



# Fall 2010

## *Registration Announcement*



*“The **FUTURE** Is Bright at”*

## *The University of Tennessee*

### *Space Institute*

411 B.H. Goethert Parkway

Tullahoma, TN 37388-9700

888-822-8874 x-37228

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



*See Inside for Online Registration Instructions*

<https://cpo.utk.edu/CPOWeb>

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## CALENDAR --- FALL SEMESTER 2010

Priority Registration.....	March 15, 2010 – August 11, 2010
Fall 2010 Graduation Application Deadline .....	August 5, 2010
<b>Admission to Candidacy Forms due for Fall 2010 Commencement .....</b>	<b>August 5, 2010</b>
Late Registration and late fees begin .....	August 12 – 27, 2010
<b>Classes begin.....</b>	<b>August 18, 2010</b>
Last Day to drop without “W” on the transcript, change to/from audit, add a course without the instructor’s signature.....	August 27, 2010
Labor Day Holiday .....	September 6, 2010
<b>Graduation Fee Payment Deadline .....</b>	<b>September 20, 2010</b>
Last day to add/change credit or grading options with signatures .....	September 28, 2010
Fall Break (No Classes) .....	October 7 – 8, 2010
Last day to meet with consultant for Thesis/Dissertation Preliminary Review .....	October 13, 2010
Tentative deadline to purchase cap/gown and order hood .....	October 29, 2010
Last day to register to attend graduate hooding .....	October 29, 2010
Last day to schedule final exam (thesis) .....	October 22, 2010
Last day to schedule final exam (non-thesis/capstone students).....	October 29, 2010
Last day to schedule final exam (dissertation).....	October 29, 2010
Last day to take final exam (thesis/dissertation students).....	November 5, 2010
Last day to take final comprehensive exam (non-thesis/capstone students).....	November 5, 2010
Last day to drop with a “W” full session courses .....	November 9, 2010
<b>Thesis/Dissertation Deadline (Electronic).....</b>	<b>November 19, 2010</b>
Report of thesis/dissertation defense or final examination (Pass/Fail Form).....	November 19, 2010
Thanksgiving Holiday.....	November 25 – 26, 2010
Deadline for submission of Admission to Candidacy for students graduating Spring 2011 .....	November 30, 2010
All “ <b>INCOMPLETES</b> ” must be removed for Graduation.....	November 30, 2010
Classes End .....	November 30, 2010
Total withdrawal from the University Deadline .....	November 30, 2010
Study Period.....	December 1, 2010
Exam Period.....	December 2, 3, & 6, 2010
Graduate Hooding (UTK) .....	December 10, 2010
COMMENCEMENT (UTK) .....	December 11, 2010
Second thesis/dissertation deadline (Student will receive diploma May 2010 But do not have to register for Spring 2011) .....	January 7, 2011 (Defense Completed by November 30, 2010)

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## SPRING SEMESTER 2011

Priority Registration for Spring Semester 2011 .....	TBD
Final Registration for UTSI students .....	TBD
Classes begin.....	January 12, 2011
Martin Luther King Day (Holiday).....	January 17, 2011
Spring Break .....	February 14 – 18, 2011
Spring Recess - Good Friday Holiday .....	April 22, 2011
Classes End .....	April 29, 2011
Study Period.....	April 30, 2010 & May 1, 2011
Exam Period.....	May 2, 3, 5, 6, 2011
Graduate Hooding Ceremony (UTK) .....	May 12, 2011
Commencement (UTK) .....	May 11 & 13, 2011

**FALL SEMESTER 2010  
FINAL STUDY DAY AND EXAM SCHEDULE**

**LAST DAY OF CLASSES .....November 30, 2010**

**STUDY PERIOD .....December 1, 2010**

**FINAL EXAMS - - - December 2, 3, &6, 2010**

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

**1ST Day - Thursday, December 2, 2010**

<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 - Friday, December 3, 2010**

<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 - Monday, December 6, 2010**

<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  
FALL SEMESTER 2010**

**REGISTRATION PROCEDURE**

**ADVISING**

Graduate students should contact their departmental faculty to arrange an advising appointment. The web registration system will ask if you have discussed your program with your advisor. Answer “yes” if you have. Graduate Studies Web page <http://web.utk.edu/~gsinfo>.

**REGISTRATION**

UTSI students **MUST** register for the Fall semester 2010 on the web at Circle Park Online <https://cpo.utk.edu/CPOWeb/>. The registration system will be available Monday through Saturday, 6:00 AM - 11:00 PM (CST) and Sundays 12:00 PM - 5:00 PM (CST). Registration will be March 15 – August 11, 2010. Late registration will be August 12 – August 27, 2010. Classes begin August 18, 2010.

**Plan your schedule. Here’s a table to help with this process:**

<b>Department Number</b>	<b>Course Number</b>	<b>Section Number</b>	<b>Spec.Credit/ Grading</b>	<b>Credit Hours</b>	<b>Hours/Days</b>	<b>Place</b>

**Students log on to CPO using their Net ID and password. If you do not know your Net ID and Password, please visit the University Registrar's website at [http://registrar.tennessee.edu/student\\_id.shtml](http://registrar.tennessee.edu/student_id.shtml) . Scroll down the page to "What is a Net ID and Net ID password?" You will find helpful information about obtaining Net IDs and Net ID passwords.**

**CPO Technical Support: Send email including your return email address in the text of your message to [cpo@utk.edu](mailto:cpo@utk.edu)**

**Web address for Circle Park Online <https://cpo.utk.edu/CPOWeb/>**

**Days of the Week**

M-Monday      T – Tuesday      W – Wednesday      R-Thursday      F-Friday      S-Saturday

## **FINANCIAL CALENDAR**

Last registration day for receiving statements by mail	July 13, 2010
Statement information available on CPO.utk.edu	July 13, 2010
Priority registration, payment/confirmation deadline	August 11, 2010 (4:30 p.m. CST)
Late registration/late fees begin	August 12, 2010
Late registration payment/confirmation deadline	August 27, 2010 (4:30 pm CST)

## **CREDIT CARD PAYMENTS**

**NOTE:** If you pay your fees using Circle Park Online (CPO) using 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 Business Office.**

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

The Business 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 Business 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**

<b>For a specific office:</b>	<b>1-888-822-UTSI (8874) and the extension number.</b>
<b>For general information:</b>	<b>1-888-822-UTSI (8874)</b>
<b>Admissions Office:</b>	<b>1-888-822-UTSI (8874) ext. 37293</b>
<b>Bookstore:</b>	<b>1-888-822-UTSI (8874) ext. 37204</b>
<b>Business Office:</b>	<b>1-888-822-UTSI (8874) ext. 37204</b>
<b>Registrar's Office:</b>	<b>1-888-822-UTSI (8874) ext. 37228</b>

## **BOOKSTORE HOURS**

The Bookstore is located in Lower C-Wing. The Bookstore hours are 8:00 a.m. - 4:00 p.m. All textbooks will be returned to the publisher one week after midterm. For further information

concerning books contact the Bookstore, ext. 37204 or 37314 or by email Robin Nee at [rne@utsi.edu](mailto:rne@utsi.edu) or Vicki Carr at [vcarr@utsi.edu](mailto:vcarr@utsi.edu) .

### **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 \$35.00 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 using the URL <http://admissions.utk.edu/graduate/apply.shtml> [Click on APPLY ONLINE and Follow Directions] or send Application for Admission, transcripts, GRE scores (if required); and if international application, TOEFL scores to the Admission Office, Mail Stop 19, Room E-109, University of Tennessee Space Institute, Tullahoma, TN 37388-9700.

### **PAYMENT OF FEES**

Payment of fees is due at time of registration. Late fees will begin on August 12, 2010. The only credit/debit cards The University of Tennessee Space Institute accepts are Visa, MasterCard and Discover.

### **FEES OF DISTANCE STUDENTS**

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

Aviation Systems	Stephen Corda	931-393-7413	<a href="mailto:scorda@utsi.edu">scorda@utsi.edu</a>
Engineering Mgt.	Dee Merriman	931-393-7293	<a href="mailto:dmerrima@utsi.edu">dmerrima@utsi.edu</a>

### **TUITION AND/OR MAINTENANCE FEES\***

#### **Full-Time Fees For In-State Students (per semester)**

Maintenance Fee .....	\$3,720.00*
Programs and Services Fee .....	\$90.00
Total .....	\$3,810.00

#### **Full-Time Fees For Out-Of-State Students (per semester)\***

Maintenance Fee .....	\$3,720.00*
Programs and Services Fee .....	\$90.00
Tuition .....	\$7,519.00*
Total .....	\$11,329.00

\* BEGINNING FALL 2010 an additional \$45.00 per credit hour with no cap will be charged to ALL ENGINEERING COURSES.

