# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calendar for Spring Semester 2010</td>
<td>1</td>
</tr>
<tr>
<td>Final Exam schedule for Spring 2010</td>
<td>2</td>
</tr>
<tr>
<td>Registration Procedures</td>
<td>3</td>
</tr>
<tr>
<td>Financial Calendar</td>
<td>4</td>
</tr>
<tr>
<td>Bookstore Hours</td>
<td>4-5</td>
</tr>
<tr>
<td>Application for Admission</td>
<td>5</td>
</tr>
<tr>
<td>Fees</td>
<td>5</td>
</tr>
<tr>
<td>Late Payment Fees</td>
<td>6</td>
</tr>
<tr>
<td>Fees for Change of Registration/Dropped Courses/Withdrawal</td>
<td>7</td>
</tr>
<tr>
<td>Full-Time Student Hours</td>
<td>8-9</td>
</tr>
<tr>
<td>Removal of “Incomplete” Grade</td>
<td>9</td>
</tr>
<tr>
<td>Admission to Candidacy (MS and PhD)</td>
<td>9</td>
</tr>
<tr>
<td>Non-Thesis/Thesis/Dissertation Final Exams</td>
<td>10</td>
</tr>
<tr>
<td>Insurance for International Students</td>
<td>10</td>
</tr>
<tr>
<td>Honor Statement</td>
<td>10-11</td>
</tr>
<tr>
<td>The University of Tennessee Policy on a Drug-Free Campus and Workplace</td>
<td>11</td>
</tr>
<tr>
<td>Thomas Jefferson Lecture Announcement</td>
<td>12</td>
</tr>
<tr>
<td>Spring 2010 Semester Course Listings &amp; Descriptions</td>
<td>13-36</td>
</tr>
<tr>
<td>Announcement Cover</td>
<td>37</td>
</tr>
</tbody>
</table>
CALENDAR - 2010 SPRING SEMESTER

Priority Registration .............................................................. September 28, 2009 – January 6, 2010
Admission to Candidacy Forms for Spring 2010 Commencement ............. December 1, 2009
Spring 2010 Graduation Application Deadline ........................................ December 1, 2009
University Closed, but CPO.UTK.EDU is available .....December 24, 2009 – December 30, 2009

Late Registration and late fees begin ........................................... January 7, 2010 – January 22, 2010
Classes begin ................................................................................. January 13, 2010
Last Day to Late Register, Add, Change Grading Options or Drop
Without a “W” ................................................................................. January 22, 2010
Martin Luther King Holiday .............................................................. January 18, 2010
Last day to add/change credit with signatures ........................................ February 23, 2010
Graduation Fee Payment Deadline (MS $30, PhD $75).......................... March 5, 2010
Preliminary Thesis/Dissertation Review Deadline ................................ March 5, 2010
Last day to schedule final exam (thesis)............................................... March 26, 2010
Last day to schedule final exam (non-thesis/capstone students) .......... March 26, 2010
Spring Break (No Classes) .................................................................. March 8-12, 2010
Last day to schedule final exam (dissertation) ......................................... March 30, 2010
Purchase cap and gown and order hood ........................................ March 30, 2010
Register to attend the Graduate Hooding Ceremony (http://gradschool.utk.edu) .. March 30, 2010
Drop with a “W” ................................................................................. April 6, 2010
Last day to take final exam (thesis/dissertation students) ...................... April 9, 2010
Last day to take final exam (non-thesis/capstone students) ................. April 9, 2010
Spring Recess (No Classes) .................................................................. April 2, 2010
Electronic Thesis/Dissertation due in Knoxville (5:00 P.M. EST) ............ April 23, 2010
Submit report of final examination (Pass/Fail) form ............................ April 23, 2010
Deadline for Submission of Admission to Candidacy for students
   Graduating Summer 2010 and Graduation Application ...................... April 30, 2010
Deadline for removing "INCOMPLETE" grades .................................. April 30, 2010
Classes End ...................................................................................... April 30, 2010
Total Withdraw from the University Deadline .................................... April 30, 2010
Study Period ................................................................................... May 3, 2010
Exam Period .................................................................................... May 4, 5, 6, 2010
Graduate Hooding Ceremony (UTK) .................................................. May 13, 2010
COMMENCEMENT (UTK) ............................................................. May 12, 2010
Second thesis/dissertation deadline (Student will receive diploma August 2010
   but do not have to register for Summer 2010) (Defense Completed by April 30) ... May 28, 2010

SUMMER SEMESTER 2010

Priority Registration for Summer Semester 2010 UTSI begins...................... TBD
Final Registration for UTSI students ................................................... TBD
Memorial Day Holiday ..................................................................... May 31, 2010
Classes begin ................................................................................... June 3, 2010
July 4th Holiday .............................................................................. July 5, 2010
Classes End ..................................................................................... August 10, 2010
Summer Graduation Date on Transcript (No Ceremony) ......................... August 18, 2010
**SPRING SEMESTER 2010**
**FINAL STUDY DAY AND EXAM SCHEDULE**

LAST DAY OF CLASSES...........................................................................................................April 30, 2010

STUDY PERIOD .........................................................................................................................May 3, 2010

**FINAL EXAMS 2010**

<table>
<thead>
<tr>
<th>REGULAR CLASS TIME</th>
<th>(Same Classroom)</th>
<th>EXAM TIME</th>
</tr>
</thead>
<tbody>
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</table>

1st Day - Tuesday, May 4, 2010

| 7:45 - 9:00 | M/Th | 7:45 - 9:45 |
| 10:45 - 12:00 | M/Th | 10:15 - 12:15 |
| 9:15 - 10:30 | M/Th | 1:00 - 3:00 |
| 2:30 - 3:45 | M/Th | 3:30 - 5:30 |

2nd Day – Wednesday, May 5, 2010

| 9:15 - 10:30 | Tu/Fri | 7:45 - 9:45 |
| 10:45 - 12:00 | Tu/Fri | 10:15 - 12:15 |
| 1:00 - 2:15 | Tu/Fri | 1:00 - 3:00 |
| 2:30 - 3:45 | Tu/Fri | 3:30 - 5:30 |

3rd Day - Thursday, 6, 2010

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

**** 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 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.  

REGISTRATION  

UTSI students MUST register for the 2010 Spring semester 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 September 28, 2009 – January 6, 2010. Late registration will be January 7, 2010. Classes begin January 13, 2010.  

