and Discover.

### NEW FOR FALL 2011

In February 2011, a new fee structure for students who are enrolled in dual campus locations was approved beginning Fall 2011. The University of Tennessee, Knoxville allows students to enroll in multiple campuses which include the following: Knoxville, UTSI, Distance Education, Nashville School of Social Work and off-campus locations. Students enrolling in dual campus locations will be assessed all fees for each campus they are enrolled. For example, students enrolled in classes on the Knoxville campus and also taking Distance Education courses will be assessed the per hour rate of all the fees for the Knoxville campus (Maintenance, Out-of-State Tuition, Programs and Service, Health, Technology, Facilities, Transportation, and any course fees that may be associated with a particular class) and the per hour rate of all the fees for the Distance Education courses (Maintenance, Out-of-State Tuition, the Distance Education Course Fee, and any course fees that may be associated with a particular course). The Out-of-State Tuition will be charged only to students who are classified as out-of-state per the appropriate Admissions Office.

UTSI students are assessed the per hour rate for the following: Maintenance, Tuition (if out-of-state), the UTSI Activity Fee, and any course fees that may be associated with a particular class. UTSI students taking mixed campus courses will follow the same fee assessment rules as above. The total per hour fee assessment will not exceed the Full-Time rate of 9 hours for Graduate students.

### FEES OF DISTANCE STUDENTS

Distance students should contact their departmental coordinator to determine the amount of the access fee.

Aviation Systems	Peter Solies	931-393-7289	<a href="mailto:psolies@utsi.edu">psolies@utsi.edu</a>
Engineering Mgt.	Charlotte Henley	931-393-7293	<a href="mailto:chenley@utsi.edu">chenley@utsi.edu</a>

### TUITION AND/OR MAINTENANCE FEES

#### Full Fees for In-State Students (per semester)

Maintenance Fee .....	\$4,500.00*
Programs and Services Fee .....	90.00
Total .....	\$4,590.00

#### Full Fees for Out-Of-State Students (per semester)

Maintenance Fee .....	\$4,500.00*
Programs and Services Fee .....	90.00
Tuition .....	\$9,094.00*
Total .....	\$13,684.00

**An additional \$54.00 per credit hour with no cap will be charged to ALL ENGINEERING COURSES (including courses that are cross-referenced).**

**\*All fees are subject to changes approved by the Board of Trustees prior to the beginning of the term.**

## **TUITION FOR PART-TIME STUDENTS**

Part time students may elect to pay fees computed by the semester hour credit as follows:

IN-STATE	\$501.00 per semester hour
3 hours	\$1,503.00
OUT-OF-STATE	\$1,512.00 per semester hour
3 hours	\$4,536.00

## **ENGINEERING FEE**

On July 1, 2007, the Computer Science Department merged with the Engineering Department. Beginning Fall 2008, a special per credit hour fee will be assessed on engineering and computer science courses offered through the College of Engineering and the College of Agricultural Sciences and Natural Resources. The additional funds will be used to acquire state-of-the-art equipment, expand first-year programs for Engineering students, and provide faculty with professional development opportunities to bring the latest knowledge into the classroom. The Colleges will retain the funds generated from this fee for their use.

## **PROGRAMS AND SERVICES FEE**

All students enrolled in nine semester hours or more for the semester are assessed an activity fee of \$90.00 per semester. Part-time students taking fewer than nine hours will be assessed at the rate of \$10.00 per semester hour. The Programs and Services Fee is non-refundable. Research assistants and fellowship/scholarship students who may have a waiver of fees (tuition), must pay appropriate University Programs and Services Fee.

Part-time students enrolled for recorded classes at off campus centers and students residing out of state are not required to pay the Programs and Services Fee.

## **RETURNED CHECK POLICY**

All checks are deposited the day they are received. A \$30.00 service charge will be assessed when checks fail to clear the bank on which drawn. In addition, if the returned check is in payment of initial fees and charges, the late payment fee in effect at the time the check is redeemed will be added to the returned check service fee. Returned checks will not be re-deposited. Cash or a cashier's check is required for payment of a returned check, late fee, and service charges. Failure to clear returned checks will result in the forfeiture of all University services including the receipt of grades, transcripts, and schedules of classes.

## **DEFERRED PAYMENT PLAN**

Although fees, rent and other University expenses are due and payable at the beginning of each term, a full-time student in good financial standing with a definite anticipated source of funds may request the deferment of up to 50% of the total charges at registration. The remaining balance for the term is due approximately 45 days after the first due date. All financial aid monies must be applied to fees before a deferment will be considered. A deferred payment service fee of \$20.00 is assessed when any portion of tuition, fees, and other charges are deferred with the approval of the Business Office. An additional \$35.00 late payment charge will be assessed if the second installment is not paid on or before the due date. For more details, contact the Business Office.



## LATE PAYMENT FEES

A **Late Payment Fee** of \$35.00 will be added to each *VOLXpress* account if the minimum payment amount which is printed on the statement is not received by the Bursar's Office on or before the published due date. This does not include beginning of term registration statements which will result in cancellation of schedules if the minimum payment is not met. Late payment fees are exclusive of all other charges and are due when assessed whether or not the student receives a *VOLXpress* statement. Accounts are subject to a late fee of \$45.00 if there is an account balance at mid-semester. The fee is assessed in addition to the unpaid fees and charges and the account balance must be paid in order to access registration services, receive a transcript, grades, or a diploma.

## TUITION/FEES POLICY FOR DROPPED COURSES OR WITHDRAWAL

THE PERCENTAGE TUITION REFUNDS SPECIFIED ON THE FOLLOWING PAGE ARE APPLICABLE WHEN A STUDENT DROPS ONE OR MORE COURSES (INCLUDING TOTAL WITHDRAWAL). Students who drop courses and continue with a reduced course load are eligible for a refund only if the total charges at the semester hour rate for the courses continued plus the percentage assessed at the semester hour rate for the courses dropped results in an amount less than that paid. The Programs and Service Fee is non-refundable.

