

# Fall 2016 Registration Announcement



The University of Tennessee  
Space Institute  
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[www.utsi.edu](http://www.utsi.edu)



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## CALENDAR - 2016 FALL SEMESTER

Priority Registration.....	March 21, 2016 – August 16, 2016
Admission to Candidacy Forms for Fall 2016 Commencement.....	August 9, 2016
Fall 2016 Graduation Application Deadline (submit online at MyUTK).....	August 9, 2016
Graduation Fee Payment Deadline (MS \$30, PhD \$75).....	August 9, 2016
Payment Due for Priority Registration.....	August 15, 2016
Late Registration and late fees begin ( <b>\$100 Late Fee</b> ).....	August 17-30, 2016
Classes begin.....	August 17, 2016
Last Day to final register, add, change grading options or drop without a “W”.....	August 26, 2016
Payment Due for Late Registration.....	August 26, 2016
Registration after 14 <sup>th</sup> day late fee ( <b>\$200 Late Fee</b> ).....	August 31, 2016-End of Term
Labor Day.....	September 5, 2016
Preliminary Thesis/Dissertation Review Deadline ( <a href="mailto:thesis@utk.edu">thesis@utk.edu</a> ).....	October 7, 2016
Fall Break (No Classes).....	October 6 - 7, 2016
Last day to schedule final exam (non-thesis/thesis/dissertation).....	October 28, 2016
Register to attend the Graduate Hooding Ceremony ( <a href="http://gradschool.utk.edu/graduation/">http://gradschool.utk.edu/graduation/</a> ) ..	TBD
Purchase cap and gown and order hood (865-974-3459).....	TBD
Last day to take final exam (non-thesis/thesis/dissertation).....	November 4, 2016
Drop with a “W”.....	November 8, 2016
Thesis/Dissertation Deadline 5:00 p.m. EST.....	November 18, 2016
Submit report of final examination (Pass/Fail) form.....	November 18, 2016
Thanksgiving Holidays.....	November 24 – 25, 2016
First Study Period.....	November 30, 2016
Deadline for Submission of Admission to Candidacy for students	
Graduating Spring 2017 and Graduation Application.....	December 1, 2016
All "INCOMPLETE" must be removed for Graduation.....	December 1, 2016
Classes End.....	December 1, 2016
Total Withdraw from the University Deadline.....	December 1, 2016
Second Study Period.....	December 2, 2016
Final Exam Period.....	December 5, 6 & 7, 2016
Graduate Hooding Ceremony (UTK).....	December 8, 2016
COMMENCEMENT (UTK).....	December 9, 2016
Official Graduation Date.....	December 9, 2016

### Second thesis/dissertation deadlines

Defense Completed by December 1, 2016

Second Deadline Application Submitted by December 1, 2016

<http://gradschool.utk.edu/forms-central/>

Thesis/Dissertation Submission Deadline by January 6, 2017

(Student will receive diploma spring 2017 semester, but will not be required to register for thesis/dissertation credits)

A new graduation application must be submitted for Spring graduation. For more

Information on graduation steps see <http://gradschool.utk.edu/graduation.shtml>

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## SPRING SEMESTER 2017

Priority Registration.....	TBD
Final Registration.....	TBD
Classes Begin.....	January 11, 2017
Martin Luther King Day (Holiday).....	January 16, 2017
Spring Break.....	March 13 – 17, 2017
Spring Recess.....	April 14, 2017

Classes End.....April 28, 2017  
 Study Period..... May 1, 2017  
 Exam Period.....May 2, 3, & 4, 2017  
 Graduate Hooding Ceremony (UTK) ..... May 11, 2017  
 University College Commencement Ceremonies ..... May 10 – 12, 2017  
 Official Graduation Date on Transcript ..... May 13, 2017

**Dates may be revised without notice. Please refer to the following sites for updates:**

[http://registrar.tennessee.edu/academic\\_calendar/index.shtml](http://registrar.tennessee.edu/academic_calendar/index.shtml)

**FALL SEMESTER 2016  
 STUDY PERIOD AND FINAL EXAM SCHEDULE**

LAST DAY OF CLASSES.....December 1, 2016  
 STUDY PERIOD ..... November 30, 2016 and December 2, 2016

**FINAL EXAMS**

REGULAR CLASS TIME	(Same Classroom)	EXAM TIME
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1<sup>st</sup> Day – Monday, December 5, 2016

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

2<sup>nd</sup> Day – Tuesday, December 6, 2016

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

3<sup>rd</sup> Day – Wednesday, December 7, 2016

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  
FALL SEMESTER 2016**

**REGISTRATION PROCEDURE**

**GRADUATE ACADEMIC ADVISING**

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

**REGISTRATION**

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

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

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

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

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

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

If you have any questions, call the Office of the University Registrar at 865-974-2101 or contact Charlene Hane in Student Services room A-206, phone 931-393-7228, email [chane@utsi.edu](mailto:chane@utsi.edu).

**TOLL-FREE NUMBERS**

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

**APPLICATION FOR ADMISSION**

No student will be allowed to register unless a completed Application for Admission to the Graduate School of the University of Tennessee, Knoxville (UTK) is on file in the Registrar's Office. An Application for Admission to the UTK Graduate School should be completed online at <https://www.applyweb.com/utg> and must be accompanied by a \$60.00 non-refundable application fee, payable to The University of Tennessee Space Institute. All applicants are required to provide one official transcript of all undergraduate and graduate records, GRE test

scores and 3 letters of recommendation when applying. International applicants will also need to include TOEFL scores. Please select UT Space Institute if your plans are to attend the Tullahoma campus location. Only online applications will be accepted by Graduate Admissions Knoxville, TN.