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

<table>
<thead>
<tr>
<th>Department Number</th>
<th>Course Number</th>
<th>Section Number</th>
<th>Spec.Credit/Grading</th>
<th>Credit Hours</th>
<th>Hours/Days</th>
<th>Place</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

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. 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  

Days of the Week  

M-Monday  T-Tuesday  W-Wednesday  R-Thursday  F-Friday  S-Saturday
Financial Calendar for Spring Term 2010

Last Registration Day for Receiving Statements by Mail  November 17, 2009
Statement Information Available on CPO           November 17, 2009
Priority Registration Payment/Confirmation Deadline   January 6, 2010 (3:30 pm CST)
Late Registration/Late Fees Begin       January 7, 2010
Late Payment and Confirmation Deadline   January 22, 2010 (3:30 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 accessed 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. 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

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)-37293
Bookstore:  1-888-822-UTSI (8874)-37204
Business Office:  1-888-822-UTSI (8874)-37204
Registrar's Office:  1-888-822-UTSI (8874)-37228

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 mnee@utsi.edu or Vicki Carr at 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 at http://admissions.utk.edu/graduate/apply.shtml [click on APPLY ONLINE and Follow Directions]. Applications for Admission and Transcripts from part-time students should be sent to the Registrar's Office, D-100, Mail Stop 7, UTSI, Tullahoma, TN 37388-9700. Full-time students send Application for Admission, transcripts, GRE scores (if required); and if international application, TOEFL scores to the Admissions Office, E-109, Mail Stop 19, UTSI, Tullahoma, TN 37388-9700.

PAYMENT OF FEES

Payment of fees is due at time of registration. Late fees will begin on January 7, 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  scorda@utsi.edu
Engineering Mgt.  Dee Merriman  931-393-7293  dmerrima@utsi.edu

TUITION AND/OR MAINTENANCE FEES*

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

Maintenance Fee ................................................................. $3,413.00*
Programs and Services Fee ...................................................... 90.00
Total ................................................................. $3,503.00

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

Maintenance Fee ................................................................. $3,413.00*
Programs and Services Fee ...................................................... 90.00
Tuition ................................................................. $6,898.00*
Total ................................................................. $10,401.00

*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**

<table>
<thead>
<tr>
<th>Hours</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>$1,140.00</td>
</tr>
</tbody>
</table>

**OUT-OF-STATE**

<table>
<thead>
<tr>
<th>Hours</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>$3,441.00</td>
</tr>
</tbody>
</table>

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 redeposited. 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 deferral of up to 50% of the total charges at registration. The deferred payment must be paid by the 45th (February 19, 2010) day of the semester. All financial aid monies must be applied to fees before a deferralment 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):

<table>
<thead>
<tr>
<th>DROP DATE</th>
<th>CHARGE</th>
<th>REFUND</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 13 - 17</td>
<td>NO CHARGE</td>
<td>100%</td>
</tr>
<tr>
<td>January 18 - 23</td>
<td>20% CHARGE</td>
<td>80%</td>
</tr>
<tr>
<td>January 24 - 28</td>
<td>40% CHARGE</td>
<td>60%</td>
</tr>
<tr>
<td>January 29 – February 2</td>
<td>60% CHARGE</td>
<td>40%</td>
</tr>
<tr>
<td>February 3 - End of Term</td>
<td>100% CHARGE</td>
<td>NO REFUND</td>
</tr>
</tbody>
</table>

TUITION/FEES 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, that 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 https://cpo.utk.edu/CPOWeb/enterCPO.jsp 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) must be removed within one semester, excluding the Summer Term. If a supplementary grade report has not been received in the Registrar's Office at the end of the following semester, 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 Spring Semester 2010 must remove all INCOMPLETE GRADES by April 30, 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. The comprehensive examination must be passed prior to admission 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 the University of Tennessee, Knoxville, are required to have comprehensive medical insurance. The policy for the 2010 academic year is provided by United Health Care. The premium must be paid before registration. Contact the Human Resources Office (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 SPRING SEMESTER 2009

STUDY PERIOD....May 3, 2010
FINAL EXAMS......May 4, 5, 6, 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.

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.
SPECIAL ANNOUNCEMENT

THOMAS JEFFERSON LECTURE

Thursday, April, 22, 2010

3:00 P.M.

UTSI Auditorium

There will be NO scheduled classes at this time by request of
Dr. Robert Moore, Executive Director

Faculty will reschedule any afternoon classes tentatively scheduled for
April 22, 2010 between 2:30 – 3:45 p.m.
Contact the Registrar’s Office
For available times and rooms for rescheduling
THE UNIVERSITY RESERVES THE RIGHT TO REVISE ANY INFORMATION LISTED IN THIS TIMETABLE OF CLASSES

THE UNIVERSITY OF TENNESSEE SPACE INSTITUTE
SPRING SEMESTER 2010 COURSE LISTINGS

AEROSPACE ENGINEERING

AE  500  Master’s Thesis (1 - 15)
SEC. 001  Schulz
009  Antar
010  Flandro
011  Majdalani
012  Moeller
013  Steinhoff
014  Vakili
015  Moulden
021  Corda

AE  502  REGISTRATION FOR USE OF FACILITIES (1 - 15)
SEC. 002  Dr. Basil Antar

AE  512  VISCOUS FLOW (3)
SEC. 001  (Videotaped at UTSI)
TIME: Monday & Thursday  1:00 – 2:15  E111
PROFESSOR:  Dr. Ahmad Vakili

Equations of viscous fluid flow; exact and approximate solution; laminar and turbulent flow; transition; separation; boundary layer theories; exact and approximate solution. *Prerequisite: AE 521.*

AE  522  AERODYNAMICS OF COMPRESSIBLE FLOWS II (3)  CANCELLED
SEC. 001
TIME: Monday & Thursday  10:45 – 12:00  B112
TEXT: TBD
PROFESSOR:  Dr. Trevor Moulden

One-dimensional internal and external flow; waves; small perturbation theory; slender body theory; similarity rules; method of characteristics. *Prerequisite: 521.*

AE  539  CONTINUUM MECHANICS (3)
SEC. 002  (Same as ES 539/ME 539)
TIME: Monday & Thursday  9:15 – 10:30  B112
PROFESSOR:  Dr. T. H. Moulden
Cartesian tensors, transformation laws, basic continuum mechanics, concepts; stress, strain, deformation, constitutive equations. Conservation laws for mass, momentum, energy. Applications in solid and fluid mechanics.

AE 542  FLUID MECHANICS II (3)
SEC. 001  (Same as ES 542/ME 542)
TIME: Tuesday & Friday  9:15 – 10:30  E211
TEXT: 1. H. Tennekes & J. Lumley:  
First Course in Turbulence, MIT, Latest Ed.  
2. R.L. Panton: Incompressible Flow; Wiley Interscience; Latest publications
PROFESSOR:  Dr. Basil Antar

Inviscid flow, boundary layers, laminar jets, wakes and shear layers. Transition to turbulence. Turbulent flow, Reynolds averaged equations, dynamics of turbulence, boundary free turbulent shear flow, turbulent channel’s pipe flow, turbulent boundary layers.