\*\*\*\*\*  
**A COURSE IS NOT OFFICIALLY DROPPED UNTIL A CHANGE OF REGISTRATION FORM HAS BEEN PROCESSED BY THE REGISTRAR'S OFFICE. CANCELED COURSES OR FAILURE TO ATTEND CLASS DOES NOT AUTOMATICALLY WITHDRAW OR DROP A STUDENT FROM THE UNIVERSITY OR CLASS --- A CHANGE OF REGISTRATION FORM MUST BE COMPLETED.**  
\*\*\*\*\*

The following percentage assessments are applicable for courses dropped (if fees are assessed at the semester hour rate):

<b>DROP DATE</b>	<b>CHARGE</b>	<b>REFUND</b>
January 9 – 13, 2013	NO CHARGE	100%
January 14 – 19, 2013	20% CHARGE	80%
January 20 – 24, 2013	40% CHARGE	60%
January 25 – 29, 2013	60% CHARGE	40%
January 30, 2013 – End of Term	100% CHARGE	0%

## TUITION/FEE REFUND POLICY FOR WITHDRAWALS

Withdrawal from school for the term after registration has been processed, even though classes have not been attended or fees paid, must be by official notification to the Registrar's office. The effective date of withdrawal is the date the Registrar's office is notified by completion of the Change of Registration request form. **FAILURE TO ATTEND CLASS DOES NOT AUTOMATICALLY CANCEL ENROLLMENT.** The appropriate percentage of fees will be charged unless the Registrar's Office is notified by the close of the last day designated for registration and before the first official day of classes for the semester or term. **WITHDRAWAL DOES NOT CANCEL FEES AND CHARGES ALREADY INCURRED. THE DROP/ADD PROCEDURE CAN NOT BE USED TO WITHDRAW FROM SCHOOL FOR THE SEMESTER OR TERM.** When a course is canceled by UTSI administration, the students who have registered for the course will be notified by either the instructor and/or Charlene Hane,

Student Services. Any questions concerning registration, please contact Charlene Hane, UTSI, Office D-100, 931-393-7228.

The University of Tennessee Space Institute, in accordance with federal regulations, follows the policy and procedures below for calculating refunds and repayments for financial aid.

## **REFUNDS**

Refunds are defined as the portion of maintenance and/or tuition and University housing charges due as rebate when a student withdraws or is expelled from the University. The amount of a refund is determined by the drop date charge fee table.

## **REPAYMENTS**

Repayments are defined as that portion of aid, received by a student after the University direct charges have been paid by that aid, which must be repaid by a student when a student withdraws or is expelled. The amount of the repayment is determined by the Drop Date Charge fee table.

Refunds and repayments to the Title IV programs are determined according to the formula published in the current Federal Student Financial Aid Handbook. The Business and Admissions Offices are responsible for determining the amount of the refund and/or repayment and distributing the correct amount back to the financial aid programs according to the Refund/Repayment Allocation Policy.

## **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 **April 26, 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](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 2012-2013 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 – April 29, 2013**

**FINAL EXAMS – April 30, 2013 – May 1 and 2, 2013**

## **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  
Spring 2013 Course Listings**

**AEROSPACE ENGINEERING**

AE	500	Thesis (1-15)	
	009	CRN 24863	Antar
	011	CRN 24864	Corda
	012	CRN 24865	Flandro
	013	CRN 24866	Majdalani
	014	CRN 24867	Moeller
	015	CRN 24868	Solies
	021	CRN 24874	Steinhoff
	022	CRN 26352	Vakili

*Grading Restriction: P/NP only.*

*Repeatability: May be repeated.*

*Credit Level Restriction: Graduate credit only.*

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

AE	502	Registration for Use of Facilities (1-15)	
SEC.	002	CRN 24876	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	512	Viscous Flow (3)	
SEC.	001	CRN 24877	
TEXT:	Viscous Flow; Frank M. White; 3rd Edition		
TIME:	Tuesday & Thursday	2:40 – 3:55	E-110
PROFESSORS:	Dr. Ahmad Vakili & Dr. Feng-Yuan Zhang		

Derivation of fundamental equations of compressible viscous flow; boundary conditions for viscous heat-conducting flow; exact solutions for Newtonian viscous flow (Navier-Stokes) equations for special cases; similarity solutions. Thermal boundary layers, stability of laminar flows, transition to turbulence, 2-D turbulent boundary layer equations. Incompressible-turbulent mean flow, and compressible boundary layer flow.

*Registration Permission: Consent of instructor.*

AE 522 Aerodynamics of Compressible Fluids II (3)  
 SEC. 001 CRN 27019  
 TEXT: John D. Anderson; *Modern Compressible Flow: With Historical Perspectives*; 3rd Edition; McGraw Hill; ISBN 0-07-242443-5.  
 H.W. Liepmann and A. Roshko; *Elements of Gasdynamics*; Dover Publications; ISBN-10: 0486419630; ISBN-13: 978-0486419633 > Visit Amazon's H. W. Liepmann Page  
 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.

*(DE) Prerequisite(s): 521.*

\*AE 542 Fluid Mechanics II (3) **CANCELLED**  
 SEC. 001 CRN 24880  
 TEXT: TBD  
 TIME: TBD  
 PROFESSOR: TBD

Equations of viscous fluid flows. Basic concepts and equations of turbulent flow. Separation, stability and transition. Laminar and turbulent boundary-layer flows. Exact, approximate, and numerical solutions.

*Cross-listed: (Same as Engineering Science 542; Mechanical Engineering 542.)*

*(DE) Prerequisite(s): 541.*

AE 562 Fundamentals of Aeroacoustics (3)  
 SEC. 001 CRN 26137  
 TEXT: TBD

TIME: Monday & Wednesday 1:10 – 2:25 E-110  
 PROFESSOR: Dr. Joseph Majdalani

Generation, propagation and absorption of sound in static and moving media.

The purpose of this course is to provide a broad coverage of the fundamentals of the theory and measurement of acoustics and noise ranging from the production of sound from vibrations and waves, acoustical devices, aeroacoustics, sound in enclosed spaces, etc.

*Registration Permission: Consent of instructor.*

AE 590 Selected Engineering Problems (3)  
 SEC. 001 CRN 24882 Antar  
 003 CRN 24883 Corda  
 004 CRN 27022 Flandro  
 005 CRN 27023 Majdalani  
 006 CRN 27024 Moeller  
 007 CRN 27025 Solies  
 008 CRN 27026 Steinhoff  
 009 CRN 27027 Vakili

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

*Comment(s): Enrollment limited to students in problems option.*

*Registration Permission: Consent of advisor.*

*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 24884  
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 AE: Aircraft Design (Same as AS 506 001 CRN 24968) (3)  
SEC. 001 CRN 24886 (Video Recorded)  
TEXT: D. P. Raymer; *Aircraft Design: A Conceptual Approach*; AIAA Education Series, 3<sup>rd</sup> Edition 1998, or later; ISBN 1-56347-281-0  
TIME: Tuesday & Friday 1:00 – 2:15 E-111  
PROFESSOR: Dr. Peter Solies

Design process, compromise of conflicting requirements, economical, industrial, and legal aspects. Definition of mission requirements, synthesis and optimization techniques, safety and reliability, systems integration, standards and regulations, teamwork, and decision-making process.