Graduate Research Assistantship applications can be sent to the Director of Administrative and Student Affairs, University of Tennessee Space Institute, MS-1, Tullahoma, TN 37388-9700. All applications should be accompanied by undergraduate and graduate transcripts and GRE test scores are required for all departments. All International applicants will need to provide TOEFL test scores in addition to GRE's. All official transcripts and test scores should be sent to College Code 1843, Graduate Admissions Office, 201 Student Services Building, Knoxville, TN 37996-0221. A full admission will not be granted by Graduate Admissions until all official test scores and degree confirmation are received. Please contact Dee Merriman, Director of Administrative and Student Affairs, at (931) 393-7213 or 888-822-8874 if you have questions.

### **TOTAL WITHDRAWAL FROM THE UNIVERSITY**

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

### **GRADES**

Students may obtain their grades through the web at MyUTK or contact Charlene Hane, Student Services, Office A-206, (931) 393-7228.

### **GRADUATE STUDENTS CHANGE OF REGISTRATION AFTER THE DEADLINE**

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

### **FULL-TIME STUDENTS**

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

### **REMOVAL OF INCOMPLETE GRADES**

All Incomplete Grades (I) must be removed prior to graduation. The instructor, in consultation with the student, decides the terms for the removal of the I, including the time limit for removal. If the I is not removed within one calendar year, the grade will be changed to an F. The course will not be counted in the cumulative grade point average until a final grade is assigned. No student may graduate with an I on the record. Students planning to graduate Fall Semester 2016 must remove all INCOMPLETE GRADES by December 1, 2016. Contact Charlene Hane, Student Services, to remove an Incomplete Grade.

## **REPEATING A COURSE**

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

## **ADMISSION TO CANDIDACY**

### **MASTER OF SCIENCE DEGREE:**

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

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

### **DOCTORAL DEGREE:**

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

## **CONTINUOUS ENROLLMENT**

All degree-seeking graduate students are expected to make a full commitment to their graduate and professional study in order to ensure that they can complete all degree requirements without unnecessary delay. Graduate students are therefore required to maintain an active status through continuous enrollment from the time of first enrollment until graduation.

Continuous enrollment is maintained by registering for a minimum of one graduate credit hour per semester (excluding the summer, unless stipulated otherwise by the program or department). However, students who have started taking dissertation hours (course 600) must maintain a minimum of three credit hours per semester during all semesters, including the summer, as stipulated in the policy on "Registration for Course 600 (Doctoral Research and Dissertation)" in order to comply with the Continuous Enrollment requirement (see under Doctoral Programs for details).

The minimum enrollment for international students may be different, and international students always need to check with the Center for International Education (CIE) in order to determine what minimum enrollment they need to maintain in order to satisfy all enrollment requirements attached to their specific visa.

## **CONSEQUENCES OF NON-ENROLLMENT WITHOUT LEAVE OF ABSENCE**

Graduate students who do not maintain continuous enrollment as stipulated in the "Continuous Enrollment" policy will lose their active student status. A student who has lost his or her active status without having been granted a Leave of Absence for the period of non-enrollment ahead of

time will not be allowed to continue in his/her graduate program until readmitted. (see policy on "Readmission" in the Graduate Catalog for more details).

Non-enrollment other than during an approved Leave of Absence (LOA) does not alter or affect any of the milestone deadlines, such as admission to candidacy, time to degree, etc.

Upon approval for readmission to complete the interrupted degree program, students will be retroactively enrolled in every semester of missed enrollment for one graduate credit hour of Course 502 or for three graduate credit hours of Course 600 (whichever is appropriate). Students will be responsible for paying the past tuition charges and fees as well as the current university per semester late registration penalty. All past due charges will need to be paid before the Graduate School will approve the student for any future enrollment.

### **FINAL EXAM FOR NON-THESIS, CAPSTONE PROJECT STUDENTS, THESIS AND DISSERTATION STUDENTS**

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

### **UT POLICY ON INSURANCE FOR INTERNATIONAL STUDENTS**

All foreign national students registered with the University of Tennessee, Knoxville, are required to have comprehensive medical insurance. The policy for the 2016-2017 academic year is provided by United HealthCare Student Resources. The premium must be paid before registration. Contact the Human Resources Office (room C-106 ext. 37267) for further information.

### **GENERAL SEMINAR**

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

### **FINAL EXAM DATES**

Study Period – November 30, 2016 and December 2, 2016  
Final Exams – December 5, 6, & 7, 2016

### **FINANCIAL CALENDAR, FEES, REFUNDS, AND TUITION**

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

The UTSI Budget and Finance Accounts Receivable Office will no longer accept payment for tuition and fees by credit card. All students will need to login to MyUTK One Stop to make secure payments online.

Please see One Stop - Paying Tuition and Fees webpage for more details  
<http://onestop.utk.edu/pay/>.



## Credit or Debit Cards

There is a 2.75% service fee for these payments. UT has a contract with an outside vendor to provide this service. The vendor retains the fee in full.