AE 590  SELECTED ENGINEERING PROBLEMS (1-3)
SEC. 001  Dr. Basil Antar
SEC. 002  Dr. Monty Smith
SEC. 003  Dr. Ahmad Vakili

AE 595  SEMINARS: AEROSPACE and MECHANICAL SYSTEMS (1)
SEC. 001  Dr. Ahmad Vakili  (Same as ME 595)

Seminars in all phases of Aerospace Engineering, reports on current research at UTK and UTSI. May be repeated.

AE 599  AIRCRAFT DESIGN (3)
SEC. 001  (Cross-Listed as AS506 Section 001) Videotaped from UTSI
TIME: Tuesday & Friday  1:00 – 2:15  E111
PROFESSOR:  Dr. U. Peter Solies

Review of air vehicle aerodynamics and performance, 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.

AE 599  SPECIAL TOPICS IN AE: ROCKET PROPULSION I (3)
SEC. 002  (Same as ME 581 Sec. 001)
TIME: Wednesdays  4:00 – 6:35  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.
AE  599  SPECIAL TOPICS: RADIATION TRANSPORT (3)
SEC.  003  (Same as ME 599 Sec. 003//ES 581 Sec. 002)
TIME:  Tuesday & Friday  10:45 – 12:00  F252
TEXT:  Thermal Radiation Heat Transfer; Robert Siegel and John R. Howell; Taylor and Francis;
PROFESSOR:   Dr. Trevor Moeller


This course will cover fundamental radiation processes that occur in absorbing, emitting, and radiating media (plasmas and high temperature gases).  Topics will include: blackbody radiation concepts, fundamentals of radiation in matter, classical radiation, quantum theory of radiation, line broadening, continuum radiation, equilibrium relations, and an introduction to spectral diagnostics of plasmas.

AE  599  SPECIAL TOPICS: TRANSONIC FLOW (3)   CANCELLED
SEC.  004  (Video Recorded)
TIME:  Monday & Wednesday  10:30 – 11:45  E111
PROFESSOR:  Dr. Trevor Moulden

Nature of flow at transonic speeds; small disturbance theory; shock wave properties; shock-free flows; strong viscous interaction phenomena; solution techniques.

AE  600  DOCTORAL & RESEARCH DISSERTATION (3 - 15)
SEC.  005  Antar
006  Moeller
007  Majdalani
008  Steinhoff
010  Corda
016  Flandro
017  Vakili

AE  661  ADVANCED TOPICS IN COMPUTATIONAL FLUID DYNAMICS (3)   CANCELLED
SEC.  001  (Same as ES 651/ME 651)
TIME:  Tuesday & Friday  10:45 – 12:00  E210
TEXT:  TBD
PROFESSOR:  Dr. John Steinhoff

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.)

AE  681  ADVANCED VISCOUS FLOW THEORY (3)
SEC.  001
TIME:  Tuesday & Friday  10:45 – 12:00  B112
TEXT:  Lecture Notes

AE  690  ADVANCED TOPICS IN AE: LINEAR AND NONLINEAR WAVES (3)
SEC.  001  (Cross listed with ES 681 Section 001)
TIME: Monday & Thursday   4:15 – 5:30     B210
TEXT: GB. Witham: Linear and Nonlinear Waves
PROFESSOR:  Dr. John Steinhoff

The basic properties of many important physical phenomena can often be modeled by partial differential equations with simple nonlinear terms. These range from pattern formation in water waves to predator-prey dynamics and optical pulse propagation in fibers. Representative classes of equations will be studied and their solutions characterized. An important sub-topic will be solitary waves and especially solitons. Solitons have recently been extensively studied as very important and interesting solutions of many nonlinear partial differential equations: they propagate without changing shape, even after interacting with each other, they are represented in many important physical phenomena, from optical pulses to tidal bores, and are studied as models of elementary particles. The course will consist of a survey of the field followed by a study of the methods of solving nonlinear partial differential equations which lead to soliton solutions. The emphases will be on physical arguments and analysis. Prerequisite: include Elementary Partial Differential Equations and Advanced Calculus.

AE  690  ADVANCED TOPICS IN AE: ADVANCED PERTURBATION METHODS (3)
SEC.  002  (Video Recorded)
TEXT: Class Notes
TIME: Monday       4:00 – 6:35    E111
PROFESSOR: Dr. Joseph Majdalani

Objectives: 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. 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. Prerequisites: Differential Equations and Perturbation Methods I.
AVIATION SYSTEMS

AS  500  MASTER’S THESIS (1 - 15)
SEC. 001  Corda
002  Collins
003  Martos
004  Muratore
005  Pujol
006  Solies

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

Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated.

AS  506  AIRCRAFT DESIGN (3)
SEC. 001 (Cross Listed as AE 599 Section 001) (Video Recorded)
TIME: Tuesday & Friday  1:00 – 2:15  E111
PROFESSOR:   Dr. U. Peter Solies

Review of air vehicle aerodynamics and performance, 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.

AS  510  SPECIAL TOPICS: INTRODUCTION TO AVIONICS II (3)
SEC. 001 (Video Recorded)
TIME: Tuesday & Friday  10:30 – 11:45  E113
PROFESSOR:   Dr. Alfonso Pujol, Jr.

Avionic systems and communications, including analog and digital systems, distance measuring equipment, transponder, radar altimeter, GPS/satellite navigation, electronic flight instrument system, cockpit voice and flight data recorders, weather detection, traffic alert and collision avoidance system, electrical systems, aviation bands and frequencies, and other topics are also discussed.

AS  510  SPECIAL TOPICS: SYSTEMS ENGINEERING (3)
SEC. 002 (Video Recorded)
TIME: Monday & Thursday  1:30 – 2:45  E113
The focus of this course is on engineering problem solving in multi-disciplinary applications with complex systems interactions. Instruction will be provided in methodologies and tools used to deal with large complex systems to deliver system performance that meets user requirements. Methodologies discussed will include system life cycles, requirements development, verification and validation, engineering review processes, hazard analysis, fault trees, reliability block diagrams, system flow diagrams, weight and cost estimating, technical budget management, engineering economic analysis, interface control, and deterministic and monte carlo definition of integrated flight design environments. Special topics will include software integration; interconnect wiring, fault tolerance and redundancy management.