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

AE 599 Special Topics in AE: Introduction to Electric Propulsion (3)  
SEC. 003 CRN 29249 (Same as ME 599 002 CRN 29260) (Video Recorded)  
TEXT: *Physics of Electric Propulsion* (textbook is available from Amazon.com); Robert G. Jahn; Dover Publications (May 26, 2006); ISBN 10:0486450406; 13: 978-0486450407  
TIME: Tuesday & Friday 1:00 – 2:15 E-113  
PROFESSOR: Dr. Trevor Moeller

The objective of this course is to provide students with specific physical background and engineering concepts underlying electric propulsion and its application to modern satellites. Topics will include the physical principles, the practical designs, and the performance levels of electrically-powered space propulsion thrusters. Systems covered include: ion engines; pulsed and steady-state (fixed field) plasma and MHD thrusters, including Hall Thrusters, and others.

Prereq: Consent of Instructors.

AE 599 Special Topics in AE: Aircraft Flight Controls (Same as AS 516 001 CRN 24971) (3)  
SEC. 005 CRN 26806 (Video Recorded)  
TEXT: Nelson, Robert C; *Flight Stability and Automatic Control*; 2<sup>nd</sup> Edition; McGraw-Hill, NY, 1998  
TIME: Thursday 2:30 – 5:05 E-113  
PROFESSOR: Dr. Peter Solies

Static and dynamic longitudinal, directional, and lateral stability of aerospace vehicles will be investigated. Topics include contribution of vehicle components to stability and control, motion with fixed and free control surfaces, steady flight and maneuvering flight, flight test techniques, and introduction to control theory and design of automatic controls.

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



AE 599 Special Topics in AE: Contemporary Optics (3)  
 SEC. 006 CRN 26542  
 (Same as BME 599 005 CRN 28111, ME 599 005 CRN 29334, PHYS507 001 CRN 28912)  
 TEXT: *Modern Optics*; B.D. Guenther; Wiley  
[http://www.amazon.com/Modern-Optics-B-D-Guenther/dp/0471605387/ref=cm\\_cr\\_pr\\_product\\_top](http://www.amazon.com/Modern-Optics-B-D-Guenther/dp/0471605387/ref=cm_cr_pr_product_top)  
 TIME: Monday & Thursday 9:15 – 10:30 F-252  
 PROFESSOR: Dr. Lloyd Davis

Topics in geometrical, physical, Fourier, and nonlinear optics and introductory laser physics. Extensive use of computer calculations and design of practical and sophisticated optical systems.

AE 599 Special Topics in AE: Applied Computational Fluid Dynamics II (3)  
 SEC. 008 CRN 28052 (Same as ME 599 006 CRN 27773)  
 TEXT: No required text  
 TIME: Monday & Wednesday 1:10 – 2:25 E-110  
 PROFESSOR: Dr. Greg Power

This course incorporates fundamental application of CFD, grid generation and post-processing codes that are widely accepted and used in industry and government labs as a hands-on introduction to computational fluid dynamics. The course will build on the knowledge and experience gained during the 1st semester (Part-I) to develop skills for simulating more complex problems using advanced physical/turbulence models. The student will be expected to complete at least one complex CFD project and prepare a detailed report and presentation of the project efforts and results. Potential topics that will be covered include: Grid generation on (for) complex geometries; Development of custom routines/subroutines; Verification and Validation of CFD results; Advanced thermodynamic models; Chemical kinetics; Time dependent flows; Advanced turbulence modeling; Advanced post-processing techniques; Parallel processing; Other topics as may be helpful by the instructor.

AE 600 Doctoral Research and Dissertation (3-15)  
 SEC. 006 CRN 24839 Corda  
 007 CRN 24894 Flandro  
 008 CRN 24895 Majdalani  
 010 CRN 24897 Moeller  
 015 CRN 27029 Steinhoff  
 017 CRN 24902 Vakili  
 018 CRN 26678 Antar

*Grading Restriction: P/NP only.*

*Repeatability: May be repeated.*

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

AE 690 Advanced Topics in AE: Advanced Perturbation Methods (3)  
 SEC. 001 CRN 29299  
 TEXT: Class Notes  
 TIME: Monday & Wednesday 4:00 – 5:15 E-111  
 PROFESSOR: Dr. Joseph Majdalani

The purpose of this course is to advance students through real life problems requiring the subtle use of asymptotic methods. The goal is to solve problems that arise in propulsion related applications or other fields of science. By the end of the course students will be able to:

- ~ understand the use of several advanced perturbation techniques; these include:
  - 1) WKB Method (Type I and Type II) with Multiple Distinguished Limits
  - 2) Latta's Method of Composite Expansions
  - 3) Method of Averaging (van der Pol's Method/ Krylov-Bogoliubov Method)
  - 4) Asymptotic Expansion of Integrals (Watson's Lemma)
  - 5) Laplace's Method
  - 6) Rayleigh Janzen Expansion
  - 7) Adomian Decomposition
  - 8) Homotopy Analysis Method (HAM)
  - 9) The Expansion of Functions in Infinite Series
- ~ obtain perturbation solutions to complex physical settings involving small or large parameters;
- ~ understand how to model highly oscillatory solutions
- ~ treat partial differential equations;
- ~ treat problems exhibiting a nonlinear scaling structure;
- ~ treat compressible flow problems.

*Repeatability: May be repeated. Maximum 9 hours.*

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

*Registration Permission: Consent of instructor and ME 540.*

AE 690 Special Topics in Aerospace Engineering: Hydrodynamic Instability (3)  
 SEC. 004 CRN 29560  
 TEXT: TBD

TIME: Monday & Thursday 10:45 – 12:00 E-210  
 PROFESSOR: Dr. Gary Flandro

Theory of hydrodynamic instability. Stability of shear flows, rotating flows, boundary layer, two fluid flows, capillary instability, convective/absolute stability. Normal mode analysis, energy theory of stability, linear stability analysis. Raleigh-Benard, Taylor, Raleigh-Taylor, Kevin-Helmholtz, Gortler instability. Orr-Sommerfeld equation, bifurcation theory, and transition to turbulence.