## HONOR STATEMENT

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

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

For official information on all UTK Graduate School policies, refer to the current UTK Graduate Catalog available at <http://catalog.utk.edu>. The student handbook "Hilltopics" is available online at <http://hilltopics.utk.edu/index.html>

**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 1988 (Public Law 100-690) and the Drug-Free Schools and communities Act of 1989, the University of Tennessee is notifying all students, faculty, and staff of the following university policy approved by the UT Board of Trustees on 21 June 1990.

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

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

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

**The University of Tennessee Space Institute  
Fall 2016 Course Listings**

**AEROSPACE ENGINEERING**

AE	500	Master's Thesis (1-15)	
SEC.	001	CRN 42734	Abedi
	009	CRN 42750	Anusonti-Inthra
	010	CRN 42754	Brooks
	011	CRN 42756	Majdalani
	012	CRN 42759	Moeller
	013	CRN 42760	Schmisseur
	014	CRN 42761	Solies
	015	CRN 42764	Vakili
	021	CRN 42774	Zhang

*Grading Restriction: P/NP only.*

*Repeatability: May be repeated.*

*Credit Level Restriction: Graduate credit only.*

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

AE	502	Registration for Use of Facilities (1-15)	
SEC.	002	CRN 42779	Moeller

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

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

*Repeatability: May be repeated.*

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

*Credit Level Restriction: Graduate credit only.*

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

AE	511	Inviscid Flow (3)	
SEC.	002	CRN 46341	
TEXT:	Fundamental Mechanics of Fluids; 4 <sup>th</sup> Edition; Currie, I.G.; ISBN 978-1439874608		
TIME:	Tuesday & Thursday	2:40 – 3:55	E-110
PROF:	Dr. Steven Brooks		

Kinematics and dynamics of inviscid fluids; potential flow about body, conformal mapping.

*(DE) Prerequisite(s): 541 and Mathematics 425.*

AE	515	Air Vehicle Aerodynamics and Performance (3)	
SEC.	001	CRN 45409	(Video Recorded)
TEXT:	M. Asselin; <i>An Introduction to Aircraft Performance</i> ; AIAA Education Series, Reston, VA 1997; ISBN 1-75-623241-X		
TIME:	Tuesday & Friday	1:00 – 2:15	E-111
PROF:	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.

AE 517 Finite Elements for Engineering Applications (3)  
SEC. 001 CRN 51392 (Same as ME 517 001 CRN 51366)  
TEXT: Notes will be provided. Recommended books:  
K. J. Bathe; *Finite Element Procedures*. Cambridge, MA: Klaus-Jurgen Bathe, 2007.  
ISBN: 9780979004902  
T. J. R. Hughes; *The Finite Element Method: Linear Static and Dynamic Finite Element Analysis*, Dover Publications, 2000. ISBN: 978-0486411811  
TIME: Tuesday & Thursday 10:10 – 11:25 E-110  
PROF: Dr. Reza Abedi

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.

*Cross-listed: (Same as Mechanical Engineering 517)*

*Comment(s): Bachelor's degree in engineering or natural science required.*

*Registration Permission: Consent of instructor.*

AE 521 Aerodynamics of Compressible Fluids I (3)  
SEC. 001 CRN 46137  
TEXT: John D. Anderson; *Modern Compressible Flow: With Historical Perspectives*; 3rd Edition; McGraw Hill; ISBN 0-07-242443-5.  
TIME: Monday & Wednesday 10:10 – 11:25 E-110  
PROF: Dr. John Schmisser

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

AE 590 Selected Engineering Problems (2-6)  
SEC. 010 CRN 48030 Abedi  
002 CRN 42787 Anusonti-Inthra  
003 CRN 42788 Brooks  
004 CRN 46139 Majdalani  
005 CRN 46140 Moeller  
006 CRN 46141 Schmisser  
007 CRN 46142 Solies  
008 CRN 46143 Vakili  
009 CRN 46144 Zhang

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

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

*Registration Permission: Consent of advisor.*

AE 595 Aerospace Engineering Seminar (1)  
SEC. 001 CRN 42791  
TEXT: None  
TIME: Will be announced through email  
PROF: Dr. Ahmad Vakili

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

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

*Repeatability: May be repeated. Maximum 20 hours.*

AE 599 Special Topics in Aerospace Engineering: Computational Fluid Dynamics I (3)  
SEC. 001 CRN 42794 (Same as ME 599 001 CRN 43482)  
TEXT: *Applied Computational Aerodynamics: A Modern Engineering Approach*; Russell M. Cummings, William H. Mason, Scot A Morton, David R. McDaniel  
TIME: Monday & Wednesday 11:40 – 12:55 E-110  
PROF: Dr. Greg Power

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

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

*Registration Permission: Consent of instructor.*

AE 600 Doctoral Research/Dissertation (3-15)  
SEC. 004 CRN 42805 Abedi  
005 CRN 42807 Anusonti-Inthra  
006 CRN 42809 Brooks  
007 CRN 42811 Majdalani  
008 CRN 42813 Moeller  
014 CRN 42819 Schmissuer  
015 CRN 42820 Solies  
017 CRN 46349 Vakili  
018 CRN 46350 Zhang

*Grading Restriction: P/NP only.*

*Repeatability: May be repeated.*

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

AE 601 Doctoral Research Methodology (3)  
SEC. 002 CRN 49698  
TEXT: TBD  
TIME: TBD  
PROF: Dr. Kivanc Ekici