AS 516 Aircraft Flight Controls (Stability and Control)
SEC. 001 (Interactive Receive)
TIME: Monday & Thursday 8:45 – 10:00 E111
PROFESSOR: Dr. Andrew Meade

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
- Introduction to control theory and design of automatic controls

AS 521 EXPERIMENTAL FLIGHT MECHANICS: FIXED WING PERFORMANCE (3)
SEC. 001
TIME: Tuesday & Friday 8:00 - 9:15 Tullahoma Airport Classroom
PROFESSOR: Borja Martos

This course will cover fundamental theories, flight test techniques, and data collection and analyses for fixed wing aircraft performance. Topics will include air data system calibration, takeoff and landing performance, turn performance, cruise performance, energy concepts, and aerodynamic modeling. 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.
Enrollment limited to Aviation Systems students in non-thesis program. May be repeated. Maximum 3 hrs allowed toward degree.

CHEMICAL/BIOMEDICAL ENGINEERING

CBE 529 APPLICATION OF LINEAR ALGEBRA IN ENGINEERING SYSTEMS (3)
SEC. 001 (Video Recorded) (Same as ECE/IE/MSE/ME 529)
TIME: Monday & Thursday 9:45 – 11:00  E113
PROFESSOR: Dr. Monty Smith

Fundamental concepts of linear algebra to problems in engineering systems: steady state and dynamic systems. Geometric and physical interpretations of relevant concepts: least square problems. LU, QR, and SVD decompositions of system matrix, eigenvalue problems, and similarity transformations in solving difference and differential equations; numerical stability aspects of various algorithms; application of linear algebra concepts in control and optimization studies; introduction to linear programming. Computer projects. (Same as Biomedical Engineering 529; Industrial Engineering 529; Materials Science and Engineering 529; Mechanical Engineering 529). Comment(s): Graduate standing or consent of instructor required.

Comments: Methods of linear algebra as applied to engineering. Topics to be covered include: systems of linear equations, matrices, solutions of linear equations, Gaussian elimination, vector spaces, linear transformations, orthogonality, least-squares approximations, determinants, eigenvalues and eigenvectors, positive definite matrices, singular value decomposition, and numerical computational methods. Course assignments will consist of pencil-and-paper exercises and numerical exercises involving MATLAB. Students registering for this course are assumed to have access to at least the Student Edition of MATLAB.

COMPUTER SCIENCE

NOTE: Students interested in the Interdisciplinary Graduate Minor in Computational Science (IGMCS) at UTSI should contact Dr. Bruce Whitehead (bwhitche@utsi.edu, 931-393-7296) for further information.

CS 472 NUMERICAL LINEAR ALGEBRA (3)
SEC. 001 Videotaped Recorded (Same as Math 472)
TIME: Monday & Wednesday 2:30 – 3:45  E111
PROFESSOR: Dr. Trevor Moulden
Direct and iterative methods for systems of linear equations. Solution of single nonlinear
equations and nonlinear systems. Orthogonal decomposition, least squares and algebraic
eigenvalue problem. Prerequisite: Numerical Algorithms 1 or consent of instructor. Recommended prerequisite: 453.

ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

ECE 500  THESIS (1 – 15)
SEC. 001  Bomar
015  Smith
022  Pujol
023  Whitehead

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

ECE 502  REGISTRATION FOR USE OF FACILITIES (1-15)
SEC. 003  Smith

ECE 529  APPLICATION OF LINEAR ALGEBRA IN ENGINEERING SYSTEMS (3)
SEC. 001  (Video Recorded) (Same as IE/MSE/ME/CBE 529)
TITLE: Advanced Linear Algebra for Engineers with MATLAB; Sohal A. Dianat and Eli S.
(Hardcover); ISBN-10: 1420095234; List Price: $99.95.
TIME: Monday & Thursday 9:45 – 11:00  E113
PROFESSOR: Dr. Monty Smith

Fundamental concepts of linear algebra to problems in engineering systems: steady state and
dynamic systems. Geometric and physical interpretations of relevant concepts: least square
problems. LU, QR, and SVD decompositions of system matrix, eigenvalue problems, and
similarity transformations in solving difference and differential equations; numerical stability
aspects of various algorithms; application of linear algebra concepts in control and optimization
studies; introduction to linear programming. Computer projects. (Same as Biomedical
Engineering 529; Industrial Engineering 529; Materials Science and Engineering 529;
Mechanical Engineering 529). Comment(s): Graduate standing or consent of instructor
required.

Comments: Methods of linear algebra as applied to engineering. Topics to be covered include:
systems of linear equations, matrices, solutions of linear equations, Gaussian elimination, vector
spaces, linear transformations, orthogonality, least-squares approximations, determinants,
eigenvalues and eigenvectors, positive definite matrices, singular value decomposition, and
numerical computational methods. Course assignments will consist of pencil-and-paper exercises
and numerical exercises involving MATLAB. Students registering for this course are assumed to
have access to at least the Student Edition of MATLAB.
ENGINEERING SCIENCE

ES 500 Master’s Thesis (1 - 15)
SEC. 001 Schulz
010 Antar
011 Flandro
012 Majdalani
013 Moeller
014 Steinhoff
015 Vakili

ES 539 CONTINUUM MECHANICS (3)
SEC. 002 (Same as AE 539/ME 539)
TIME: Monday & Thursday 9:15 – 10:30 B112
PROFESSOR: Dr. T. H. Moulden

Cartesian tensors, transformation laws, basic continuum mechanics, concepts; stress, strain, deformation, constitutive equations. Conservation laws for mass, momentum, energy. Applications in solid and fluid mechanics.

ES 542 FLUID MECHANICS II (3)
SEC. 001 (Same as AE 542/ME 542)
TIME: Tuesday & Friday 9:15 – 10:30 E211
2. R.L. Panton: Incompressible Flow: Wiley Interscience; Latest publications
PROFESSOR: Dr. Basil Antar

Inviscid flow, boundary layers, laminar jets, wakes and shear layers. Transition to turbulence. Turbulent flow, Reynolds averaged equations, dynamics of turbulence, boundary free turbulent shear flow, turbulent channel’s pipe flow, turbulent boundary layers.

ES 581 SPECIAL TOPICS: RADIATION TRANSPORT (3)
SEC. 002 (Same as AE/ME 599 Sec. 003)
TIME: Tuesday & Friday 10:45 – 12:00 F252
PROFESSOR: Dr. Trevor Moeller


This course will cover fundamental radiation processes that occur in absorbing, emitting, and radiating media (plasmas and high temperature gases). Topics will include: blackbody radiation concepts, fundamentals of radiation in matter, classical radiation, quantum theory of radiation, line broadening, continuum radiation, equilibrium relations, and an introduction to spectral diagnostics of plasmas.
ES 595 SEMINARS: ENGINEERING SCIENCE (1)
SEC. 002 Dr. Ahmad Vakili

Seminars in all phases of Engineering Science, reports on current research at UTK and UTSI. May be repeated.