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

## AVIATION SYSTEMS

AVSY 500 Thesis (1-15)  
 SEC. 001 CRN 24958 Corda  
 003 CRN 24959 Martos  
 004 CRN 24960 Pujol  
 005 CRN 24961 Solies

*Grading Restriction: P/NP only.*

*Repeatability: May be repeated.*

*Credit Level Restriction: Graduate credit only.*

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

AVSY 502 Registration for Use of Facilities (1-15)  
 SEC. 001 CRN 24963 Corda  
 003 CRN 24964 Martos

004 CRN 24965 Pujol  
005 CRN 24966 Solies

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.*

AVSY 506 Aircraft Design (Same as AE 599 001 CRN 24886) (3)  
SEC. 001 CRN 24968 (Video Recorded)  
TEXT: D. P. Raymer; *Aircraft Design: A Conceptual Approach*; AIAA Education Series, 3<sup>rd</sup> Edition  
1998, or later; ISBN 1-56347-281-0  
TIME: Tuesday & Friday 1:00 – 2:15 E-111  
PROFESSOR: Dr. Peter Solies

Design process, compromise of conflicting requirements, economical, industrial, and legal aspects.  
Definition of mission requirements, synthesis and optimization techniques, safety and reliability, systems integration, standards and regulations, teamwork, and decision-making process.

AVSY 510 Special Topics in Aviation Systems: Introduction in Avionics II (3)  
SEC. 001 CRN 24969 (Video Recorded)  
TEXT: *Principles of Avionics*; Albert Helfrick; Avionics Communications (<http://www.avionics.com>);  
7<sup>th</sup> Edition; ISBN-13:978-1-8855-4427-8  
TIME: Tuesday & Friday 9:15 – 10:30 E-113  
PROFESSOR: Dr. Monty Smith

Electronic instrumentation, navigation, communication, guidance and control systems used in aviation.  
The primary topics to be covered in the second semester include: surveillance systems, airborne communication systems, onboard communications, indicators, air data sensors, and flight control systems.  
*Repeatability: May be repeated. Maximum 15 hours.*  
*Credit Restriction: Maximum of 12 hours may be applied toward degree requirements.*  
*Registration Permission: Consent of instructor.*

AVSY 510 Special Topics in Aviation Systems: Aerospace Vehicle Modeling and Simulation (3)  
SEC. 002 CRN 24970 (Video Recorded)  
TEXT: TBD  
TIME: Wednesday 1:00 – 3:30 E-111  
PROFESSOR: Borja Martos

Derivation of equations of motion for a six degrees of freedom aerospace vehicle, solving of the equations with numerical integration methods in MATLAB<sup>®</sup> / SIMULINK<sup>®</sup> software, developing a physical understanding of equations of motion and stability derivatives, modeling of simple and complex sub-systems, pilot in the loop simulation, fly by wire flight controls, and flight test engineering problems. Students will be provided with a pilot in the loop simulation that integrates a joystick and is connected to FlightGear<sup>®</sup> software on their personal computer. A joystick is required.

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

AVSY 516 Aircraft Flight Controls (Stability and Control) (Same as AE 599 005 CRN 26806) (3)  
SEC. 001 CRN 24971 (Video Recorded)  
TEXT: Nelson, Robert C; *Flight Stability and Automatic Control*; 2<sup>nd</sup> Edition; McGraw-Hill, NY, 1998  
TIME: Thursday 2:30 – 5:05 E-113  
PROFESSOR: Dr. Peter Solies

Static and dynamic longitudinal, directional, and lateral stability of aerospace vehicles will be investigated. Topics include contribution of vehicle components to stability and control, motion with fixed and free control surfaces, steady flight and maneuvering flight, flight test techniques, and introduction to control theory and design of automatic controls.

AVSY 521 Experimental Flight Mechanics: Fixed Wing Performance (3)  
SEC. 001 CRN 24972  
TEXT: Ralph Kimberlin; *Flight Testing of Fixed Wing Aircraft*; AIAA; 1<sup>st</sup> Edition; ISBN 1-56347-564-2  
TIME: Tuesday & Friday 10:30 – 11:45 E-111  
PROFESSOR: Devon Simmons

Course covers fundamental theories, flight test techniques, data collection and analyses for fixed wing aircraft performance. Topics include aid data system calibration, takeoff and landing performance, turn performance, cruise performance, energy concepts, and aerodynamic modeling. Courses combines classroom academics with 4-6 flight labs. Distance learning students must make arrangements with the instructor to participate on campus in a one-week lab course toward the end of the semester.  
*(RE) Prerequisite(s): 503.*

AVSY 550 Project in Aviation Systems (3)  
SEC. 001 CRN 24973 Corda  
003 CRN 24974 Martos  
004 CRN 24975 Pujol  
005 CRN 24976 Solies

*Repeatability: May be repeated. Maximum 15 hours.*  
*Credit Restriction: Maximum of 3 hours may be applied toward degree requirements.*  
*Comment(s): Non-thesis aviation systems majors only.*  
*Credit Level Restriction: Graduate credit only.*  
*Registration Restriction(s): Minimum student level - graduate.*

## **BIOMEDICAL ENGINEERING**

BME 500 Thesis (1-15)  
SEC. 012 CRN 27866 Johnson  
*Grading Restriction: P/NP only.*  
*Repeatability: May be repeated.*  
*Credit Level Restriction: Graduate credit only.*  
*Registration Restriction(s): Minimum student level – graduate.*

BME 590 Selected Biomedical Engineering Problems (3)  
SEC. 001 CRN 29384  
TEXT: TBD  
TIME: TBD  
PROFESSOR: Dr. Jackie Johnson

*Grading Restriction: Satisfactory/No Credit grading only.*  
*Repeatability: May be repeated. Maximum 6 hours.*  
*Comment(s): Enrollment is limited to students in the non-thesis option.*  
*Credit Level Restriction: Graduate credit only.*  
*Registration Restriction(s): Minimum student level – graduate.*  
*Registration Permission: Consent of instructor.*

BME 595 Seminar (1)  
SEC. 002 CRN 28091  
TEXT: None  
TIME: Will be announced through email  
PROFESSOR: Dr. Jackie Johnson

All phases of biomedical engineering, reports on current research at UTK and UTSL.  
*Grading Restriction: Satisfactory/No Credit grading only.*  
*Repeatability: May be repeated. Maximum 20 hours.*  
*Credit Level Restriction: Graduate credit only.*  
*Registration Restriction(s): Minimum student level – graduate.*

BME 599 Special Topics in Biomedical Engineering: Contemporary Optics (3)  
SEC. 005 CRN 28111  
(Same as AE 599 006 CRN 26542, ME 599 005 CRN 29334, PHYS507 001 CRN 28912)  
TEXT: *Modern Optics*; B.D. Guenther; Wiley  
[http://www.amazon.com/Modern-Optics-B-D-Guenther/dp/0471605387/ref=cm\\_cr\\_pr\\_product\\_top](http://www.amazon.com/Modern-Optics-B-D-Guenther/dp/0471605387/ref=cm_cr_pr_product_top)  
TIME: Monday & Thursday 9:15 – 10:30 F-252  
PROFESSOR: Dr. Lloyd Davis

Topics in geometrical, physical, Fourier, and nonlinear optics and introductory laser physics. Extensive use of computer calculations and design of practical and sophisticated optical systems.