Methods of planning and conducting original research and proposal writing.  
*Registration Restriction(s): Minimum student level – graduate / doctoral students.*  
*Registration Permission: Departmental approval.*

AE 681 Advanced Viscous Flow Theory (3)  
SEC. 001 CRN 49403  
TEXT: TBD; Handouts will be provided  
TIME: Monday & Wednesday 8:40 – 9:55 E-211  
PROF: Dr. Ahmad Vakili

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.  
*(DE) Prerequisite(s): 512, continuum mechanics, and Mathematics 562.*  
*Registration Restriction(s): Minimum student level – graduate.*

AE 682 Rocket Propulsion II (3)  
SEC. 001 CRN 51325  
TEXT: George P. Sutton and Oscar Biblarz, Rocket Propulsion Elements, 3<sup>rd</sup> or 4<sup>th</sup> ed. Wiley.  
[http://www.amazon.com/Rocket-Propulsion-Elements-George-Sutton/dp/0470080248/ref=sr\\_1\\_1?ie=UTF8&qid=1437680444&sr=8-1&keywords=sutton+rocket+propulsion+elements](http://www.amazon.com/Rocket-Propulsion-Elements-George-Sutton/dp/0470080248/ref=sr_1_1?ie=UTF8&qid=1437680444&sr=8-1&keywords=sutton+rocket+propulsion+elements)  
TIME: Monday & Thursday 1:00 – 2:15 E-113  
PROF: 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.  
*(RE) Prerequisite(s): 581.*  
*Registration Restriction(s): Minimum student level – graduate.*  
*Registration Permission: Consent of Instructor.*

## AVIATION SYSTEMS

AS 500 Master's Thesis (1-15)  
SEC. 001 CRN 46145 Brooks  
002 CRN 46146 Solies

*Grading Restriction: P/NP only.*  
*Repeatability: May be repeated.*  
*Credit Level Restriction: Graduate credit only.*  
*Registration Restriction(s): Minimum student level – graduate*

AS 502 Registration for Use of Facilities (1-15)  
SEC. 001 CRN 46149 Brooks  
002 CRN 46150 Solies

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

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

*Repeatability: May be repeated.*

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

*Credit Level Restriction: Graduate credit only.*

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

AS 522 Experimental Flight Mechanics: Fixed Wing Stability & Control (3)  
SEC. 001 CRN 46154  
TEXT: Ralph D. Kimberlin; *Flight Testing of Fixed Wing Aircraft*; AIAA; 1<sup>st</sup> Edition;  
ISBN 1-56347-564-2  
TIME: Tuesday & Friday 10:30 – 11:45 Airport Classroom  
PROF: Dr. Peter Solies

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

*(DE) Prerequisite(s): 516 and 521.*

AS 550 Project in Aviation Systems (3)  
SEC. 001 CRN 46155 Brooks  
002 CRN 46156 Solies

*Repeatability: May be repeated. Maximum 15 hours.*

*Credit Restriction: Maximum of 3 hours may be applied toward degree requirements.*

*Comment(s): Non-thesis aviation systems majors only.*

*Credit Level Restriction: Graduate credit only.*

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

## **BIOMEDICAL ENGINEERING**

BME 500 Master's Thesis (1-15)  
SEC. 012 CRN 47158 Johnson

*Grading Restriction: P/NP only.*

*Repeatability: May be repeated.*

*Credit Level Restriction: Graduate credit only.*

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

BME 505 All Things Carbon (3)  
SEC. 001 CRN 51367  
TEXT: TBD  
TIME: Monday & Wednesday 1:10 – 2:25 E-110  
PROF: Dr. Jacqueline Johnson

Carbon is the basis of life; as such BME students have the ability to study this element along with associated biological applications. Diamond-like carbon has potential as a coating for orthopedic implants. Nano-crystalline diamond can be used as a biosensor. Carbon nanotubes have applications in pharmacy and medicine due to their large surface area. Carbon is a suitable coating for magnetic nanoparticles, which can be used for hyperthermia and magnetic resonance imaging. In summary the

ability of carbon to enhance medical diagnostics and treatment is wide-ranging and not fully exploited. Students will learn current applications of carbon in medicine and be able to project future uses once this course is completed.

BME 511 Biotransport Processes (3)  
SEC. 002 CRN 51400  
TEXT: TBD  
TIME: Tuesday & Thursday 1:10 – 2:25 E-110  
PROF: Dr. S. Sarles

Introduction of an integrative set of computational problem solving tools providing numerical foundations for Biomedical Engineering. This course will apply numerical methods to applications in systems, organs, cellular, and molecular systems.

*(DE) Prerequisite(s): 503.*

BME 529 Applications of Linear Algebra in Engineering Systems (3)  
SEC. 002 CRN 47251 (Video Recorded)  
TEXT: *Advanced Linear Algebra for Engineers with MATLAB*; Sohail A. Dianat and Eli S. Saber; CRC Press; Latest Edition; ISBN 978-1-4200-9523-4  
TIME: Tuesday & Friday 9:30 – 10:45 E-111  
PROF: 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.