ES 600 DOCTORAL & RESEARCH DISSERTATION (1 – 15)
SEC. 004 Antar
006 Majdalani
007 Steinhoff
008 Moeller

ES 651 ADVANCED TOPICS IN COMPUTATIONAL FLUID DYNAMICS (3) CANCELLED
SEC. 001 (Same as AE 661/ME 651)
TIME: Tuesday & Friday 10:45 – 12:00 E210
TEXT: TBD
PROFESSOR: Dr. John Steinhoff

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.)

ES 681 ADVANCED TOPICS IN ENGINEERING MECHANICS: LINEAR AND NONLINEAR WAVES (3)
SEC. 001 (Cross-listed as AE 690 Section 002)
TIME: Monday & Thursday 4:15 – 5:30 B210
TEXT: GB. Witham: Linear and Nonlinear Waves
PROFESSOR: Dr. John Steinhoff

The basic properties of many important physical phenomena can often he modeled by partial differential equations with simple nonlinear terms. These range from pattern formation in water waves to predator-prey dynamics and optical pulse propagation in fibers. Representative classes of equations will be studied and their solutions characterized. An important sub-topic will be solitary waves and especially solitons. Solitons have recently been extensively studied as very important and interesting solutions of many nonlinear partial differential equations: they propagate without changing shape, even after interacting with each other, they are represented in many important physical phenomena, from optical pulses to tidal bores, and are studied as models of elementary particles. The course will consist of a survey of the field followed by a study of the methods of solving nonlinear partial differential equations which lead to soliton solutions. The emphases will be on physical arguments and analysis. Prerequisite: include Elementary Partial Differential Equations and Advanced Calculus.
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 (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 533 THEORY AND PRACTICE OF ENGINEERING MANAGEMENT (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/iieandem/student_services.htm
TIME: Thursday 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 534 FINANCIAL MANAGEMENT (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
TIME: Tuesday 4:00 – 6:35 E113
TEXT: Go to http://www.utsi.edu/academics/iieandem/student_services.htm
PROFESSOR: Dr. Gregory Sedrick

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)
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

EM 595 SPECIAL TOPICS IN ENGINEERING MANAGEMENT (3)
SEC. 001 Sedrick

EM 691 ADVANCED TOPICS IN ENGINEERING MANAGEMENT (3)
SEC. 001 Sedrick

INDUSTRIAL ENGINEERING

IE 500 THESIS (1-15)
SEC. 002 Dr. Denise Jackson as main advisor
SEC. 006 Dr. Gregory Sedrick as main advisor

IE 514 ADVANCED INFORMATION SYSTEMS ANALYSIS (3)
SEC. 001 All Students participating at Knoxville
SEC. 002 UTK Students participating elsewhere
SEC. 003 UTSI Students participating at Tullahoma or Oak Ridge
SEC. 004 UTSI Students participating elsewhere

TIME: CENTRA
TEXT: http://www.utsi.edu/academics/iieandem/student_services.htm
PROFESSOR: Dr. Xueping Li

Systems analysis and systems control concepts applied to systems of information. Role of IE in office and factory of future. Management support systems, decision support systems, and integrated support systems.

IE 518 ADVANCED ENGINEERING ECONOMIC ANALYSIS (3)
SEC. 001 UTK Students participating at Knoxville DE Classrooms
SEC. 002 UTK Students participating elsewhere
SEC. 003 UTSI Students participating at Tullahoma or Oak Ridge
SEC. 004 UTSI Students participating elsewhere

TIME: Wednesday 4:00 – 6:35 E113
TEXT: http://www.utsi.edu/academics/iieandem/student_services.htm
PROFESSOR: Dr. Joseph Wilck

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. Prerequisite: EM537 OR both Engineering Economy (IIE405 or equivalent) and Probability and Statistics for Scientists and Engineers, (IIE205 or equivalent).
IE 522 OPTIMIZATION METHODS IN INDUSTRIAL ENGINEERING (3)
SEC. 001 All Students participating at Knoxville
SEC. 002 UTK Students participating elsewhere
SEC. 003 UTSI Students participating at Tullahoma or Oak Ridge
SEC. 004 UTSI Students participating elsewhere
TIME: CENTRA
TEXT: http://www.utsi.edu/academics/iieandem/student_services.htm
PROFESSOR: Dr. Charles Aiken

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

IE 527 LEAN PRODUCTION SYSTEMS (3)
SEC. 001 All Students participating at Knoxville
SEC. 002 UTK Students participating elsewhere
SEC. 003 UTSI Students participating at Tullahoma or Oak Ridge
SEC. 004 UTSI Students participating elsewhere
TIME: CENTRA
TEXT: http://www.utsi.edu/academics/iieandem/student_services.htm
PROFESSOR: Dr. Rupey Sawhney

Characteristics and performance of mass and lean production systems. Lean production concepts and principles. Planning, designing and implementing lean production systems: line balancing, set-up time reduction, cost management, maintenance support and other selected topics. Application at enterprise level to achieve strategic competitive goals. Prerequisite: 515 or consent of instructor.

IE 529 APPLICATION OF LINEAR ALGEBRA IN ENGINEERING SYSTEMS (3)
SEC. 001 (Video Recorded) (Same as CBE/ECE/MSE/ME 529)
TIME: Monday & Thursday 9:45 – 11:00 E113
PROFESSOR: Dr. Monty Smith

Fundamental concepts of linear algebra to problems in engineering systems: steady state and dynamic systems. Geometric and physical interpretations of relevant concepts: least square problems. LU, QR, and SVD decompositions of system matrix, eigenvalue problems, and similarity transformations in solving difference and differential equations; numerical stability aspects of various algorithms; application of linear algebra concepts in control and optimization studies; introduction to linear programming. Computer projects. (Same as Biomedical Engineering 529; Industrial Engineering 529; Materials Science and Engineering 529; Mechanical Engineering 529). Comment(s): Graduate standing or consent of instructor required.

Comments: Methods of linear algebra as applied to engineering. Topics to be covered include: systems of linear equations, matrices, solutions of linear equations, Gaussian elimination, vector spaces, linear transformations, orthogonality, least-squares approximations, determinants, eigenvalues and eigenvectors, positive definite matrices, singular value decomposition, and numerical computational methods. Course assignments will consist of pencil-and-paper exercises
and numerical exercises involving MATLAB. Students registering for this course are assumed to have access to at least the Student Edition of MATLAB.