\* 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:

<b>IN-STATE</b>	<b>\$ 414.00 per semester hour</b>
<b>3 hrs.</b>	<b>\$ 1,242.00</b>
<b>OUT-OF-STATE</b>	<b>\$ 1,250.00 per semester hour</b>
<b>3 hrs.</b>	<b>\$ 3,750.00</b>

## **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 Fall or Spring 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 videotape 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 deferred payment may be divided into two equal payments payable on the 45th (October 1, 2010) day of the semester. 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>
<b>August 18 – August 22</b>	<b>NO CHARGE</b>	<b>100%</b>
<b>August 23 – August 28</b>	<b>20% CHARGE</b>	<b>80%</b>
<b>August 29 – September 2</b>	<b>40% CHARGE</b>	<b>60%</b>
<b>September 3 – September 7</b>	<b>60% CHARGE</b>	<b>40%</b>
<b>September 8 – End of Term</b>	<b>100% CHARGE</b>	<b>NO REFUND</b>

**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 the Registrar's Office

and required to file a Change of Registration form with the Registrar's Office, UTSI, Room D-100, 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 on this page.

### **REPAYMENTS**

Repayments are defined as that portion of aid, received by a student after the University direct charges have been paid by that aid, 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 on the previous page.

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.

### **WITHDRAWAL (TOTAL) 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 the Registrar's Office 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 <http://registrar.tennessee.edu/records/grades.shtml> or by calling 865-656-2527. Grades will not be mailed unless a printed copy is requested through the web address. Students will be prompted to enter their ID number and their Personal Security Code. There is a limit of 8 telephone calls per student, per semester. Unlimited access is available via the Internet. Grades may also be obtained through the Registrar's Office at UTSI.

### **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 the Registrar's Office 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 Dean for Academic Affairs.

## **REMOVAL OF INCOMPLETE GRADES**

All Incomplete Grades (I) should be removed within one semester, excluding the Summer Term unless other arrangements have been made with the instructor. If the I is not removed within one calendar year, the I will be changed to an F. The course will not be counted in the cumulative grade point average until a final grade is assigned. Students wishing to graduate Fall Semester 2010 must remove all INCOMPLETE GRADES by **December 1, 2010**.

It is the responsibility of the student to contact the instructor and the instructor's responsibility to complete a Grade Change form. The Registrar's Office cannot change a grade on verbal instructions only.

## **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 to the Registrar's Office a completed and signed Application for Admission to Candidacy form at least one semester prior to receiving the degree.

Candidacy committee changes or course changes must be submitted to the Committee Chairman using a Change of Committee/Course for approval. This form is available in the UTSI Registrar's Office.

## **ADMISSION TO CANDIDACY**

### **DOCTOR OF PHILOSOPHY DEGREE:**

A Doctoral Committee should be formed during the student's first year of doctoral study and submitted to the Registrar's Office for approval. The form is available in the UTSI Registrar's Office. Any changes to the doctoral committee (deletions or additions) must be done through the Registrar's Office. Each Ph.D. student is responsible for submitting to the Registrar's Office a completed Admission to Candidacy form signed by the Doctoral Committee at least one semester prior to receiving the degree. The Candidacy form must be approved by the UTK Graduate School before a student will be admitted to candidacy.

## **CONTINUOUS REGISTRATION OF DOCTORAL STUDENTS**

All doctoral students must be registered for doctoral dissertation research course 600 (minimum of 3 hrs), on a continuous basis starting when the doctoral research proposal is approved, admission to candidacy is accepted, or registration for course 600 is begun, whichever comes first, including ALL Summer terms and the semester in which the dissertation is approved and accepted by The Graduate School. A leave of absence may be requested for extenuating circumstances. The procedure can be found in the UTK Graduate catalog.

## **FINAL EXAMINATION 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 the Registrar's Office. Failure to notify the Registrar's Office 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 UTSI, are required to have comprehensive medical insurance. The policy for the 2010 - 2011 academic year will be announced in August 2010. The premium must be paid before registration. Contact the Human Resources Department (C-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 FOR FALL SEMESTER 2010**

**STUDY PERIOD...December 2, 2010**

**FINAL EXAMS.....December 3, 4, & 7, 2010**

## **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 in the Registrar's Office, D-100.

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

## TECHNICAL WRITING COURSE

**THIS IS A NON-CREDIT COURSE REQUIRED FOR ALL GRA's AT UTSI  
AND OPTIONAL FOR ALL OTHER STUDENTS**

**ENHANCE YOUR CAREER:** Learn to efficiently tackle writing chores and to effectively communicate in writing. This course, designed for scientists and engineers, reviews the most important aspects of clear communication, with an emphasis on organization and coherence. The principles of logic, grammar, and style are considered as they apply to technical documents -- especially proposals, theses, and dissertations. Oral presentations and resumes will also be covered. Contact Dee Merriman at (931) 393-7293 or [dmerrima@utsi.edu](mailto:dmerrima@utsi.edu) to enroll in the technical writing course.

**INSTRUCTOR:** Dr. Mary McLemore

**TEXT:** John M. Lannon; *Technical Communication*; 10<sup>th</sup> ed.; Longman;  
ISBN# 0321270762

**TIME:** Tuesday 6:00 – 8:00

**ROOM:** E211

**FEE:** \$165.00 for non-GRA students

**THE UNIVERSITY RESERVES THE RIGHT TO REVISE  
ANY INFORMATION LISTED IN THIS TIMETABLE OF CLASSES**

**THE UNIVERSITY OF TENNESSEE  
SPACE INSTITUTE  
FALL SEMESTER 2010 COURSE LISTINGS**

**AEROSPACE ENGINEERING**

AE 500 Master's Thesis (3, 6, 9)  
SEC. 001 Moeller  
007 Vakili  
008 Majdalani  
009 Steinhoff  
011 Antar  
012 Moulden  
014 Corda  
022 Flandro

AE 511 INVISCID FLOW (3)  
SEC. 001 (Video Recorded)  
TEXT: Karamcheti: Principles of Ideal Fluids Aerodynamics; R. E. Krieger Publ. Co.;  
ISBN# 0898741130.  
TIME: Monday & Thursday 1:00 – 2:15 E111  
PROFESSOR: Dr. Ahmad Vakili

Brief review of vector algebra, kinematics and dynamics of inviscid fluids; potential flow about body, conformal mapping review and application. *Prerequisite: AE 422 or ME 531, MATH 425 or equivalent.*

AE 515 AIR VEHICLE AERODYNAMICS AND PERFORMANCE (3)  
SEC. 001 (Same as AS 503)  
TEXT: Introduction to Flight; John D. Anderson; McGraw-Hill; Science/Engineering/Math; 6  
Edition (October 25, 2007); ISBN # 978-0073529394.  
TIME: Tuesday & Friday 1:00 – 2:30 E111  
PROFESSOR: Dr. Peter Solies

Application of aerodynamics principles to air vehicles to provide estimates of performance, stability, and control characteristics for subsonic to hypersonic speeds. Relations among thrust, drag, lift and attitude, propulsion systems, vehicle performance characteristics, and trajectory optimization. *Prerequisite(s): 422.*

AE 521 AERODYNAMICS OF COMPRESSIBLE FLUIDS (3)  
SEC. 001  
TEXT: Elements of Gasdynamics; Liepmann H.W., Roskho A.; Dover; ISBN# 0486 419 630.  
TIME: Tuesday & Friday 9:15 – 10:30 B210  
PROFESSOR: Dr. Trevor Moulden

Equations of compressible fluid motion. Thermodynamic component of the equation, forces on bodies in a moving fluid. One dimensional flows: nozzles. Heat and friction effects. Normal and oblique shock waves in supersonic flow.