Methods of linear algebra with application to engineering problems. Systems of linear equations: matrix-vector notation, solutions to linear equations, determinants, matrix inversion. Vector spaces: spanning sets, orthogonality, matrix decompositions, linear transformations. Eigenvalues and eigenvectors: characteristic polynomials, singular value decomposition. The Cayley-Hamilton theorem: matrix polynomials, functions of matrices. Optimization: least-squares and weighted least-squares methods. *Cross-listed: (Same as Chemical and Biomolecular Engineering 529; Civil Engineering 529, Electrical and Computer Engineering 529; Environmental Engineering 529; Industrial Engineering 529; Materials Science and Engineering 529; Mechanical Engineering 529; Nuclear Engineering 529).*  
*Comment(s): Graduate standing or consent of instructor required.*

BME 595 Biomedical Seminar (1)  
SEC. 002 CRN 46815  
TEXT: None  
TIME: Will be announced through email  
PROF: Dr. Jacqueline Johnson

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

BME 600 Doctoral Research/Dissertation (3-15)  
SEC. 011 CRN 46816 Johnson

*Grading Restriction: P/NP only.*

*Repeatability: May be repeated.*

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

BME 601 Doctoral Research Methodology (3)  
SEC. 002 CRN 49699  
TEXT: TBD  
TIME: TBD  
PROF: Dr. Eric Boder

Intensive, individualized experience in reviewing literature, evaluating experimental or theoretical methods, planning a research project, and presenting research project plans orally and in writing.

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

*Registration Permission: Consent of instructor.*

## **ELECTRICAL ENGINEERING AND COMPUTER SCIENCE**

ECE 529 Applications of Linear Algebra in Engineering Systems (3)  
SEC. 002 CRN 47252 (Video Recorded)  
TEXT: *Advanced Linear Algebra for Engineers with MATLAB*; Sohail A. Dianat and Eli S. Saber;  
CRC Press; Latest Edition; ISBN 978-1-4200-9523-4  
TIME: Tuesday & Friday 9:30 – 10:45 E-111  
PROF: 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.

Methods of linear algebra with application to engineering problems. Systems of linear equations: matrix-vector notation, solutions to linear equations, determinants, matrix inversion. Vector spaces: spanning sets, orthogonality, matrix decompositions, linear transformations. Eigenvalues and eigenvectors: characteristic polynomials, singular value decomposition. The Cayley-Hamilton theorem: matrix polynomials, functions of matrices. Optimization: least-squares and weighted least-squares methods.

*Cross-listed: (Same as Chemical and Biomolecular Engineering 529; Civil Engineering 529, Environmental Engineering 529; Industrial Engineering 529; Materials Science and Engineering 529; Mechanical Engineering 529; Nuclear Engineering 529).*

*Comment(s): Graduate standing or consent of instructor required.*

ECE 600 Doctoral Research/Dissertation (3-15)  
SEC. 031 CRN 50377 Bomar

*Grading Restriction: P/NP only.*

*Repeatability: May be repeated.*

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



## ENGINEERING MANAGEMENT

EM 500 Master's Thesis (1-15)  
SEC. 001 CRN 48268 Simonton  
002 CRN 50267 Yu

*Restriction: P/NP only.*

*Repeatability: May be repeated.*

*Credit Level Restriction: Graduate credit only.*

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

EM 501 Capstone Project (3-6)  
SEC. 001 CRN 43152 Tolk  
002 CRN 49108 Tolk

Application-oriented project to show competence in major academic area.

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

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

*Comment(s): Requires enrollment in engineering management.*

*Credit Level Restriction: Graduate credit only.*

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

EM 502 Registration for Use of Facilities (1-15)  
SEC. 001 CRN 43153 Simonton  
002 CRN 50272 Yu

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

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

*Repeatability: May be repeated.*

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

*Credit Level Restriction: Graduate credit only.*

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

EM 532 Productivity and Quality Engineering (3)  
SEC. 001 CRN 45466 (Prerecorded)

TEXT: *Improving Performance: How to Manage the White Space on the Organization Chart*; 3<sup>rd</sup> Edition; Geary A. Rummler and Alan P. Brache.

*The Principles of Scientific Management*, Taylor, F. W. (1998, 1911). Mineola, NY: Dover Publications, Inc.

*The New Economics for Industry, Government, Education*, 2<sup>nd</sup> Edition, Deming, W. E. (1994). Cambridge, MA: The MIT Press.

TIME: TBD

PROF: Dr. Janice Tolk

Productivity and quality measures defined and used to analyze current competitive position of important sectors of American industry with respect to national and international competition. Study of management theorists and systems which promote or inhibit productivity or quality improvements.

EM 533 Theory and Practice of Engineering Management (3)  
SEC. 001 CRN 43154 UTSI students participating at Tullahoma

002 CRN 43155 UTSI students participating elsewhere  
 003 CRN 43156 UTK students participating elsewhere  
 TEXT: *Paradigms: The Business of Discovering the Future*, J. A. Barker, (1993), Harper Business Press, New York, ISBN# 10: 0887306470 13: 978-0887306471  
*Productive Workplaces Revisited: Dignity, Meaning and Community in the 21st Century*, M. R. Weisbord, (2004) Pfeifer, ISBN # 0787971170  
 TIME: Tuesday 4:00 – 6:35 E-113  
 PROF: Dr. James L. Simonton