IE 592 SPECIAL TOPICS IN INDUSTRIAL ENGINEERING (1-3)  
SEC. 002 Sedrick

IE 600 DOCTORAL RESEARCH/DISSERTATION (3-15)  
SEC. 002 Jackson  
SEC. 006 Sedrick

IE 691 ADVANCED TOPICS IN INDUSTRIAL ENGINEERING (3) CANCELLED  
SEC. 002 Sedrick

IE 692 ADVANCED TOPICS IN INDUSTRIAL ENGINEERING (3) CANCELLED  
SEC. 001 Sedrick

MATERIALS SCIENCE

MSE 405 STRUCTURAL CHARACTERIZATION OF MATERIALS (4)  
SEC. 002  
TIME: Tuesday & Friday  1:00 – 2:30  CLA Conference Room  
TEXT: TBD  
PROFESSOR:  Dr. William Hofmeister and Dr. George Murray

X-ray diffraction, fluorescence, scanning and transmission electron microscopy; secondary ion mass spectroscopy, microanalytical techniques, tribology, hardness and tensile testing. Class plus laboratory exercises.

MSE 500 THESIS (1 – 15)  
SEC. 002 Dr. William Hofmeister  
SEC. 004 Dr. George Murray  
SEC. 005 Dr. Jackie Johnson

MSE 503 GRADUATE SEMINAR IN MATERIALS SCIENCE & ENGINEERING (1)  
SEC. 002  
TIME: Wednesday  3:00  CLA Conference Room  
PROFESSOR:  Dr. Zhongren Yue

Theme: Biomimetic materials.

MSE 529 APPLICATION OF LINEAR ALGEBRA IN ENGINEERING SYSTEMS (3)  
SEC. 001 (Video Recorded) (Same as CBE/ECE/IE/ME 529)  
TIME: Monday & Thursday  9:45 – 11:00  E113  
PROFESSOR:  Dr. Monty Smith

Fundamental concepts of linear algebra to problems in engineering systems: steady state and dynamic systems. Geometric and physical interpretations of relevant concepts: least square problems. LU, QR, and SVD decompositions of system matrix, eigenvalue problems, and similarity transformations in solving difference and differential equations; numerical stability
aspects of various algorithms; application of linear algebra concepts in control and optimization studies; introduction to linear programming. Computer projects. (Same as Biomedical Engineering 529; Industrial Engineering 529; Materials Science and Engineering 529; Mechanical Engineering 529). Comment(s): Graduate standing or consent of instructor required.

Comments: Methods of linear algebra as applied to engineering. Topics to be covered include: systems of linear equations, matrices, solutions of linear equations, Gaussian elimination, vector spaces, linear transformations, orthogonality, least-squares approximations, determinants, eigenvalues and eigenvectors, positive definite matrices, singular value decomposition, and numerical computational methods. Course assignments will consist of pencil-and-paper exercises and numerical exercises involving MATLAB. Students registering for this course are assumed to have access to at least the Student Edition of MATLAB.

MSE 578 ADVANCED BIOMATERIALS: BIOLOGICAL APPLICATIONS OF NANOMATERIALS (3)
SEC. 006
TIME: Monday & Thursday 10:45 – 12:00 F253
TEXT: TBD
PROFESSOR: Dr. Jackie Johnson

Focuses on the biological/medical uses of nanoscale materials. Includes the following topics: 0-d, 1-d, and 2-d nanomaterials synthesis and characterization with an emphasis on surface properties. Chemical and biological functionalization of nanomaterials and nano-bio interfaces. Biological and biomedical application of nanomaterials. (Cross-listed: Same as Biomedical Engineering 578).

MSE 600 DIRECT DOCTORAL DISSERTATION (1-15)
SEC. 002 Dr. William Hofmeister
SEC. 003 Dr. Jackie Johnson

MATHEMATICS

MATH 431 DIFFERENTIAL EQUATIONS II (3)
SEC. 001
TIME: Tuesday & Friday 2:30 – 3:45 B112
TEXT: Class Notes
PROFESSOR: Dr. T. H. Moulden

First order equations. The matrix eigenvalue problem and systems of first order linear equations. Solution in series, Laplace transforms and Green’s functions.

MATH 435 PARTIAL DIFFERENTIAL EQUATIONS (3)
SEC. 002 (Video Recorded)
TIME: Tuesday & Friday 10:30 – 11:45 E111
PROFESSOR: Dr. Kenneth Kimble

Separation of variables, Fourier series, solution of Laplace, wave and heat equations. Prerequisite: Differential Equations and Calculus III.
MATH 453  MATRIX ALGEBRA II (3)  CANCELLED  
SEC.  001  
TIME: TBD  
PROFESSOR: TBD  

Advanced topics in matrix theory including Jordan canonical form. Prerequisite(s): 251 or 257.  

MATH 472  NUMERICAL LINEAR ALGEBRA (3)  
SEC.  001  (Video Recorded)  (Same as CS 472)  
TIME: Monday & Wednesday  2:30 – 3:45  E111  
PROFESSOR: Dr. Trevor Moulden  


MATH 472  NUMERICAL LINEAR ALGEBRA (3)  
SEC.  003  AEDC On-Base Students  
TIME: Tuesday & Friday  8:00 – 9:15  AEDC Small DO Conference Room  
PROFESSOR: Dr. Chad Limbaugh  


MATH 500  MASTER’S THESIS (1 - 15)  
SEC.  002  Dr. Boris Kupershmidt  
SEC.  003  Dr. K.C. Reddy  

MATH 519  SEMINAR IN APPLIED MATHEMATICS (1-3)  
SEC.  002  
TEXT: Notes provided by Instructor  
TIME: Monday & Thursday  9:15 – 10:30  B210  
PROFESSOR: Dr. Boris Kupershmidt  

Repeatability: May be repeated. Maximum 12 hours.  

MATH 578  NUMERICAL METHODS FOR PARTIAL DIFFERENTIAL EQUATIONS (3)  
SEC.  001  
TIME: Monday & Thursday  1:00 – 2:15  F252  
TEXT: TBD  
PROFESSOR: Dr. Christian Parigger
Numerical approximation of solutions of partial differential equations including conservation laws and hyperbolic, parabolic, and elliptic problems. Derivation, physical meaning, and implementation of schemes. Recommended Background: A course in partial differential equations or 512 or 515, and familiarity with an operating system and a programming language.

MATH 593  INDEPENDENT STUDY (1-12)
SEC. 002  Dr. Boris Kupershmidt

MECHANICAL ENGINEERING

ME  500  MASTER’S THESIS (1 - 15)
SEC. 001  Schulz
  021  Antar
  022  Flandro
  023  Majdalani
  024  Moeller
  025  Steinhoff
  026  Vakili

ME  512  HEAT TRANSFER II (3)
SEC. 001
TIME:  Tuesday & Friday    1:00 – 2:30  E113
PROFESSOR:  Dr. Basil Antar

This course is a continuation of heat transfer, covering convection and thermal radiation heat transfer. Prerequisite: Mechanical Engineering 511 or consent of instructor.