BME 600 Doctoral Research and Dissertation (3-15)  
SEC. 011 CRN 27867 Johnson  
*Grading Restriction: P/NP only.*  
*Repeatability: May be repeated.*  
*Registration Restriction(s): Minimum student level – graduate.*

BME 610 Advanced Topics in BME: Mechanics for Dental Materials (30)  
SEC. 005 CRN 29247  
TEXT: *Materials Science for Dentistry*; B.W. Darvell; Woodhead Publisher; 9th Edition; ISBN 978-1-84569-529-3  
TIME: Tuesday & Thursday 11:40 – 12:55 E-110  
PROFESSOR: Dr. Jackie Johnson

Mechanical testing; Rheology; Surfaces; Corrosion; Casting; Mechanics; More mechanical testing

## COMPUTER SCIENCE

\*CS 472 Numerical Algebra (3) **CANCELLED**  
SEC. 001 CRN 22279 (Video Recorded)  
TEXT: *Numerical Analysis*; Richard L. Burden and J. Douglas Faires; Brooks Cole; 9<sup>th</sup> Edition;  
ISBN-10: 0538733519; ISBN-13: 978-0538733519  
TIME: Monday & Thursday 10:00 – 11:15 E-111  
PROFESSOR: Dr. Charles Limbaugh

Direct and iterative methods for systems of linear equations. Solution of single nonlinear equation and nonlinear systems. Orthogonal decomposition, least squares and algebraic eigenvalue problem.

*Cross-listed: (Same as Math 472.)*

*(RE) Prerequisite(s): 231; 200 or 251 or 257.*

*(DE) Prerequisite(s): 371.*

*Comment(s): Knowledge of a high-level programming language required.*

## ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

ECE 500 Thesis (1-15)  
SEC. 027 CRN 28707 Bomar  
028 CRN 28708 Pujol  
029 CRN 28709 Smith

*Grading Restriction: P/NP only.*

*Repeatability: May be repeated.*

*Credit Level Restriction: Graduate credit only.*

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

ECE 501 Project in Lieu of Thesis (3)  
SEC. 002 CRN 22225 Smith

Capstone course taken under supervision of student's major professor and master's committee. Individual project involving literature survey, development of some software or hardware, testing, writing a white paper or journal paper, or other suitable project.

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

*Credit Level Restriction: Graduate credit only.*

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

*Registration Permission: Consent of graduate committee.*

ECE 502 Registration for Use of Facilities (1-15)  
SEC. 002 CRN 22230 Smith

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.*

ECE 600 Doctoral Research and Dissertation (3-15)

SEC. 030 CRN 28797 Bomar

*Grading Restriction: P/NP only.*

*Repeatability: May be repeated.*

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

## ENGINEERING MANAGEMENT

EM 501 Capstone Project (3-6)

SEC. 001 CRN 22489 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 22491 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 533 Theory and Practice of Engineering Management (3) (Video Recorded)

SEC. 001 CRN 22492 UTSI students participating at Tullahoma or Oak Ridge

002 CRN 22493 UTSI students participating elsewhere

003 CRN 22494 UTK students participating at Knoxville DE classrooms

004 CRN 22495 UTK students participating elsewhere

TEXT: *Paradigms: The Business of Discovering the Future*, J. A. Barker, (1993), Harper Business Press, New York, ISBN# 10: 0887306470 13: 978-0887306471

*Productive Workplaces Revisited: Dignity, Meaning and Community in the 21st Century*, M. R. Weisbord, (2004) Pfeifer, ISBN # 0787971170

TIME: Wednesday

4:00 - 6:35

E-113

PROFESSOR: Dr. James 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 534 Financial Management for Engineering Managers (3) (Video Recorded)

SEC. 001 CRN 22496 UTSI students participating at Tullahoma or Oak Ridge

002 CRN 22497 UTSI students participating elsewhere

003 CRN 22498 UTK students participating at Knoxville DE classrooms

004 CRN 22499 UTK students participating elsewhere

TEXT: *Introduction to Management Accounting*, C. T. Horngren, G.L. Sundem, W.O. Stratton,

D. Burgstahler, and J.O. Schatzberg (2010), 15<sup>th</sup> edition, Prentice Hall, NJ. ISBN # 10: 0136102654, ISBN 13: 978-0136102656

TIME: Tuesday 4:00 – 6:35 E-113  
PROFESSOR: Dr. James Simonton

Financial and managerial accounting in engineering and technology management. Transaction recording, financial statements, ratios and analysis, activity-based accounting, and standard practices for costing, budgeting, assessment, and control.

EM 541 Managing Change and Improvement in Technical Organizations (3) (Video Recorded)  
SEC. 001 CRN 22500 UTSI students participating at Tullahoma or Oak Ridge  
002 CRN 22501 UTSI students participating elsewhere  
003 CRN 22502 UTK students participating at Knoxville DE classrooms  
004 CRN 22503 UTK students participating elsewhere

TEXT: *Organizational Behavior*; Fred Luthans; McGraw-Hill Irwin; 12<sup>th</sup> Edition; ISBN 13: 9780073530352 (required text). *Good to Great*; Jim Collins; Harper Collins; 1<sup>ST</sup> Edition (2001) ISBN 10: 0066620996 (optional text). *Who Moved My Cheese*; Spencer Johnson; New York: Putnam; 1998 Edition; ISBN 10: 0399144463 (optional text)

TIME: Monday 4:00 – 6:35 E-113  
PROFESSOR: Dr. Denise Jackson

Current topics, theories, and applications for managing change and innovation for performance improvement in organizations. Multi-initiative approaches: quality management, organizational effectiveness, employee empowerment, performance measurement, and application of statistical tools and techniques. Self-assessment and Baldrige criteria for performance excellence. Change agent, team building, and leadership issues. Case studies.