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

EM 537 Analytical Methods for Engineering Managers (3)  
 SEC. 001 CRN 45470 UTSI students participating at Tullahoma  
 002 CRN 45471 UTSI students participating elsewhere  
 003 CRN 45472 UTK students participating elsewhere  
 TEXT: *Operations Management*; William Stevenson; McGraw-Hill; January 7, 2014; Edition 12<sup>th</sup>; ISBN 13:978-0078024108, ISBN 10:0078024102  
 TIME: Monday 4:00 – 6:35 E-113  
 PROF: Dr. Andrew Yu

Survey of management analysis and control systems through industrial engineering techniques. Qualitative and quantitative systems: methods analysis, work measurement, incentive systems, wage and salary development, production and inventory control, facility layout, linear programming, and applied operations research techniques.  
*Credit Restriction: No credit for student with undergraduate degrees in industrial engineering.*

EM 539 Strategic Management in Technical Organizations (3)  
 SEC. 001 CRN 45474 (Prerecorded)  
 TEXT: *Strategic Management: Concepts & Cases*; Frank Rothaermel; 1<sup>st</sup> Edition; McGraw-Hill; ISBN 10:0078112737, ISBN-13: 978-0078112737  
 TIME: TBD  
 PROF: Dr. Janice Tolk

Strategic planning process and strategic management in practice; corporate vision and mission; product, market, organizational, and financial strategies; external factors; commercialization of new technologies; and competition and beyond.  
*Recommended Background: Graduate standing in Engineering or Business.*

EM 600 Doctoral Research/Dissertation (3-15)  
 SEC. 001 CRN 45480 Simonton  
 002 CRN 45482 Yu

*Grading Restriction: P/NP only.*  
*Repeatability: May be repeated.*  
*Registration Restriction(s): Minimum student level – graduate.*

EM 691 Advanced Topics EM: Systems Theory and Engineering (3)  
 SEC. 001 CRN 51332 UTSI students participating at Tullahoma

002 CRN 51372 UTSI students participating elsewhere  
 003 CRN 51373 UTK students participating elsewhere  
 TEXT: *Systems Engineering Management*; Benjamin Blanchard and John E. Blyter; 5<sup>th</sup> Edition;  
 ISBN 978-1-119-04782-7  
 TIME: Thursday 4:00 – 6:35 E-113  
 PROF: Dr. James Simonton

Forum to study advanced topics individually or in groups.  
*Repeatability: May be repeated if topic differs. Maximum 6 hours.*  
*Registration Restriction(s): Minimum student level – graduate.*

Course Description: Theoretical foundations of General System Theory as they are applied to engineering and organizational enterprises addressing issues concerning systems, the effectiveness of organizations in the context of traditional management related issues, as well as incorporating the critical impact of systems thinking on the socio-technical environment.

### INDUSTRIAL ENGINEERING

IE 529 Applications of Linear Algebra in Engineering Systems (3)  
 SEC. 002 CRN 47253 (Video Recorded)  
 TEXT: *Advanced Linear Algebra for Engineers with MATLAB*; Sohail A. Dianat and Eli S. Saber;  
 CRC Press; Latest Edition; ISBN 978-1-4200-9523-4  
 TIME: Tuesday & Friday 9:30 – 10:45 E-111  
 PROF: 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.

Methods of linear algebra with application to engineering problems. Systems of linear equations: matrix-vector notation, solutions to linear equations, determinants, matrix inversion. Vector spaces: spanning sets, orthogonality, matrix decompositions, linear transformations. Eigenvalues and eigenvectors: characteristic polynomials, singular value decomposition. The Cayley-Hamilton theorem: matrix polynomials, functions of matrices. Optimization: least-squares and weighted least-squares methods.  
*Cross-listed: (Same as Chemical and Biomolecular Engineering 529; Civil Engineering 529, Electrical and Computer Engineering 529; Environmental Engineering 529; Materials Science and Engineering 529; Mechanical Engineering 529; Nuclear Engineering 529).*  
*Comment(s): Graduate standing or consent of instructor required.*

### MATERIAL SCIENCE ENGINEERING

MSE 529 Applications of Linear Algebra in Engineering Systems (3)  
 SEC. 002 CRN 47254 (Video Recorded)  
 TEXT: *Advanced Linear Algebra for Engineers with MATLAB*; Sohail A. Dianat and Eli S. Saber;  
 CRC Press; Latest Edition; ISBN 978-1-4200-9523-4  
 TIME: Tuesday & Friday 9:30 – 10:45 E-111  
 PROF: 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.

Methods of linear algebra with application to engineering problems. Systems of linear equations: matrix-vector notation, solutions to linear equations, determinants, matrix inversion. Vector spaces: spanning sets, orthogonality, matrix decompositions, linear transformations. Eigenvalues and eigenvectors: characteristic polynomials, singular value decomposition. The Cayley-Hamilton theorem: matrix polynomials, functions of matrices. Optimization: least-squares and weighted least-squares methods. *Cross-listed: (Same as Biomedical Engineering 529; Chemical and Biomolecular Engineering 529; Civil Engineering 529, Electrical and Computer Engineering 529; Environmental Engineering 529; Industrial Engineering 529; Nuclear Engineering 529).*  
*Comment(s): Graduate standing or consent of instructor required.*

## MATHEMATICS

Math	404	Applied Vector Calculus (3)		<b>CANCELLED</b>
SEC.	001	CRN 43322		
TEXT:		<i>Vector Calculus</i> ; Paul C. Matthews; Springer; ISBN-10: 3540761802; ISBN-13: 978-3540761808		
TIME:	Tuesday	2:00 – 4:30		F-253
PROF:	Dr. Jan Zijlstra			