AE 525 HYPERSONIC FLOW (3)  
 SEC. 001  
 TEXT: Hyper sonic Aerodynamics and High Temperature Gas Dynamics; John Anderson; AIAA Publishers; \$90 for non-AIAA members; \$70 for AIAA members.  
 TIME: Monday & Thursday 4:30 – 5:45 E211  
 PROFESSOR: Dr. Roy Schulz

Slender body flow; similitude; Newtonian theory; blunt body flow; viscous interactions; free molecule and rarefied gas flow. *Prerequisite(s): 512.*

\*AE 531 MAGNETOHYDRODYNAMICS (3) **CANCELLED**  
 SEC. 001

TEXT: Foundations of Plasma Dynamics. This book is no longer in print, but copies of pertinent sections will be provided. E.H. Holt and R.E. Haskell, The Macmillan Co., 1965, 1<sup>st</sup> Ed., ISBN#: Library of Congress catalog card number: 65-14072.  
 TIME: Monday & Thursday 9:15 – 10:30 F252  
 PROFESSOR: Dr. Trevor Moeller

This course will also address the fundamentals of plasmas, where they are found, and their characteristics. Topics will include an introduction to electromagnetics, charged particle motion in static and uniform electric and magnetic fields, elastic collision processes, plasma kinetic theory, and charged particle interactions. The magnetohydrodynamic (MHD) approximation will also be introduced. Electromagnetic field theory; chemical kinetics; thermodynamic and thermophysical properties of gas plasmas; governing equations and applications. *Prerequisite(s): 422 and Mathematics 471.*

\*AE 533 DYNAMICS (3) **CANCELLED**  
 SEC. 002 (Same as ME 533/ES 533)

TEXT: TBD  
 TIME: Monday & Thursday 1:00 – 2:15 E211  
 PROFESSOR: Dr. Basil Antar

Kinematics and dynamics of particles in three dimensions. Rotating coordinate systems. Hamilton's principle. Lagrange's equations of motion. Kinematics and dynamics of rigid bodies. (Same as Mechanical Engineering 533; Biomedical Engineering 534; Engineering Science 534). (DE) *Prerequisite(s): 391 or Mathematics 431 and an undergraduate vibrations course.*

AE 541 FLUID MECHANICS I (3)  
 SEC. 001 (Same as ES 541 & ME 541)  
 TEXT: R.L. Panton: Incompressible Flow; Wiley Interscience; 3<sup>rd</sup>: ISBN# 047126122X.  
 TIME: Tuesday & Friday 9:15 – 10:30 E211  
 PROFESSOR: Dr. Basil Antar

Derivation of equations governing flow of inviscid and viscous fluids (conservation of mass, Newton's second law, conservation of energy). Equations of state and constitutive relations. Euler and Navier-Stokes forms and nondimensionalization. Exact solutions and introduction to potential and boundary-layer flows. (Same as Engineering Science 541; Mechanical Engineering 541). *Prerequisite: AE 511 or equivalent, or consent of instructor.*

\*AE 562 FUNDAMENTALS OF AEROACOUSTICS (3) **CANCELLED**  
 SEC. 001

TIME: Tuesday & Friday 4:00 – 5:15 B210  
 TEXT: Class notes  
 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.

**Please note that this course used to be AE561. After dropping it in 2007, it was reinstated by the Graduate Council effective Fall 2009. The announcement is attached:**

<http://gradschool.utk.edu/GraduateCouncil/Minutes/GCMinutes10302008.pdf>

\*AE 571 FINITE ELEMENTS FOR ENGINEERING APPLICATIONS (3) **CANCELLED**  
SEC. 003 (Same as ES 551 & ME 561)

TEXT: Class Notes/Handouts

TIME: Tuesday & Friday 1:00 – 2:15 B210

PROFESSOR: Dr. Kenneth Kimble

Modern computational theory applied to conservation principles across the engineering sciences. Weak forms, extremization, boundary conditions, discrete implementation via finite element, finite difference, finite volume methods. Asymptotic error estimates, accuracy, convergence, stability. Linear problem applications in 1, 2 and 3 dimensions, extensions to non-linearity, non-smooth data, unsteady, spectral analysis techniques, coupled equation systems. Computer projects in heat transfer, structural mechanics, mechanical vibrations, fluid mechanics, heat/mass transport. (*Same as Biomedical Engineering 561; Mechanical Engineering 561; Engineering Science 551*). *Comment(s): Bachelor's degree in engineering or natural science required.*

AE 572 COMPUTATIONAL FLUID DYNAMICS (3)

SEC. 001 (Same as ES 552 & ME 562)

TEXT: TBD

TIME: Monday & Thursday 4:00 – 5:15 B210

PROFESSOR: Dr. John Steinhoff

Modern techniques in computing fluid dynamic flows will be covered. First, different classes of flows will be reviewed, and the most appropriate methods that satisfy both the physics requirements (capture the essential physics), and the engineering requirements (time required to set up and compute solutions) will be discussed. Methods suited for general configurations (blunt bodies) and methods suited for streamlined bodies, such as aircraft will be contrasted. The types of problems for which incompressible methods or compressible methods are best used, as well as those for which turbulence modeling is required will be covered. Accuracy issues and requirements will be covered, both for fully resolved flows and flows where turbulence modeling is needed. Particular equations to be covered include Potential, Euler, and (for laminar flow) Navier Stokes, as well as “Large Eddy Simulation” and “Reynolds Averaged Navier Stokes” for modeling turbulent flows. For compressible flows, methods involving shock capturing, with higher order schemes and limiters will be covered. For general flows, methods involving efficient treatment of concentrated vortices, passive scalar transport, as well as free surfaces will also be covered. (*Same as Engineering Science 552; Mechanical Engineering 562*).

AE 590 SELECTED ENGINEERING PROBLEMS (2-6)

SEC. 001 PROFESSOR: Dr. Basil Antar

AE 595 SEMINAR: AEROSPACE AND MECHANICAL SYSTEMS (1)

SEC. 001 (Same as ME 595 & ES 595)

PROFESSOR: Dr. Ahmad Vakili

AE 599 SPECIAL TOPICS: INTRODUCTION TO ELECTRIC PROPULSION (3)



SEC. 001 (Same as ME 599 Sec. 004/ES 581 Sec. 003)  
 TIME: Tuesday & Friday 10:45 – 12:00 F252  
 TEXT: Physics of Electric Propulsion; Robert G. Jahn; Dover Publications; ISBN 10:  
 0486450406; ISBN 13: 978-0486450407 (*Textbook is available from Amazon.com*)  
 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 600 DOCTORAL RESEARCH AND DISSERTATION (3, 6, 9)  
 SEC. 005 Vakili  
 006 Majdalani  
 007 Steinhoff  
 009 Antar  
 010 Corda  
 013 Moeller  
 020 Flandro

AE 661 ADVANCED TOPICS IN COMPUTATIONAL FLUID DYNAMICS (3)  
 SEC. 001 (Same as ES 651 & ME 651)  
 TEXT: TBD  
 TIME: TBD  
 PROFESSOR: Dr. Joe Majdalani

Modern approximation theory for Euler and Navier-Stokes conservation systems, compressible flow, hyperbolic forms, boundary conditions. Weak forms, extremization, finite element/finite volume/flux vector discrete implementations, a priori error estimates, accuracy, convergence stability. Numerical linear algebra, approximate factorization, sparse matrix methods. Dissipation, Fourier spectral analysis, smooth and non-smooth solutions. (*Same as Engineering Science 651; Mechanical Engineering 651*). *Prerequisite(s): 552.*

\*AE 681 ADVANCED VISCOUS FLOW (3) **CANCELLED**  
 SEC. 001  
 TEXT: Class Notes  
 TIME: Tuesday & Friday 2:30 – 3:45 B112  
 PROFESSOR: Dr. Trevor Moulden

Critical review of significance to governing equations. Nature of boundary layer approximation as singular perturbation problem. Uniqueness and existence of solutions. Applications of group theory. Special problem areas of interest to students. *Prerequisite(s): 512, Continuum Mechanics and Mathematics 562.*

AE 690 ADVANCED TOPICS IN AE: ADVANCED RADIATION HEAT TRANSFER (3)  
 SEC. 001 (Same as ME 613)  
 TIME: Monday & Thursday 1:05 – 2:15 F253  
 TEXT: TBD (Various, including Siegel and Howell, Griem, Buolos)  
 PROFESSOR: Dr. Trevor Moeller

Radiation heat transfer in absorbing, emitting and scattering media; interaction of thermal radiation with conduction and convection heat transfer. Application Monte Carlo simulation techniques will be of primary interest.