*(RE) Prerequisite(s): Industrial Engineering 516*

EM 600 Doctoral Research and Dissertation (3-15)

SEC. 001 CRN 26639 Simonton

*Grading Restriction: P/NP only.*

*Repeatability: May be repeated.*

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

## **INDUSTRIAL ENGINEERING**

IE 518 Advanced Engineering Economic Analysis (3) (Video Recorded)

SEC. 001 CRN 22156 UTK Students participating at Knoxville DE Classrooms

002 CRN 22157 UTK Students participating elsewhere

003 CRN 22158 UTSI Students participating elsewhere

TEXT: *Engineering Economy*, Sullivan, et al., 15th edition, 2012, Prentice Hall (Pearson Higher Education), ISBN-13: 9780132554909

TIME: Wednesday 5:00 – 7:15 (EST) MediaSite Server UTK

PROFESSOR: Dr. Reid Kress

Application of engineering economic analysis in complex decision situations. Inflation and price changes; uncertainty evaluation using non-probabilistic techniques; capital financing and project allocation; evaluations involving equipment replacement, investor-owned utilities, and public works projects; probabilistic risk analysis including computer simulation and decision trees; multi-attribute decision analysis; and other advanced topics.



*(RE) Prerequisite(s): 405.*

*Recommended Background: Statistics 251.*

IE 522 Optimization Methods in Industrial Engineering (3) (Video Recorded)

SEC. 001 CRN 22160 UTK Students participating at Knoxville DE Classrooms

002 CRN 22161 UTK Students participating elsewhere

TIME: TBD

TEXT: *Operations Research: Applications & Algorithms*; Wayne L. Winston; CENGAGE Learning; 4<sup>th</sup> Edition; ISBN 10: 0534380581; 13: 9780534380588

PROFESSOR: Dr. Mingzhou Jin

Classical optimization applied to constrained and unconstrained, non-linear, multi-variable functions; search techniques; decision making under uncertainty; game theory; and dynamic programming.

*(RE) Prerequisite(s): Engineering Management 537.*

*Recommended Background: 301.*

## MATERIAL SCIENCE AND ENGINEERING

MSE 500 Thesis (1-15)

002 CRN 21987 Hofmeister

*Grading Restriction: P/NP only.*

*Repeatability: May be repeated.*

*Credit Level Restriction: Graduate credit only.*

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

MSE 600 Doctoral Research and Dissertation (3, 6, 9)

SEC. 002 CRN 21999 Hofmeister

*Grading Restriction: P/NP only.*

*Repeatability: May be repeated.*

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

## MATHEMATICS

MATH 435 Partial Differential Equations (3)

SEC. 002 CRN 20456

TEXT: Richard Haberman; *Applied Partial Differential Equations with Fourier Series and Boundary Value Problems*; 4<sup>th</sup> Edition; Prentice Hall; ISBN 013-065243-1

TIME: Monday & Thursday

3:00 – 4:15

F-252

PROFESSOR: Dr. Jan Zijlstra

Separation of variables, Fourier series, solution of Laplace, wave, and heat equations.

*(RE) Prerequisite(s): 231; 241 or 247.*

\*MATH 472 Numerical Algebra (3) **CANCELLED**

SEC. 001 CRN 20462 (Video Recorded)

TEXT: *Numerical Analysis*; Richard L. Burden and J. Douglas Faires; Brooks Cole; 9<sup>th</sup> Edition;  
ISBN-10: 0538733519; ISBN-13: 978-0538733519

TIME: Monday & Thursday 10:00 – 11:15 E-111

PROFESSOR: Dr. Charles Limbaugh

Direct and iterative methods for systems of linear equations. Solution of single nonlinear equation and nonlinear systems. Orthogonal decomposition, least squares and algebraic eigenvalue problem.

*Cross-listed: (Same as Computer Science 472.)*

*(RE) Prerequisite(s): 231; 200 or 251 or 257.*

*(DE) Prerequisite(s): 371.*

*Comment(s): Knowledge of a high-level programming language required*

MATH 518 Mathematical Methods in Physics II (3)

SEC. 002 CRN 26365

TEXT: Arfken et al. 7<sup>th</sup> Edition; Arfken reference; [http://www.amazon.com/Mathematical-Methods-Physicists-Seventh-](http://www.amazon.com/Mathematical-Methods-Physicists-Seventh-Comprehensive/dp/0123846544/ref=sr_1_1?s=books&ie=UTF8&qid=1328812143&sr=1-1)

[Comprehensive/dp/0123846544/ref=sr\\_1\\_1?s=books&ie=UTF8&qid=1328812143&sr=1-1](http://www.amazon.com/Mathematical-Methods-Physical-Sciences-Mary/dp/0471198269/ref=pd_vtp_b_1)

Boas 3<sup>rd</sup> Edition; Boas reference; [http://www.amazon.com/Mathematical-Methods-Physical-Sciences-Mary/dp/0471198269/ref=pd\\_vtp\\_b\\_1](http://www.amazon.com/Mathematical-Methods-Physical-Sciences-Mary/dp/0471198269/ref=pd_vtp_b_1)

TIME: Monday & Thursday 1:00 – 2:15 E-111

PROFESSOR: Dr. Christian Parigger

Advanced Problems. Topics may vary according to interests of students and instructor.

*Cross-listed: (Same as PHYS572.)*

*(DE) Prerequisite(s): 571.*

## MECHANICAL ENGINEERING

ME 500 Thesis (1-15)

SEC. 001 CRN 22038 Antar  
021 CRN 22058 Corda  
022 CRN 22059 Flandro  
023 CRN 22060 Majdalani  
024 CRN 22061 Moeller  
025 CRN 22062 Solies  
026 CRN 22063 Steinhoff  
034 CRN 27334 Vakili

*Grading Restriction: P/NP only.*

*Repeatability: May be repeated.*

*Credit Level Restriction: Graduate credit only.*

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

ME 502 Registration for Use of Facilities (1-15)

SEC. 002 CRN 26705 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.*

\*ME 512 Heat Transfer II (3) (Video Recorded) **CANCELLED**

SEC. 001 CRN 22569

TEXT: TBD

TIME: Monday & Wednesday

4:00 – 5:15

E-111

PROFESSOR: Dr. Joseph Majdalani

Analysis of steady-state and time-dependent heat conduction by numerical methods. Analysis of laminar and turbulent convection heat transfer in internal and external flows, forced and buoyancy driven flows.  
*(DE) Prerequisite(s): 541.*

ME 522 Thermodynamics II (3)

SEC. 001 CRN 22571

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 542 Fluid Mechanics II (3) **CANCELLED**

SEC. 001 CRN 22577

TEXT: TBD

TIME: Tuesday & Thursday

1:10 – 2:25

E-110

PROFESSOR: TBD

Equations of viscous fluid flows. Basic concepts and equations of turbulent flow. Separation, stability and transition. Laminar and turbulent boundary-layer flows. Exact, approximate, and numerical solutions.