Topics from multivariable and vector calculus; line and surface integrals, divergence theorem and the theorems of Gauss and Stokes.  
*(RE) Prerequisite(s): 241 or 247.*

## MECHANICAL ENGINEERING

ME	500	Master's Thesis (1-15)	
SEC.	001	CRN 43441	Abedi
	021	CRN 43461	Anusonti-Inthra
	022	CRN 43462	Brooks
	023	CRN 43463	Majdalani
	024	CRN 43464	Moeller
	025	CRN 43465	Schmisseur
	034	CRN 46159	Solies
	035	CRN 46160	Vakili
	036	CRN 46161	Zhang

*Grading Restriction: P/NP only.*

*Repeatability: May be repeated.*

*Credit Level Restriction: Graduate credit only.*

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

ME	502	Registration for Use of Facilities (1-15)	
SEC.	002	CRN 46162	Moeller

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

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

*Repeatability: May be repeated.*

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

*Credit Level Restriction: Graduate credit only.*

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

ME 511 Fundamentals of Heat Conduction (3)  
SEC. 001 CRN 45700  
TEXT: Heat Conduction; 3<sup>rd</sup> Edition; David W. Hahn, M. Necati Ozisik; ISBN 978-1-118-33285-6  
TIME: Monday & Wednesday 2:40 – 3:55 E-110 (no connection)  
PROF: Dr. Feng-Yuan Zhang

Properties of radiating surfaces. Diffuse, specular and directional interchange for gray and nongray surfaces. Interaction with other heat transfer modes. Analysis of steady-state and time-dependent with other heat transfer modes. Analysis of steady-state and time-dependent heat conduction by analytical methods.

*Recommended Background: Undergraduate heat transfer course.*

ME 517 Finite Elements for Engineering Applications (3)  
SEC. 001 CRN 51366 (Same as AE 517 001 51392)  
TEXT: Notes will be provided. Recommended books:  
K. J. Bathe; *Finite Element Procedures*. Cambridge, MA: Klaus-Jurgen Bathe, 2007.  
ISBN: 9780979004902  
T. J. R. Hughes; *The Finite Element Method: Linear Static and Dynamic Finite Element Analysis*, Dover Publications, 2000. ISBN: 978-0486411811  
TIME: Tuesday & Thursday 10:10 – 11:25 E-110  
PROF: Dr. Reza Abedi

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.

*Cross-listed: (Same as Aerospace Engineering 517.)*

*Comment(s): Bachelor's degree in engineering or natural science required.*

*Registration Permission: Consent of instructor.*

ME 521 Thermodynamics I (3)  
SEC. 002 CRN 46342  
TEXT: *Thermodynamics*; 1st Edition by [Sanford Klein](#) (Author), [Gregory Nellis](#) (Author)  
ISBN-13: 978-0521195706  
TIME: Monday 4:00 – 6:35 E-111  
PROF: Dr. Paul Marotta

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

physics, Schroedinger equation.

*Recommended Background: Undergraduate thermodynamics.*

ME 524 Fracture Mechanics (3)

SEC. 001 CRN 49402

TEXT: T. L. Anderson, *Fracture Mechanics: Fundamentals and Applications*, 3rd Edition, CRC Press, USA, 2004 (main textbook).

TIME: Tuesday & Thursday 8:40 – 9:55 E-110

PROF: Dr. Reza Abedi

Mechanisms of fracture and crack growth; stress analysis; crack tip plastic zone; energy principles in fracture mechanics; fatigue-crack initiation and propagation; fracture mechanic design and fatigue life prediction. Analytical, numerical, and experimental methods for determination of stress intensity factors. Current topics in fracture mechanics.

*Registration Permission: Consent of instructor.*

ME 525 Combustion of Chemically Reacting Flow I (3)

SEC. 001 CRN 51338

TEXT: *An Introduction to Combustion: Concepts and Applications*; 3rd Edition; Stephen Turns; ISBN-13: 978-0073380193; ISBN-10: 0073380199  
Available from Amazon.com:

[https://www.amazon.com/Introduction-Combustion-Concepts-Applications/dp/0073380199/ref=mt\\_hardcover?\\_encoding=UTF8&me=](https://www.amazon.com/Introduction-Combustion-Concepts-Applications/dp/0073380199/ref=mt_hardcover?_encoding=UTF8&me=)

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

PROF: Dr. Trevor Moeller

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.

*(DE) Prerequisite(s): 522 and 541 or consent of instructor.*

ME 529 Applications of Linear Algebra in Engineering Systems (3)

SEC. 002 CRN 47255 (Video Recorded)

TEXT: *Advanced Linear Algebra for Engineers with MATLAB*; Sohail A. Dianat and Eli S. Saber; CRC Press; Latest Edition; ISBN 978-1-4200-9523-4

TIME: Tuesday & Friday 9:30 – 10:45 E-111

PROF: 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.

Methods of linear algebra with application to engineering problems. Systems of linear equations: matrix-vector notation, solutions to linear equations, determinants, matrix inversion. Vector spaces: spanning sets, orthogonality, matrix decompositions, linear transformations. Eigenvalues and eigenvectors: characteristic polynomials, singular value decomposition. The Cayley-Hamilton theorem: matrix polynomials, functions of matrices. Optimization: least-squares and weighted least-squares methods.