ME  522  THERMODYNAMICS II (3)
SEC. 001
TIME:  Wednesday & Friday  8:30 – 9:45  E113
PROFESSOR:  Dr. Robert McAmis

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, Schrodinger equation. Prerequisites: 332.

ME  529  APPLICATION OF LINEAR ALGEBRA IN ENGINEERING SYSTEMS (3)
SEC. 001  (Video Recorded) (Same as CBE/ECE/IE/MSE 529)
TIME:  Monday & Thursday  9:45 – 11:00  E113
PROFESSOR:  Dr. Monty Smith

Fundamental concepts of linear algebra to problems in engineering systems: steady state and dynamic systems. Geometric and physical interpretations of relevant concepts: least square
problems. LU, QR, and SVD decompositions of system matrix, eigenvalue problems, and similarity transformations in solving difference and differential equations; numerical stability aspects of various algorithms; application of linear algebra concepts in control and optimization studies; introduction to linear programming. Computer projects. (Same as Biomedical Engineering 529; Industrial Engineering 529; Materials Science and Engineering 529; Mechanical Engineering 529). Comment(s): Graduate standing or consent of instructor required.

Comments: Methods of linear algebra as applied to engineering. Topics to be covered include: systems of linear equations, matrices, solutions of linear equations, Gaussian elimination, vector spaces, linear transformations, orthogonality, least-squares approximations, determinants, eigenvalues and eigenvectors, positive definite matrices, singular value decomposition, and numerical computational methods. Course assignments will consist of pencil-and-paper exercises and numerical exercises involving MATLAB. Students registering for this course are assumed to have access to at least the Student Edition of MATLAB.

ME  539 CONTINUUM MECHANICS (3)
SEC. 002 (Same as ES 539/AE 539)
TIME: Monday & Thursday  9:15 – 10:30  B112
PROFESSOR:  Dr. T. H. Moulden

Cartesian tensors, transformation laws, basic continuum mechanics, concepts; stress, strain, deformation, constitutive equations. Conservation laws for mass, momentum, energy. Applications in solid and fluid mechanics. Same as Engineering Science and Aerospace Engineering 539.

ME  542 FLUID MECHANICS II (3)
SEC. 001 (Same as AE 542/ES 542)
TIME: Tuesday & Friday  9:15 – 10:30  E211
2. R.L. Panton: Incompressible Flow; Wiley Interscience; Latest publications
PROFESSOR:  Dr. Basil Antar

Inviscid flows, boundary layers, laminar jets, wakes and shear layers. Transition to turbulence. Turbulent flow, Reynolds averaged equations, dynamics of turbulence, boundary free turbulent shear flow, turbulent channel’s pipe flow, and turbulent boundary layers.

ME  581 SPECIAL TOPICS IN AE: ROCKET PROPULSION I (3)
SEC. 001 (Video Recorded) (Same as ME 599 Sec. 004)
TEXT: Rocket Propulsion Elements; George P. and Biblarz, Oscar; Wiley; 7th Edition;
ISBN# 041326429.
TIME: Wednesdays  4:00 – 6:35  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 582 ROCKET PROPULSION II (3)  CANCELLED
SEC. 001
TIME: Monday & Thursday 10:45 – 12:00  E211
TEXT: Physics of Electric Propulsion; Robert Jahn (available on amazon.com).
PROFESSOR: Dr. Trevor Moeller

Solid propellant rocket performance, homogeneous and heterogeneous propellant chemistry and combustion system performance, thermal decomposition and gas phase reaction models; effect of chamber pressure and additives on solid propellant burn rates, erosive burning; analysis of two-phase solid rocket exhaust flow. Introduction to nuclear and electric propulsion; electrical resistance and electric field (ion) engine performance, magnetohydrodynamic thrusters, traveling wave thrusters; exotic propulsion systems.

ME 585 TURBOMACHINERY SYSTEMS II (3)
SEC. 001 (Video Recorded)
TIME: Tuesday & Thursday 4:00 – 5:15  E111
PROFESSOR: Dr. Milt Davis

The course will provide an in-depth analysis of component performance for compressors, turbines, nozzles, inlets, combustors. Compressor and turbine analysis will include: the Euler turbomachinery equation, velocity triangles, degree of reaction, blade performance and efficiency, and stage loading. Axial and centrifugal turbomachines will be analyzed. Combustors and augmenter performance will be studied. Inlet and nozzle performance will be analyzed and their integration with the full gas turbine engine will be studied. The course will emphasize the use of numerical simulations as tools for use in analyzing gas turbine engine/component performance.

ME 590 SELECTED ENGINEERING PROBLEMS (2-6)
SEC. 001 Dr. Montgomery Smith  CANCELLED
SEC 003 Dr. Basil Antar

ME 595 SEMINARS: AEROSPACE & MECHANICAL SYSTEMS (1)
SEC. 001 Dr. Ahmad Vakili (Same as AE 595)

Seminars in all phases of Mechanical Engineering, reports on current research at UTK and UTSI. May be repeated.

ME 599 SPECIAL TOPICS: RADIATION TRANSPORT (3)
SEC. 003 (Same as AE 599 Sec. 003/ES 581 Sec. 002)
TIME: Tuesday & Friday 10:45 – 12:00  F252
PROFESSOR: Dr. Trevor Moeller

This course will cover fundamental radiation processes that occur in absorbing, emitting, and radiating media (plasmas and high temperature gases). Topics will include: blackbody radiation concepts, fundamentals of radiation in matter, classical radiation, quantum theory of radiation, line broadening, continuum radiation, equilibrium relations, and an introduction to spectral diagnostics of plasmas.

**ME 600** DOCTORAL and RESEARCH DISSERTATION (3 - 15)
SEC. 016 Antar
017 Majdalani
021 Steinhoff
022 Moeller
031 Vakili

**ME 651** ADVANCED TOPICS IN COMPUTATIONAL FLUID DYNAMICS (3) [CANCELLED]
SEC. 001 (Same as AE 661/ES 651)
TIME: Tuesday & Friday 10:45 – 12:00 E210
TEXT: TBD
PROFESSOR: Dr. John Steinhoff


**PHYSICS**

**PHYS 500** MASTER’S THESIS (1 - 15)
SEC. 002 Crater
003 Lewis
004 Davis
005 Parigger
006 Chen
007 McGregor

**PHYS 503** PHYSICS COLLOQUIUM (1)
SEC. 002
TIME: Thursday 3:30 – 5:00 CLA Conference Room
PROFESSOR: Dr. Horace Crater

Lectures and discussion on current research topics. Continuous registration required for current graduate students.