### **AVIATION SYSTEMS**

AS 500 MASTER'S THESIS (3, 6, or 9)  
SEC. 001 Corda  
003 Martos  
004 Muratore  
005 Pujol  
006 Solies

AS 502 REGISTRATION USE OF FACILITIES (1 –15)  
SEC. 001 Corda  
003 Martos  
004 Muratore  
005 Pujol  
006 Solies

AS 503 AIR VEHICLES (3)  
SEC. 001 (Video Recorded) (Same as AE 515)  
TEXT: 1. Asselin, Mario, An Introduction to Aircraft Performance; AIAA Education Series, Reston, VA, 1997  
2. Kinney, Jeremy R., Airplanes – The Life Story of a Technology, John Hopkins University Press, Baltimore, MD, 2008  
TIME: Tuesday & Friday 1:00 – 2:30 E111  
PROFESSOR: Dr. Peter Solies

Current capabilities and future requirements for civilian and military air vehicles. Parameters significant for air vehicle type selection, integration of air vehicle into aviation systems.

**COMMENT:** The course 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.

AS 508 FLIGHT TEST INSTRUMENTATION (3)  
SEC. 001 (Video Recorded)  
TEXT: TBD  
TIME: Monday & Thursday 1:30 – 2:45 E113  
PROFESSOR: John Muratore

Principles of measurement, measuring devices with views toward both ground and flight aerospace testing: measurement fundamentals, sensors for specific parameters (e.g. temperature, heat flux, flow rate, pressure, acceleration, vibration, strain, and humidity), data bus integration, signal condition, telemetry, and fabrication.

**COMMENT:** The objective of this course is to familiarize the student with the principles of flight test instrumentation sufficient to allow the student to plan and instrument an aircraft to conduct a series of tests. Subjects to be covered include basic principles of measurement theory, components of an instrumentation system, specific sensors used for flight test and the signal conditioning required to deal with typical flight test sensors. The class will also cover interfacing and data acquisition with digital sensors that output their results in computer compatible format such as serial data streams. The class will make extensive use of LabVIEW to experiment with sensors and instruments in the laboratory experiments.

**This class will be videotaped and is being offered to DISTANCE Students. All Distance students will be required to purchase a NI USB-6008 Student Kit with LabVIEW student edition from National Instruments (approximate cost \$170.00) in order to perform required laboratory assignments.**

AS 510 SPECIAL TOPICS IN AVIATION SYSTEMS: INTRODUCTION TO  
AVIONICS I (3)  
SEC 001 (Video Recorded)  
TEXT: Avionics Training: Systems, Installation and Troubleshooting; Len Buckwalter; Avionics Communications, Inc.; Latest Ed.; ISBN# 1-88-5544-21-9.  
TIME: Tuesday & Friday 10:30 – 11:45 E113  
PROFESSOR: Dr. Alfonso Pujol, Jr.

Avionic systems and communications, including analog and digital systems, aviation bands and frequencies, satellite and aircraft communications, selective calling, emergency locator transmitter, omni-directional range, instrument and microwave landing systems, automatic direction finder, and other topics are also discussed.

AS 522 EXPERIMENTAL FLIGHT MECHANICS: FIXED WING STABILITY AND  
CONTROL (3)  
SEC. 001  
TEXT: Ralph D. Kimberlin: Flight Testing of Fixed Wing Aircraft; AIAA Education Series; ISBN# 1-56347-564-2.  
TIME: Tuesday & Friday 9:30 – 11:45 Airport Classroom  
PROFESSOR: Borja Martos

This course will cover fundamental theories, flight test techniques, and data collection and analyses for fixed wing aircraft stability and control. Topics will include static and dynamic longitudinal stability, longitudinal maneuvering stability and control, static and dynamic lateral-directional stability, lateral control power, and departure testing. Course structure will be weekly classroom academics with approximately 4-6 flight labs evenly distributed during the semester. This course is designed for full time attendance during the semester and will not be offered as a Distance Learning course. *Prerequisite: AS 521 Fixed Wing Performance or consent of instructor.*

AS 550 PROJECT AVIATION SYSTEMS (3)  
 SEC. 001 Corda  
 003 Martos  
 004 Muratore  
 005 Pujol  
 006 Solies

**BIOMEDICAL ENGINEERING**

\*BE 587 DYNAMIC MODELING AND SIMULATION (3) **CANCELLED**  
 SEC. 002 (Interactive Video) (Same as ME 587)  
 TEXT: An Introduction to Mathematical Modeling; Edward A. Bender; Dover Publications;  
 ISBN# 0-486-41180-X.  
 TIME: Monday & Thursday 8:30 – 9:45 E113  
 PROFESSOR: Dr. Kenneth Kimble

Modeling and analysis of physical systems. Systems and parameter identification. Mathematical modeling methods and approximations. Digital simulation techniques and practices. Design and control applications. (Same as Mechanical Engineering 587).

**COMPUTER SCIENCE**

CS 471 NUMERICAL ANALYSIS (3)  
 SEC. 001 (Video Recorded) (Same as Math 471)  
 TEXT: TBD  
 TIME: Monday & Wednesday 2:30 – 3:45 E111  
 PROFESSOR: Dr. Trevor Moulden

Numerical computation, instabilities, and rounding. Interpolation and approximation by polynomials and piecewise polynomials. Quadrature and numerical solution of initial and boundary value problems of ordinary differential equations, stiff systems. *Prerequisite: Numerical Algorithms I or consent of instructor.*

**ELECTRICAL and COMPUTER ENGINEERING**

ECE 500 MASTER'S THESIS (3, 6, or 9)  
 SEC. 001 Bomar  
 019 Smith  
 020 Whitehead  
 021 Pujol

ECE 501 PROJECT IN LIEU OF THESIS (3)  
 SEC. 001 Bomar  
 004 Smith  
 005 Whitehead  
 006 Pujol

ECE 502 REGISTRATION USE OF FACILITIES (1-15)  
002 Bomar  
003 Smith  
004 Whitehead  
005 Pujol

ECE 600 DOCTORAL RESEARCH AND DISSERTATION (3-15)  
SEC. 020  
PROFESSOR: Dr. Bruce Bomar

*Repeatability: May be repeated.*

### **ENGINEERING SCIENCE**

ES 500 MASTER'S THESIS (1 - 15)  
SEC. 001 Moeller  
010 Vakili  
011 Majdalani  
012 Steinhoff  
014 Antar

\*ES 533 DYNAMICS (3) **CANCELLED**  
SEC. 002 (Same as AE 533/ME 533)  
TEXT: TBD  
TIME: Monday & Thursday 1:00 – 2:15 E211  
PROFESSOR: Dr. Basil Antar

Kinematics and dynamics of particles in three dimensions. Rotating coordinate systems. Hamilton's principle. Lagrange's equations of motion. Kinematics and dynamics of rigid bodies. (Same as Mechanical Engineering 533; Biomedical Engineering 534; Engineering Science 534). (DE) Prerequisite(s): 391 or Mathematics 431 and an undergraduate vibrations course.

ES 541 FLUID MECHANICS I (3)  
SEC. 001 (Same as AE 541/ME 541)  
TEXT: R.L. Panton: Incompressible Flow: Wiley Interscience; 3rd; ISBN# 047126122X.  
TIME: Tuesday & Friday 9:15 – 10:30 E211  
PROFESSOR: Dr. Basil Antar

Derivation of equations governing flow of inviscid and viscous fluids (conservation of mass, Newton's second law, conservation of energy). Equations of state and constitutive relations. Euler and Navier-Stokes forms and nondimensionalization. Exact solutions and introduction to potential and boundary-layer flows. (Same as Aerospace Engineering 541; Mechanical Engineering 541). Prerequisite: AE 511 or equivalent, or consent of instructor.