*Cross-listed: (Same as Aerospace Engineering 542.)*

*(DE) Prerequisite(s): 541.*

ME 585 Turbomachinery II (3) (Video Recorded)

SEC. 001 CRN 22083

TEXT: Jack D. Mattingly; *Elements of Propulsion: Gas Turbines and Rockets*; 2006;

ISBN 1-56347-779-3

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. 002 CRN 22084 Antar  
 003 CRN 27316 Corda  
 005 CRN 27317 Flandro  
 006 CRN 27318 Majdalani  
 007 CRN 27319 Moeller  
 008 CRN 27320 Smith  
 009 CRN 27321 Solies  
 010 CRN 27322 Steinhoff  
 011 CRN 27323 Vakili

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

ME 595 Mechanical Engineering Seminar (1)  
 SEC. 001 CRN 22085  
 TEXT: None  
 TIME: Will be announced through email  
 PROFESSOR: Dr. Ahmad Vakili

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

ME 599 Special Topics in AE: Introduction to Electric Propulsion (3)  
 SEC. 002 CRN 29260 (Same as AE 599 003 CRN 29249) (Video Recorded)  
 TEXT: Physics of Electric Propulsion (textbook is available from Amazon.com); Robert G. Jahn; Dover Publications (May 26, 2006); ISBN 10:0486450406; 13: 978-0486450407  
 TIME: Tuesday & Friday 1:00 – 2:15 E-113  
 PROFESSOR: Dr. Trevor Moeller

The objective of this course is to provide students with specific physical background and engineering concepts underlying electric propulsion and its application to modern satellites. Topics will include the physical principles, the practical designs, and the performance levels of electrically-powered space propulsion thrusters. Systems covered include: ion engines; pulsed and steady-state (fixed field) plasma and MHD thrusters, including Hall Thrusters, and others.  
 Prereq: Consent of Instructors.

ME 599 Special Topics in ME: Contemporary Optics (3)  
 SEC. 005 CRN 29334  
 (Same as AE 599 006 CRN 26542, BME 599 005 CRN 28111, PHYS507 001 CRN 28912)  
 TEXT: *Modern Optics*; B.D. Guenther; Wiley  
[http://www.amazon.com/Modern-Optics-B-D-Guenther/dp/0471605387/ref=cm\\_cr\\_pr\\_product\\_top](http://www.amazon.com/Modern-Optics-B-D-Guenther/dp/0471605387/ref=cm_cr_pr_product_top)  
 TIME: Monday & Thursday 9:15 – 10:30 F-252  
 PROFESSOR: Dr. Lloyd Davis

Topics in geometrical, physical, Fourier, and nonlinear optics and introductory laser physics. Extensive use of computer calculations and design of practical and sophisticated optical systems.

ME 599 Special Topics in AE: Applied Computational Fluid Dynamics II (3)  
SEC. 006 CRN 27773 (Same as AE 599 008 CRN 28052)  
TEXT: No required text  
TIME: Monday & Wednesday 1:10 – 2:25 E-110  
PROFESSOR: Dr. Greg Power

This course incorporates fundamental application of CFD, grid generation and post-processing codes that are widely accepted and used in industry and government labs as a hands-on introduction to computational fluid dynamics. The course will build on the knowledge and experience gained during the 1st semester (Part-I) to develop skills for simulating more complex problems using advanced physical/turbulence models. The student will be expected to complete at least one complex CFD project and prepare a detailed report and presentation of the project efforts and results. Potential topics that will be covered include: Grid generation on (for) complex geometries; Development of custom routines/subroutines; Verification and Validation of CFD results; Advanced thermodynamic models; Chemical kinetics; Time dependent flows; Advanced turbulence modeling; Advanced post-processing techniques; Parallel processing; Other topics as may be helpful by the instructor.

ME 600 Doctoral Research and Dissertation (3-15)  
SEC. 015 CRN 22103 Antar  
016 CRN 22104 Corda  
018 CRN 22106 Flandro  
019 CRN 22107 Majdalani  
027 CRN 22115 Moeller  
029 CRN 27325 Steinhoff  
030 CRN 27326 Vakili

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

## PHYSICS

PHYS 500 Thesis (1-15)  
SEC. 002 CRN 24342 Chen  
003 CRN 24343 Crater  
004 CRN 24344 Davis  
005 CRN 24345 Lewis  
006 CRN 24346 Parigger

*Grading Restriction: P/NP only.*  
*Repeatability: May be repeated.*

*Credit Level Restriction: Graduate credit only.*  
*Registration Restriction(s): Minimum student level – graduate.*

PHYS 503 Physics Colloquium (1)  
SEC. 002 CRN 24351  
TEXT: None  
TIME: 2<sup>nd</sup> & 4<sup>th</sup> Thursday 3:30 – 5:00 H-111  
PROFESSOR: Dr. Ying-Ling Chen

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 507 Contemporary Optics (3)  
SEC. 001 CRN 28912  
(Same as AE 599 006 CRN 26542, BME 599 005 CRN 28111, ME 599 005 CRN 29334)  
TEXT: *Modern Optics*; B.D. Guenther; Wiley  
[http://www.amazon.com/Modern-Optics-B-D-Guenther/dp/0471605387/ref=cm\\_cr\\_pr\\_product\\_top](http://www.amazon.com/Modern-Optics-B-D-Guenther/dp/0471605387/ref=cm_cr_pr_product_top)  
TIME: Monday & Thursday 9:15 – 10:30 F-252  
PROFESSOR: Dr. Lloyd Davis

Topics in geometrical, physical, Fourier, and nonlinear optics and introductory laser physics. Extensive use of computer calculations and design of practical and sophisticated optical systems.

PHYS 512 Theoretical Physics II (3)  
SEC. 002 CRN 24352 (Video Recorded)  
TEXT: Constant; *Theoretical Physics*; Addison Wesley  
TIME: Monday & Thursday 1:00 – 2:15 E-113  
PROFESSOR: Dr. Horace Crater

Concepts and applications in applied physics. Topics: electrostatic and magneto-static problems, EM waves, duality and quantization, absorption and emission, statistical ensemble and thermal equilibrium, and other modern applications of current interest, in areas of quantum chemistry, biophysics, optics, spectroscopy, and astrophysics.