**PHYS 512** THEORETICAL PHYSICS II (3)
SEC. 002 (Video Record)
TIME: Monday & Thursday 11:15 – 12:30 E113
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 (4)** CANCELLED
SEC. 002 (Interactive Transmission from Knoxville)
TIME: Wednesday 10:15 – 11:15 E113
TEXT: Core Concepts in Physics
PROFESSOR: Dr. Marianne Breinig

A course in Calculus based physics with 135, satisfies prerequisite for 200 level and beyond. Alternative to honors Physics 137–138 for physics majors. 3 hours lecture, 2 hours lab. **Coreq: Mathematics 141-142.**

**PHYS 522 QUANTUM MECHANICS (3)**
SEC. 002
TIME: Monday & Thursday 7:45 – 9:00 F252
PROFESSOR: Dr. Christian Parigger

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.

The course syllabus (lecture series and exercises) is designed to be attractive for pure and applied Science students. References to classical “Quantum Mechanics” texts such as Sakurai, Cohen-Tannoudji et al., and Greiner’s books “Quantum Mechanics, An Introduction” and “Quantum Mechanics, Special Chapters” will be made. This course is part I of a two-part course series, recommended to be taken in sequence. The above description of the course covers both 521 and 522, although for the spring 522 “Quantum Mechanics,” Schwabl’s “Advanced Quantum Mechanics” book, 4-th edition (2008) will also be used. For fall2009 and spring2010, UT’s electronic “blackboard” will be used.

**PHYS 551 STATISTICAL MECHANICS (3)**
SEC. 001
TIME: Tuesday & Friday 9:15 – 10:30 F252
TEXT: TBD
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 573 NUMERICAL METHODS IN PHYSICS (3)**

**SEC. 002**
**TIME:** Tuesday & Friday 2:30 – 3:45 E211

**PROFESSOR:** Dr. Christian Parigger

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

**COMMENT:** This is a course recognized for the new interdisciplinary graduate minor program in computational science: http://igmcs.utk.edu.

**PHYS 599 SEMINAR IN MODERN PHYSICS: SINGLE-MOLECULE SPECTROSCOPY (3)**

**SEC. 006**
**TIME:** Tuesday & Friday 10:45 – 12:00 F253
**TEXT:** TBD
**PROFESSOR:** Dr. Lloyd Davis

Seminar discussions on assigned readings from the literature on single-molecule spectroscopy.

**PHYS 599 SEMINAR IN MODERN PHYSICS: OCULAR SCIENCE AND INSTRUMENTATION (3)**

**SEC. 007**
**TIME:** Monday & Thursday 9:15 – 10:30 F253
**TEXT:** TBD
**PROFESSOR:** Dr. Ying Ling Ann Chen

**Repeatability:** May be repeated with consent of department. Maximum 18 hours.

**PHYS 599 SEMINAR IN MODERN PHYSICS: GENERAL RELATIVITY (1-3)**

**SEC. 008**
**TIME:** Monday & Thursday 9:15 – 10:30 B210
**TEXT:** TBD
**PROFESSOR:** Dr. Horace Crater

This course will explore an approach to Einstein's general relativity developed by the physicist Mendel Sachs. His approach utilizes quaternions and incorporates in one set of equations, the Einstein equations of General Relativity and the Maxwell equations of Electromagnetism. His unified field theory is in the spirit of that which Einstein sought through most of the later part of his life. The equations of Sachs' unified theory are nonlinear, just as with the Einstein equations. In the limit of small space curvature though, the quaternionic structure of the associated matter field equations leads to linear equations identical in form to those of quantum mechanics. The
The approach to be taken in this course will be to develop the main aspects of the older Einstein tensor formalism and in parallel develop the approach of Sachs. No previous course in general relativity is required. **Repeatability: May be repeated with consent of department. Maximum 18 hours.**

**PHYS 600 DOCTORAL & RESEARCH DISSERTATION (3 - 15)**

SEC. 002 Crater
003 Lewis
004 Davis
005 Parigger
006 Chen

**PHYS 606 NONLINEAR OPTICS (3)**

SEC. 001 (Interactive Video)

TIME: Tuesday & Thursday 8:15 – 9:30 E113

TEXT: TBD

PROFESSOR: Dr. Lloyd Davis

Nonlinear optical susceptibilities, wave propagation in nonlinear media, sum-frequency and difference frequency generation, harmonic generation, parametric amplification and oscillation, stimulated Raman processes, two-and multi-photon processes, four-wave mixing and phase conjugation, transient coherent optical effects and free induction decay, optical breakdown and nonlinear effects in plasmas. **Prerequisites:** 521

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

SEC. 001

TEXT: Advanced books on Quantum Mechanics including Schwabl; Advanced Quantum Mechanics, Third Edition; Springer 2005; Schwabl, Quantum Mechanics, 4th edition, Springer 2007 and classic references such as Bransden and Joachain; Physics of Atoms and Molecules; Benjamin Cummings; 2003 (2nd Edition); and/or Sakurai and Cohen Tannoudji, and on-line references, including references to Quantum Electrodynamics.

TIME: Monday & Thursday 9:15 –10:30 F252

PROFESSOR: Dr. Christian Parigger

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

**PHYS 642 ADVANCED TOPICS IN MODERN PHYSICS (3)**

SEC. 001

TEXT: TBD

TIME: Tuesday & Friday 10:45 – 12:00 F253

PROFESSOR: Dr. Lloyd Davis

Advanced theoretical or experimental topics not covered in other courses. **Repeatability: May be requested with consent of department. Maximum 9 hours.**

**PHYS 671 ADVANCED SOLID STATE PHYSICS (3)**

SEC. 001

TEXT: Electrical Transport in Nanoscale Systems; Massimiliano Di Ventra; Cambridge 2008; and classic Solid State Physics references, e.g. Kittel, Solid State Physics, 8th ed, Wiley 2005, including references to sections of Greiner, Quantum Electrodynamics, Springer 2003, and on-line references.

TIME: Tuesday & Friday 10:45 – 12:00 E211

PROFESSOR: Dr. Christian Parigger

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

STAT 251    PROBABILITY AND STATISTICS (3) CANCELLED
SEC. 002    (Video Recorded)
TEXT: TBD
TIME: Tuesday & Friday 8:45 – 10:00 E111
PROFESSOR: Dr. K.C. Reddy


Preq: or Coreq: Math 241.
Spring 2010
Registration Announcement

The University of Tennessee Space Institute

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

See Inside for Online Registration Instructions
https://cpo.utk.edu/CPOWeb