\*ES 551 FINITE ELEMENTS FOR ENGINEERING APPLICATIONS (3) **CANCELLED**  
SEC. 003 (Same as AE 571 & ME 561)  
TEXT: Class Notes/Handouts  
TIME: Tuesday & Friday 1:00 – 2:15 B210  
PROFESSOR: Dr. Kenneth Kimble

Modern computational theory applied to conservation principles across the engineering sciences. Weak forms, extremization, boundary conditions, discrete implementation via finite element, finite difference, finite volume methods. Asymptotic error estimates, accuracy, convergence, stability. Linear problem applications in 1, 2 and 3 dimensions, extensions to non-linearity, non-smooth data, unsteady, spectral analysis techniques, coupled equation systems. Computer projects in heat transfer, structural mechanics, mechanical vibrations, fluid mechanics, heat/mass transport. (*Same as Aerospace Engineering 571; Biomedical Engineering 561; Mechanical Engineering 561*). *Comment(s): Bachelor's degree in engineering or natural science required.*

ES 552 COMPUTATIONAL FLUID DYNAMICS (3)  
SEC. 001 (Same as AE 572 & ME 562)  
TEXT: Monday & Thursday 4:00 – 5:15 B210  
TIME: TBD  
PROFESSOR: Dr. John Steinhoff

Modern techniques in computing fluid dynamic flows will be covered. First, different classes of flows will be reviewed, and the most appropriate methods that satisfy both the physics requirements (capture the essential physics), and the engineering requirements (time required to set up and compute solutions) will be discussed. Methods suited for general configurations (blunt bodies) and methods suited for streamlined bodies, such as aircraft will be contrasted. The types of problems for which incompressible methods or compressible methods are best used, as well as those for which turbulence modeling is required will be covered. Accuracy issues and requirements will be covered, both for fully resolved flows and flows where turbulence modeling is needed. Particular equations to be covered include Potential, Euler, and (for laminar flow) Navier Stokes, as well as “Large Eddy Simulation” and “Reynolds Averaged Navier Stokes” for modeling turbulent flows. For compressible flows, methods involving shock capturing, with higher order schemes and limiters will be covered. For general flows, methods involving efficient treatment of concentrated vortices, passive scalar transport, as well as free surfaces will also be covered. (*Same as Aerospace Engineering 572; Mechanical Engineering 562*).

ES 581 SPECIAL TOPICS: MATHEMATICAL TREATMENT OF WAVES (4)  
SEC. 002  
TIME: Tuesday & Friday 2:30-3:45 B210  
TEXT: TBD  
PROFESSOR: Dr. John Steinhoff

Mechanics problems related to recent developments. *Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of Instructor.*

ES 581 SPECIAL TOPICS: INTRODUCTION TO ELECTRIC PROPULSION (3)  
SEC. 003 (Same as AE 599 SEC. 001/ME 599 SEC. 004)  
TIME: Tuesday & Friday 10:45 – 12:00 F252  
TEXT: Physics of Electric Propulsion; Robert G. Jahn; Dover Publications; ISBN 10: 0486450406; ISBN 13: 978-0486450407 (*Textbook is available from Amazon.com*)  
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.*

ES 595 SEMINAR: COMPUTATIONAL MECHANICS (1)  
SEC. 001 PROFESSOR: Dr. Ahmad Vakili

ES 600 DOCTORAL AND RESEARCH DISSERTATION (3, 6, 9)  
SEC. 006 Vakili  
007 Majdalani  
008 Steinhoff  
010 Antar  
014 Moeller

ES 651 ADVANCED TOPICS IN COMPUTATIONAL FLUID DYNAMICS (3)  
SEC. 001 (Same as AE 661 & ME 651)  
TEXT: TBD  
TIME: TBD  
PROFESSOR: Dr. Joe Majdalani

Modern approximation theory for Euler and Navier-Stokes conservation systems, compressible flow, hyperbolic forms, boundary conditions. Weak forms, extremization, finite element/finite volume/flux vector discrete implementations, a priori error estimates, accuracy, convergence stability. Numerical linear algebra, approximate factorization, sparse matrix methods. Dissipation, Fourier spectral analysis, smooth and non-smooth solutions. (*Same as Aerospace Engineering 661; Mechanical Engineering 651*). *Prerequisite(s): 552.*

### **ENGINEERING MANAGEMENT**

EM 501 CAPSTONE PROJECT (3-6)  
SEC. 001 Dr. Gregory Sedrick  
SEC. 002 Dr. Denise Jackson

Application-oriented project to show competence in major academic area. Enrollment limited to Engineering Management students in non-thesis program. May be repeated. Maximum 6 hours.

EM 502 REGISTRATION FOR USE OF FACILITIES FOR EM STUDENTS (1-15)  
SEC. 001 Dr. Gregory Sedrick  
SEC. 002 Dr. Denise Jackson

Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before a degree in Industrial Engineering (Engineering Management) is completed. May not be used toward degree requirements.

EM 532 PROUCTIVITY AND QUALITY ENGINEERING (3)  
SEC. 001 UTSI students participating at Tullahoma or Oak Ridge  
SEC. 002 UTSI students participating elsewhere  
SEC. 003 UTK students participating at Knoxville DE classrooms  
SEC. 004 UTK students participating elsewhere  
TEXT: [http://www.utsi.edu/academics/ieandem/student\\_services.htm](http://www.utsi.edu/academics/ieandem/student_services.htm)  
TIME: Tuesday 4:00 – 6:35 E113  
PROFESSOR: Dr. Denise Jackson

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 UTSI students participating at Tullahoma and Oak Ridge  
SEC. 002 UTSI students participating elsewhere  
SEC. 003 UTK students participating at Knoxville DE classrooms  
SEC. 004 UTK students participating elsewhere  
TEXT: [http://www.utsi.edu/academics/ieandem/student\\_services.htm](http://www.utsi.edu/academics/ieandem/student_services.htm)  
TIME: Monday 4:00 – 6:35 E113  
PROFESSOR: Dr. Gregory Sedrick

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 UTSI students participating at Tullahoma or Oak Ridge  
SEC. 002 UTSI students participating elsewhere  
SEC. 003 UTK students participating at Knoxville DE classrooms  
SEC. 004 UTK students participating elsewhere  
TEXT: [http://www.utsi.edu/academics/ieandem/student\\_services.htm](http://www.utsi.edu/academics/ieandem/student_services.htm)  
TIME: Thursday 4:00 – 6:35 E113  
PROFESSOR: Dr. Denise Jackson

Survey of management analysis and control systems through IE 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. Not for credit for students with undergraduate degrees in industrial engineering.

EM 539 STRATEGIC MANAGEMENT IN TECHNICAL ORGANIZATIONS (3)  
SEC. 001 UTSI students participating at Tullahoma or Oak Ridge  
SEC. 002 UTSI students participating elsewhere  
SEC. 003 UTK students participating at Knoxville DE classrooms  
SEC. 004 UTK students participating elsewhere  
TEXT: [http://www.utsi.edu/academics/ieandem/student\\_services.htm](http://www.utsi.edu/academics/ieandem/student_services.htm)  
TIME: Wednesday 4:00 – 6:35 E113  
PROFESSOR: Dr. Gregory Sedrick

Strategic planning process and strategic management in practice, corporate vision and mission; product, market, organizational, and financial strategies; external factors; commercialization of new analysis to determine commercial feasibility of new ventures. *Prerequisite(s): EM 534 and IE 518 or consent of instructor.*

EM 595 SPECIAL TOPICS IN ENGINEERING MANAGEMENT (3)  
SEC. 001  
PROFESSOR: Dr. Denise Jackson



EM 600 DOCTORAL RESEARCH AND DISSERTATION (3-15)  
SEC. 001 Sedrick  
SEC. 002 Jackson

### **INDUSTRIAL ENGINEERING**

IE 500 MASTER'S THESIS (1-15)  
SEC. 005 Dr. Denise Jackson as main advisor  
SEC. 006 Dr. Gregory Sedrick as main advisor

IE 515 ADVANCED PRODUCTION AND INVENTORY SYSTEMS (3)  
(CENTRA Web-based Course from UTK)  
SEC. 003 UTSI students participating at Tullahoma or Oak Ridge  
SEC. 005 UTSI students participating elsewhere  
TEXT: [http://www.utsi.edu/academics/ieandem/student\\_services.htm](http://www.utsi.edu/academics/ieandem/student_services.htm)  
TIME: Thursday 12:40 – 1:55 (EST)  
PROFESSOR: Dr. Xiaoyan Zhu

Advanced topics in production planning and inventory systems. Material requirements planning; production planning and master scheduling; just-in-time concepts; distribution requirements planning; and other selected topics. *Prerequisite: 402 or consent of instructor.*