*Recommended Background: Familiarity with computational methods.*

PHYS 514 Problems in Theoretical Physics II (3)  
SEC. 002 CRN 29316  
TEXT: TBD  
TIME: Wednesday 10:15 – 12:00 E-113  
PROFESSOR: Dr. M. Breinig

Fundamentals of physics: electrodynamics, relativity, and quantum mechanics.

PHYS 522 Quantum Mechanics (3)  
SEC. 002 CRN 27327

TEXT: *Modern Quantum Mechanics*; J.J. Sakurai and Jim Napolitano; Pearson; 2<sup>nd</sup> Edition  
[http://www.amazon.com/Modern-Quantum-Mechanics-2nd-Edition/dp/0805382917/ref=dp\\_ob\\_title\\_bk](http://www.amazon.com/Modern-Quantum-Mechanics-2nd-Edition/dp/0805382917/ref=dp_ob_title_bk)

TIME: Monday & Thursday 10:45 – 12:00 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.

(DE) Prerequisite(s): 521.

PHYS 541 Electromagnetic Theory (3)

SEC. 002 CRN 26141

TEXT: *Classical Electrodynamics*; Greiner W; Springer: <http://www.amazon.com/Classical-Electrodynamics-Theoretical-Physics/dp/038794799X>; First Edition; ISBN-10: 038794799X or ISBN-13: 978-0387947990 and *Electromagnetic Field Theory*; Bo Thide; Second Edition; online book <http://www.plasma.uu.se/CED/Book/index.html> and references to other “classic” textbooks on the subject such as J.D. Jackson’s third edition on Classical Electrodynamics.

TIME: Monday & Thursday 10:45 – 12:00 E-111

PROFESSOR: Dr. Horace Crater

Review of electrostatics, magnetostatics, and quasi-static problems; Maxwell’s field equations and their solutions in dielectric and conducting media; electrodynamics and relativity, retarded potentials and gauge transformations, radiation produced by accelerating charges.

(DE) Prerequisite(s): 571.

PHYS 572 Mathematical Methods in Physics II (3)

SEC. 002 CRN 26354

TEXT: Arfken et al. 7<sup>th</sup> Edition; Arfken reference; [http://www.amazon.com/Mathematical-Methods-Physicists-Seventh-Comprehensive/dp/0123846544/ref=sr\\_1\\_1?s=books&ie=UTF8&qid=1328812143&sr=1-1](http://www.amazon.com/Mathematical-Methods-Physicists-Seventh-Comprehensive/dp/0123846544/ref=sr_1_1?s=books&ie=UTF8&qid=1328812143&sr=1-1)

Boas 3<sup>rd</sup> Edition; Boas reference; [http://www.amazon.com/Mathematical-Methods-Physical-Sciences-Mary/dp/0471198269/ref=pd\\_vtp\\_b\\_1](http://www.amazon.com/Mathematical-Methods-Physical-Sciences-Mary/dp/0471198269/ref=pd_vtp_b_1)

TIME: Monday & Thursday 1:00 – 2:15 E-111

PROFESSOR: Dr. Christian Parigger

Advanced Problems. Topics may vary according to interests of students and instructor.

Cross-listed: (Same as Mathematics 518.)

(DE) Prerequisite(s): 571.

PHYS 573 Numerical Methods in Physics (3)

SEC. 002 CRN 24359

TEXT: *Survey of Computational Physics*; R.H. Landau et al.; Princeton: <http://www.amazon.com/Survey-Computational-Physics-Introductory-Science/dp/0691131376> or free online book <http://www.physics.orst.edu/~rubin/Books/eBookWorking/index.html>; first (book: java) and second (online: python); ISBN-10: 0691131376 ISBN-13: 978-0691131375. *Numerical Recipes*; Third Edition; and references to other “classic” textbooks on the subject such as Numerical Mathematics by Quarteroni et al on Computational Physics and/or Numerical Methods for Engineers and Scientists by J.D. Hoffmann; W.H. Press et al.; online book <http://www.nr.com>; see online reference.

TIME: Monday & Thursday 2:30 - 3:45 E-111

PROFESSOR: Dr. Christian Parigger

Numerical methods for solution of physical problems, use of digital computers, analysis of errors.  
(DE) Prerequisite(s): 571 or consent of instructor.

PHYS 599 Physics Seminar (1)

SEC. 007 CRN 24369

TEXT: None

TIME: 2<sup>nd</sup> & 4<sup>th</sup> Thursday 3:30 – 5:00 H-111

PROFESSOR: TBD

(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.

PHYS 600 Doctoral Research and Dissertation (3-15)

SEC. 002 CRN 24372 Chen

003 CRN 24373 Crater

004 CRN 24374 Davis

005 CRN 24375 Lewis

006 CRN 24376 Parigger

Grading Restriction: P/NP only.

Repeatability: May be repeated.

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

PHYS 642 Advanced Topics in Modern Physics (3)

SEC. 001 CRN 29543

TEXT: None

TIME: Monday & Thursday 1:00 – 2:15 TBD

PROFESSOR: Dr. Christian Parigger

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.

PHYS 643 Computational Physics (3)

SEC. 001 CRN 28913

TEXT: *Survey of Computational Physics*; R.H. Landau et al.; Princeton:

<http://www.amazon.com/Survey-Computational-Physics-Introductory-Science/dp/0691131376> or free online book <http://www.physics.orst.edu/~rubin/Books/eBookWorking/index.html>; first (book: java) and second (online: python); ISBN-10: 0691131376 ISBN-13: 978-0691131375. *Numerical Recipes*; Third Edition; and references to other “classic” textbooks on the subject such as *Numerical Mathematics* by Quarteroni et al on Computational Physics and/or *Numerical Methods for Engineers and Scientists* by J.D. Hoffmann; W.H. Press et al.; online book <http://www.nr.com>; see online reference.

TIME: Monday & Thursday 2:30 - 3:45 E-111

PROFESSOR: Dr. Christian Parigger

Developing computer algorithms for solving representative problems in various fields of physics, celestial dynamics in astrophysics, boundary value problems in electromagnetism, atomic and nuclear structures, band structure in solid state physics, transport problems in statistical mechanics, Monte Carlo simulation of liquids, fitting and interpolation of data, correlation analysis, or optimization strategy.

(DE) Prerequisite(s): 521, 531, and 571.

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