*Cross-listed: (Same as Chemical and Biomolecular Engineering 529; Civil Engineering 529, Electrical and Computer Engineering 529; Environmental Engineering 529; Industrial Engineering 529; Materials Science and Engineering 529; Nuclear Engineering 529).*

*Comment(s): Graduate standing or consent of instructor required.*

ME 584 Turbomachinery Systems I (3)  
SEC. 001 CRN 45709 (Video Recorded)  
TEXT: Jack D. Mattingly; *Elements of Propulsion: Gas Turbines and Rockets*; 2006;  
ISBN 1-56347-779-3  
TIME: Tuesday & Thursday 4:00 – 5:15 E-111  
PROF: Dr. Milt Davis

Ideal cycle analysis of turbine engines, real cycle analysis, component performance analysis, component design and systems integration (inlets, nozzles, combustors, compressors, turbines), flowthrough theory, turbine engine component matching, transient operation, surge and rotating stall, engine control systems, structural considerations.

*Comment(s): First-year graduate standing required.*

*Registration Permission: Consent of instructor.*

ME 590 Selected Engineering Problems (3)  
SEC. 001 CRN 43478 Abedi  
002 CRN 43479 Anustonti-Inthra  
003 CRN 45715 Brooks  
004 CRN 46163 Majdalani  
005 CRN 46164 Moeller  
006 CRN 46165 Schmisser  
007 CRN 46166 Solies  
008 CRN 46167 Vakili  
009 CRN 46168 Zhang

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

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

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

*Registration Permission: Consent of advisor.*

ME 595 Mechanical Engineering Seminar (1)  
SEC. 001 CRN 43480  
TEXT: None  
TIME: Will be announced through email  
PROF: Dr. Ahmad Vakili

All phases of mechanical engineering, reports on current research at the University of Tennessee, Knoxville, and the University of Tennessee Space Institute.

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

*Repeatability: May be repeated. Maximum 20 hours.*

ME 599 Special Topics in Aerospace Engineering: Computational Fluid Dynamics I (3)  
SEC. 001 CRN 43482 (Same as AE 599 001 CRN 42794)  
TEXT: *Applied Computational Aerodynamics: A Modern Engineering Approach*; Russell M. Cummings, William H. Mason, Scot A Morton, David R. McDaniel  
TIME: Monday & Wednesday 11:40 – 12:55 E-110

PROF: Dr. Greg Power

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

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

*Registration Permission: Consent of instructor.*

ME	600	Doctoral Research/Dissertation (3-15)
SEC.	015	CRN 43499 Abedi
	016	CRN 43500 Anusonti-Inthra
	018	CRN 43502 Brooks
	019	CRN 43503 Majdalani
	026	CRN 43510 Moeller
	027	CRN 43511 Schmisser
	028	CRN 43512 Solies
	029	CRN 48032 Vakili
	030	CRN 48033 Zhang

*Grading Restriction: P/NP only.*

*Repeatability: May be repeated.*

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

ME	601	Doctoral Research Methodology (3)
SEC.	002	CRN 50380
TEXT:	TBD	
TIME:	TBD	
PROF:	Dr. Kivanc Ekici	

Methods of planning and conducting original research and proposal writing.

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

*Registration Permission: Departmental approval.*

## PHYSICS

Phys	500	Master's Thesis (1-15)
SEC.	002	CRN 41919 Davis
	003	CRN 41999 Parigger

*Grading Restriction: P/NP only.*

*Repeatability: May be repeated.*

*Credit Level Restriction: Graduate credit only.*

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

Phys	503	Physics Colloquium (1)
SEC.	002	CRN 42009
TEXT:	None	



TIME: TBD  
PROF: Dr. Lloyd Davis

TBD

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

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

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

Phys 507 Contemporary Optics (3)  
SEC. 001 CRN 49153  
TEXT: TBD  
TIME: Tuesday & Thursday 9:10 – 10:25 TBD  
PROF: Dr. Lloyd Davis

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

Phys 599 Seminars (1)  
SEC. 009 CRN 49155  
TEXT: Classic Texts and Literature  
TIME: 2<sup>nd</sup>, 4<sup>th</sup> Thursday /each month 3:00 - 4:30 TBD  
PROF: Dr. Christian Parigger

(a) Mechanics; (b) Radiation; (c) Heat and Thermodynamics; (d) Electricity and Magnetism; (e) Modern Physics.

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

Phys 600 Doctoral Research/Dissertation (3-15)  
SEC. 002 CRN 42047 Davis  
003 CRN 42048 Parigger

*Grading Restriction: P/NP only.*

*Repeatability: May be repeated.*

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

Phys 605 Laser Spectroscopy (3)  
SEC. 001 CRN 48035  
TEXT: Laser Spectroscopy 1 (Basic Principles) and Laser Spectroscopy 2 (Experimental Techniques) 5<sup>th</sup> edition 2014 and 2015, respectively, Wolfgang Demtröder, Springer E-book, International Edition, augmented by on-line references, other classic books on the subject, and lecture and lab notes.  
TIME: Monday & Thursday 1:00 – 2:15 E-111  
PROF: Dr. Christian Parigger

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

*(DE) Prerequisite(s): 521 and 541.*

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