IE 516 STATISTICAL METHODS IN INDUSTRIAL ENGINEERING (3)  
SEC. 001 UTK students participating at Knoxville DE classrooms  
002 UTK students participating elsewhere  
003 UTSI students participating at Tullahoma or Oak Ridge  
004 UTSI students participating elsewhere  
TEXT: Applied Statistics and Probability for Engineers, 4<sup>th</sup> Edition;  
Douglas C. Montgomery, George C. Runger; John Wiley and Sons; 4<sup>th</sup> Edition; ISBN  
#:978-0-471-74589-1. [http://www.utsi.edu/academics/ieandem/student\\_services.htm](http://www.utsi.edu/academics/ieandem/student_services.htm)  
TIME: Tuesday & Friday 10:15 – 11:30 E111  
PROFESSOR: Dr. Montgomery Smith

Application of classical statistical techniques to industrial engineering problems. Statistics and statistical thinking in managerial context of organizational improvement; descriptive statistics and distribution theory; relationship between statistical process control techniques and classical statistical tools; parameter estimation and hypothesis testing; goodness-of-fit testing; linear regression and correlation; analysis of variance; single and multiple factor experimental design. *Prereq: IE 251 - Probability and Statistics for Scientists and Engineers, or equivalent.*

IE 526 ADVANCED APPLICATIONS OF SYSTEMS MODELING AND  
SIMULATION (3)  
(CENTRA Web-based Course from UTK)  
SEC. 003 UTSI students participating at Tullahoma or Oak Ridge  
SEC. 004 UTSI students participating elsewhere  
TEXT: [http://www.utsi.edu/academics/ieandem/student\\_services.htm](http://www.utsi.edu/academics/ieandem/student_services.htm)  
TIME: Thursday 2:10 – 3:25  
PROFESSOR: Dr. Xueping Li

Modeling of discrete, continuous, and combined systems using current simulation software. Development of flexible simulation models to enhance accessibility of simulation models for

experimentation. Development of distributed simulation models to represent and test production and supply chain systems. (*Same as Management Science 526*). Prerequisite(s): 306 or 525.

IE 600 DOCTORAL RESEARCH/DISSERATION (3-15)  
SEC. 003 Dr. Denise Jackson  
SEC. 007 Dr. Gregory Sedrick

IE 691 ADVANCED TOPICS IN ENGINEERING MANAGEMENT (3)  
SEC. 003 Sedrick

### **MATERIAL SCIENCE & ENGINEERING**

MSE 500 MASTER'S THESIS (3, 6, 9)  
SEC. 002 PROFESSOR: Dr. William Hofmeister  
SEC. 003 Dr. Jackie Johnson  
SEC. 004 Dr. George Murray

MSE 503 GRADUATE SEMINAR IN MATERIALS SCIENCE AND ENGINEERING (1)  
SEC. 002  
TEXT: No text required for this course  
TIME: Wednesday 2:30 – 3:45 CLA Conference Room  
PROFESSOR: Dr. William Hofmeister

Admission to MSE graduate program required. All MSE students are required to attend this course.

MSE 512 FUNDAMENTALS OF MATERIALS SCIENCE AND ENGINEERING I (3)  
SEC. 002  
TITLE: TBD  
TIME: Tuesday & Friday 2:30 – 3:45 F252  
PROFESSOR: Dr. Jackie Johnson

Physical properties: electrical and thermal conduction, elementary quantum physics, band theory, dielectric materials, magnetic and optical properties. Mechanical behavior: stress and strain at a point, elastic constitutive equations, phenomenological bulk behavior, and deformation mechanisms.

MSE 540 BASIC POLYMER CHEMISTRY (3)  
SEC. 002  
TEXT: TBD  
TIME: Monday & Thursday 1:00 – 2:15 B210  
PROFESSOR: Dr. Zhongren Yue

Introductory concepts and definitions of polymers. Polymer solution properties, conformation and molecular weight characterization. Fundamentals of polymer science and engineering. The structure and characterization of polymers. Rheological and viscoelastic behavior: relaxations and transitions, rubber elasticity. Crystallinity, morphology and deformation of crystalline polymers. Compounding and processing of plastics. Description of major structure, properties and utilization of polymers and polymer materials-plastics, fibers, rubbers, composites, etc.

\*MSE 576 SPECIAL TOPICS IN MATERIALS SCIENCE ENGINEERING: **CANCELLED**  
ELECTROCHEMICAL PROCESSES IN MATERIALS (3)  
SEC. 003 (Video Recorded)  
TEXT: Various  
TIME: Tuesday & Friday 4:00 – 5:15 E111  
PROFESSOR: Dr. George Murray

This course provides a thorough discussion of electrochemistry, including a variety of topics: thermodynamic and transport properties of aqueous and nonaqueous electrolytes, the electrode/electrolyte interface, and the kinetics of electrode processes. It also covers electrochemical characterization with regards to d.c. techniques (controlled potential, controlled current) and a.c. techniques (voltametry and impedance spectroscopy). Applications of the following will also be discussed: electrowinning, electrorefining, electroplating, and electrosynthesis, as well as electrochemical power sources (batteries and fuel cells), electroactive polymers, organic photovoltaics, organic light emitting diodes, corrosion and corrosion control.

MSE 600 DOCTORAL RESEARCH AND DISSERTATION (3, 6, 9)  
SEC. 002 PROFESSOR: Dr. William Hofmeister  
003 Dr. Jackie Johnson

## MATHEMATICS

MATH 404 APPLIED VECTOR CALCULUS (3)  
SEC. 001 (Video Recorded)  
TEXT: Wilfred Kaplan: Advanced Calculus; 5<sup>th</sup> ed.; Addison Wesley; ISBN# 0-201-79937-5.  
TIME: Monday & Thursday 10:00 – 11:15 E113  
PROFESSOR: Dr. Kenneth Kimble

Refresher of one-variable calculus; function of several variables; partial derivatives; Vectors and vector fields; curves and surfaces; multiple, line, and surface integrals. Green and Stokes' theorems.

MATH 471 NUMERICAL ANALYSIS (3)  
SEC. 001 (Video Recorded at UTSI)  
TEXT: Numerical Analysis; Borden R.L., Faires, J.P.; Thompson Brooks/Cole; 8<sup>th</sup> edition; ISBN# 0 534 39 200 8.  
TIME: Monday & Wednesday 2:30 – 3:45 E111  
PROFESSOR: Dr. Trevor Moulden

Numerical computation, instabilities, and rounding. Interpolation and approximation by polynomials and piecewise polynomials. Quadrature and numerical solution of initial and boundary value problems of ordinary differential equations, stiff systems. *Prerequisite: Numerical Algorithms I or consent of instructor.*

MATH 500 MASTER'S THESIS (3, 6, or 9)  
SEC. 001 PROFESSOR: Dr. Gregory Sedrick

MATH 517 MATHEMATICAL METHODS IN PHYSICS I (3)  
SEC. 002 (Same as Phys 571)  
TIME: Wednesday 1:00 – 3:30 F252

TEXT: Mathematical Methods for Physicists; George Arfken and Hans Weber; Elsevier; 6<sup>th</sup> Edition (2005); ISBN #: 0-12-059876-0.

PROFESSOR: Dr. Christian Parigger

Linear vector spaces, matrices, tensors, curvilinear coordinates, functions of a complex variable, partial differential equations and boundary value problems, Green's functions, integral transforms, integral equations, spherical harmonics, Bessel functions, calculus of variations. (Same as Math 517.) *Recommended Background: Advanced calculus and differential equations.* The course syllabus (lecture series and exercises) is designed to be attractive for pure and applied Science students. References to classical books such as "Methods of Mathematical Physics Vol I and II" by Courant & Hilbert will be made over and above references to classical Physics problems usually found in "Classical Mechanics," "Electrodynamics," "Quantum Mechanics," "Statistical Mechanics," or "Solid State Physics." This course is followed in spring 2011 by the PHYS572 "Mathematical Methods in Physics II" Also, while PHYS572 is cross-referenced as the same as MATH518, this course qualifies as a Physics portion for students seeking the so-called "Interdisciplinary Graduate Minor in Computer Science." For Fall 2010 and Spring 2011, UT's electronic "blackboard" will be used.

MATH 519 SEMINAR IN APPLIED MATHEMATICS (1-3)

SEC. 002

TEXT: Notes provided by Instructor

TIME: TBD

PROFESSOR: TBD

*Repeatability: May be repeated. Maximum 12 hours.*

## **MECHANICAL ENGINEERING**

ME 500 MASTER THESIS (3)

SEC. 001 Moeller

022 Vakili

023 Majdalani

024 Steinhoff

026 Antar

ME 511 HEAT TRANSFER I (3)

SEC. 001 (Interactive Video)

TEXT: G. E. Meyers: Analytical Methods in Conduction Heat Transfer; Amcht Publishing; ISBN# 0966606507.

TIME: Tuesday & Friday 1:00 – 2:15 E113

PROFESSOR: Dr. Basil Antar

Thermal physical properties of material. Analysis of steady-state and time dependent heat conduction by analytical methods. Numerical solution of heat conduction equation.

ME 521 THERMODYNAMICS I (3)

SEC. 001 (Video Recorded)

TEXT: Thermodynamics, and Engineering Approach; Y. Cengel and M. Boles; Half.com\_Books\_Thermodynamics\_An Engineering Approach.webarchive;

Amazon.com\_Thermodynamics\_An Engineering Approach w version 1.2 CD  
ROM\_Yunus A. Cengel, Michael Boles\_Books.webarchive.

TIME: Wednesday & Friday 8:15 – 9:30 E113  
PROFESSOR: Dr. Robert W. McAmis

Macroscopic thermodynamics, including First and Second Law analyses and applications, availability, phase and chemical equilibrium, combustion, gas and liquid mixtures, property relations, determination of thermodynamic properties from molecular structure and spectroscopic data.

\*ME 525 COMBUSTION AND CHEMICALLY REACTING FLOWS (3) **CANCELLED**  
SEC: 001 (Video Recorded)

TEXT: TBD

TIME: Monday & Thursday 10:00 – 11:15 E111  
PROFESSOR: Dr. Robert W. McAmis

Fundamentals: thermochemistry, chemical kinetics and conservation equations; phenomenological approach to laminar flames; diffusion and premixed flame theory; single droplet combustion; deflagration and detonation theory; stabilization of combustion waves in laminar streams; flammability limits of premixed laminar flames; introduction to turbulent flames. *Prerequisite(s): 522 and 541 or consent of instructor.*

\*ME 533 DYNAMICS (3) **CANCELLED**  
SEC. 002 (Same as AE 533/ES 533)

TEXT: TBD

TIME: Monday & Thursday 1:00 – 2:15 E211  
PROFESSOR: Dr. Basil Antar

Kinematics and dynamics of particles in three dimensions. Rotating coordinate systems. Hamilton's principle. Lagrange's equations of motion. Kinematics and dynamics of rigid bodies. *(Same as Mechanical Engineering 533; Biomedical Engineering 534; Engineering Science 534). (DE) Prerequisite(s): 391 or Mathematics 431 and an undergraduate vibrations course.*

ME 540 PERTURBATION METHODS IN ENGINEERING I (3)  
SEC. 001 (Videotaped)

TIME: Monday & Wednesday 5:15 – 6:30 TBD

TEXT: David C. Wilcox; Perturbation Methods in the Computer Age; DCW Industries, Inc.; 1995.

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; Poincare'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 541 FLUID MECHANICS I (3)  
SEC. 001 (Same as AE 541 & ES 541)

TEXT: R.L. Panton; Incompressible Flow; Wiley Interscience; 3<sup>rd</sup> Ed.; ISBN# 047126122X.

TIME: Tuesday & Friday 9:15 – 10:30 E211

PROFESSOR: Dr. Basil Antar

Derivation of equations governing flow of inviscid and viscous fluids (conservation of mass, Newton's second law, conservation of energy). Equations of state and constitutive relations. Euler and Navier-Stokes forms and nondimensionalization. Exact solutions and introduction to potential and boundary-layer flows. (*Same as Aerospace Engineering 541; Engineering Science 541*). Prerequisite: AE 511 or equivalent, or consent of instructor.

ME 561 FINITE ELEMENTS FOR ENGINEERING APPLICATIONS (3)  
SEC. 003 (Same as AE 571 & ES 551)  
TEXT: Class Notes/Handouts  
TIME: Tuesday & Friday 1:00 – 2:15 B210  
PROFESSOR: Dr. Kenneth Kimble

Modern computational theory applied to conservation principles across the engineering sciences. Weak forms, extremization, boundary conditions, discrete implementation via finite element, finite difference, finite volume methods. Asymptotic error estimates, accuracy, convergence, stability. Linear problem applications in 1, 2 and 3 dimensions, extensions to non-linearity, non-smooth data, unsteady, spectral analysis techniques, coupled equation systems. Computer projects in heat transfer, structural mechanics, mechanical vibrations, fluid mechanics, heat/mass transport. (*Same as Aerospace Engineering 571; Biomedical Engineering 561; Mechanical Engineering 561*). Comment(s): Bachelor's degree in engineering or natural science required.

ME 562 COMPUTATIONAL FLUID DYNAMICS (3)  
SEC. 001 (Same as AE 572 & ES 552)  
TEXT: TBD  
TIME: Monday & Thursday 4:00 – 5:15 B210  
PROFESSOR: Dr. John Steinhoff

Modern techniques in computing fluid dynamic flows will be covered. First, different classes of flows will be reviewed, and the most appropriate methods that satisfy both the physics requirements (capture the essential physics), and the engineering requirements (time required to set up and compute solutions) will be discussed. Methods suited for general configurations (blunt bodies) and methods suited for streamlined bodies, such as aircraft will be contrasted. The types of problems for which incompressible methods or compressible methods are best used, as well as those for which turbulence modeling is required will be covered. Accuracy issues and requirements will be covered, both for fully resolved flows and flows where turbulence modeling is needed. Particular equations to be covered include Potential, Euler, and (for laminar flow) Navier Stokes, as well as "Large Eddy Simulation" and "Reynolds Averaged Navier Stokes" for modeling turbulent flows. For compressible flows, methods involving shock capturing, with higher order schemes and limiters will be covered. For general flows, methods involving efficient treatment of concentrated vortices, passive scalar transport, as well as free surfaces will also be covered. (*Same as Aerospace Engineering 572; Engineering Science 552*).

ME 581 ROCKET PROPULSION I (3)  
SEC. 001 (Video Recorded)  
TEXT: Rocket Propulsion Elements; George P. and Biblarz, Oscar; Wiley; 7<sup>th</sup> Edition; ISBN# 041326429.  
TIME: Monday & Wednesday 4:00 – 5:00 E111  
PROFESSOR: Dr. Joseph Majdalani

Rocket propulsion fundamentals; thermodynamics of non-reacting 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.

ME 584 TURBOMACHINERY I (3)  
 SEC. 002  
 TEXT: Jack D. Mattingly: Elements of Gas Turbine Propulsion; AIAA Educator Series,  
 Latest ed., ISBN# 1-56347-778-5.  
 TIME: Tuesday & Thursday 4:00 – 5:15 E211  
 PROFESSOR: Dr. Milt Davis

The course will provide a review of gas dynamics, an analysis of ideal cycle analysis of turbine engines along with engine design concepts. Methods for analyzing engine performance for turbojets, turbofans and turboprops will be studied for both ideal and real cycles. The course will emphasize the use of numerical simulations as tools for use in analyzing gas turbine engine performance and connect engine testing with analysis processes.

\*ME 587 DYNAMIC MODELING AND SIMULATION (3) **CANCELLED**  
 SEC. 002 (Interactive Video) (Same as BE 587)  
 TEXT: An Introduction to Mathematical Modeling; Edward A. Bender; Dover Publications;  
 ISBN# 0-486-41180-X.  
 TIME: Monday & Thursday 8:30 – 9:45 E113  
 PROFESSOR: Dr. Kenneth Kimble

Modeling and analysis of physical systems. Systems and parameter identification. Mathematical modeling methods and approximations. Digital simulation techniques and practices. Design and control applications. (Same as Biomedical Engineering 587).

ME 590 SELECTED ENGINEERING PROBLEMS (2-6)  
 SEC. 001 Antar  
 SEC. 003 Smith  
 SEC. 004 Majdalani

Enrollment limited to students in the problems option. (Grading Restriction: Satisfactory/No Credit grading only). *Registration Permission: Consent of advisor.*

ME 595 SEMINAR: AEROSPACE AND MECHANICAL SYSTEMS (1)  
 SEC. 001 PROFESSOR: Dr. Ahmad Vakili

ME 599 SPECIAL TOPICS: INTRODUCTION TO ELECTRIC PROPULSION (3)  
 SEC. 004 (Same as AE 599 SEC. 001/ES 581 SEC. 003)  
 TIME: Tuesday & Friday 10:45 – 12:00 F252  
 TEXT: Physics of Electric Propulsion; Robert G. Jahn; Dover Publications; ISBN 10:  
 0486450406; ISBN 13: 978-0486450407 (*Textbook is available from Amazon.com*)  
 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 600 DOCTORAL AND RESEARCH DISSERTATION (3 - 15)  
 SEC. 015 Vakili  
 016 Majdalani  
 017 Steinhoff

019 Antar  
029 Moeller

ME 613 ADVANCED RADIATION HEAT TRANSFER (3)  
SEC. 001 (Same as AE 690)  
TIME: Monday & Thursday 1:00 –2:15 F253  
TEXT: TBD (Various, including Siegel and Howell, Griem, Buolos)  
PROFESSOR: Dr. Trevor Moeller

Radiation heat transfer in absorbing, emitting and scattering media; interaction of thermal radiation with conduction and convection heat transfer. Application Monte Carlo simulation techniques will be of primary interest.

ME 651 ADVANCED TOPICS IN COMPUTATIONAL FLUID DYNAMICS (3)  
SEC. 001 (Same as AE 661 & ES 651)  
TEXT: TBD  
TIME: TBD  
PROFESSOR: Dr. Joe Majdalani

Modern approximation theory for Euler and Navier-Stokes conservation systems, compressible flow, hyperbolic forms, boundary conditions. Weak forms, extremization, finite element/finite volume/flux vector discrete implementations, a priori error estimates, accuracy, convergence stability. Numerical linear algebra, approximate factorization, sparse matrix methods. Dissipation, Fourier spectral analysis, smooth and non-smooth solutions. (*Same as Aerospace Engineering 661; Engineering Science 651*). *Prerequisite(s): 552.*

## **PHYSICS**

PHYS 500 MASTER'S THESIS (3, 6, or 9)  
SEC. 002 Crater  
003 Lewis  
004 Parigger  
005 Chen  
006 Davis  
007 McGregor

PHYS 503 PHYSICS COLLOQUIUM (1)  
SEC. 002 (REQUIRED OF ALL PHYSICS STUDENTS) (Same as MSE 503)  
TEXT: No text required for this course  
TIME: 2<sup>nd</sup>/4<sup>th</sup> Thursday 3:00 – 4:30 F252  
PROFESSOR: Dr. Christian Parigger

Physics seminar presentations of current topics by students, faculty, and invited speakers.

PHYS 511 THEORETICAL PHYSICS (3)  
SEC. 001  
TIME: Monday & Thursday 8:45 – 10:00 B210



TEXT: Theoretical Physics – Mechanics; Constant; Addison Wesley.

PROFESSOR: Dr. Horace Crater

This course will serve as a bridge for students wishing to enter the physics program at UTSI who do not have a physics undergraduate degree or whose background needs expanding before taking the core physics courses of Mechanics (Phys 531), Electrodynamics (Phys 541), quantum mechanics (Phys. 521-22), and statistical mechanics (Phys. 551). It will also serve those students not in the physics program who need the background to take these core courses. The mathematics required will be calculus and ordinary differential equations. Any math beyond this will be taught only as needed by the physics developed in the course. This course will be a general physics course at an intermediate level and include concepts and applications in applied physics. Topics included for the first semester will be kinematics and dynamics of one-body, two-body, and rigid body motion, elasticity, fluid and heat flow, and thermodynamics. The second semester will include topics in kinetic theory, statistical mechanics, electrostatics, magneto-statics, electrodynamics, and physical optics. Special topic may be included depending on student interest. This course in the past has been taught so as to be self paced.

**\*PHYS 513 PROBLEMS IN THEORETICAL PHYSICS I (3) CANCELLED**

SEC. 002 (Interactive from UTK, Distance Ed)

TEXT: Check with Instructor

TIME: Wednesday 10:15 – 11:30 E113

PROFESSOR: Dr. Marianne Breinig (UTK Faculty)

Fundamentals of physics: classical mechanics (Newtonian mechanics, Lagrangian and Hamiltonian dynamics) and electrostatics and magnetostatics.

PHYS 531 CLASSICAL MECHANICS (3)

SEC. 002

TEXT: TBD

TIME: Monday & Thursday 10:45 – 12:00 B210

PROFESSOR: Dr. Horace Crater

Variational formulation, Lagrange's and Hamilton's equations, constraints, canonical transformations, Hamilton-Jacobi theory and action-angle variables.

PHYS 551 STATISTICAL MECHANICS (3)

SEC. 002

TEXT: TBD

TIME: Tuesday & Friday 1:00 – 2:15 F252

PROFESSOR: Dr. Christian Parigger

Ergodic theory, classical ensemble theory, quantum mechanical ensembles, relation of statistical mechanics to thermodynamics, transport theory and approach to equilibrium, phase transition, fluctuations and correlations. *Prerequisite(s): 521, 531 and 571.*

PHYS 571 MATHEMATICAL METHODS IN PHYSICS I (3)

SEC. 002 (Same as Math 517)

TIME: Wednesday 1:00 – 3:00 F252

TEXT: Mathematical Methods for Physicists; George Arfken and Hans Weber; Elsevier; 6<sup>th</sup> Edition (2005); ISBN #: 0-12-059876-0.

PROFESSOR: Dr. Christian Parigger

Linear vector spaces, matrices, tensors, curvilinear coordinates, functions of a complex variable, partial differential equations and boundary value problems, Green's functions, integral

transforms, integral equations, spherical harmonics, Bessel functions, calculus of variations. (Same as Math 517.) *Recommended Background: Advanced calculus and differential equations.* The course syllabus (lecture series and exercises) is designed to be attractive for pure and applied Science students. References to classical books such as “Methods of Mathematical Physics Vol I and II” by Courant & Hilbert will be made over and above references to classical Physics problems usually found in “Classical Mechanics,” “Electrodynamics,” “Quantum Mechanics,” “Statistical Mechanics,” or “Solid State Physics.” This course is followed in spring 2011 by the PHYS572 “Mathematical Methods in Physics II” Also, while PHYS572 is cross-referenced as the same as MATH518, this course qualifies as a Physics portion for students seeking the so-called “Interdisciplinary Graduate Minor in Computer Science.” For Fall 2010 and Spring 2011, UT’s electronic “blackboard” will be used.

PHYS 599 SEMINARS: GENERAL RELATIVITY AND QUATERNIONS RESEARCH PROBLEMS (1-3)

SEC. 005

TEXT: TBD

TIME: TBD

PROFESSOR: Dr. Horace Crater

Mechanics; Radiation; Heat and Thermodynamics; Electricity and Magnetism; Modern Physics.  
*Repeatability: May be repeated with consent of department. Maximum 18 hours.*

PHYS 599 SEMINAR: (1)

SEC. 006

TEXT: TBD

TIME: TBD

PROFESSOR: Dr. Christian Parigger

Mechanics; Radiation; Heat and Thermodynamics; Electricity and Magnetism; Modern Physics.  
*Repeatability: May be repeated with consent of department. Maximum 18 hours.*

COMMENT: Physics seminar presentations of current topics by students, faculty and invited speakers.

PHYS 600 DISSERTATION (1 - 15)

SEC. 002 Crater

003 Lewis

004 Parigger

005 Chen

006 Davis

\*PHYS 610 QUANTUM OPTICS (3) **CANCELLED**

SEC. 001 (Interactive/Videotape to UTK)

TEXT: TBD

TIME: Tuesday & Thursday 8:30 – 9:45 E113

PROFESSOR: Dr. Lloyd Davis

Quantum theory of emission and absorption of radiation; frequency-dependent susceptibility; coherence theory; field quantization and coherent photon states; interaction of radiation

with atoms; photon optics, counting and higher-order coherence; atomic scattering phenomena

**\*PHYS 611 ADVANCED QUANTUM MECHANICS AND FIELD THEORY (3) CANCELLED**

SEC. 002

TEXT: TBD

TIME: Tuesday & Friday

1:00-2:15

F252

PROFESSOR: Dr. Christian Parigger

Survey of problems and methods. Topics of current interest. *Comment(s): Intended for all graduate students.*