
SPRING 2018

REGISTRATION ANNOUNCEMENT



411 B.H. GOETHERT PARKWAY

TULLAHOMA, TN 37388-9700

 SPACE INSTITUTE

www.utsi.edu

888-822-8874 Ext. 37228

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CALENDAR - 2018 SPRING SEMESTER

Priority Registration.....	October 16, 2017 – January 9, 2018
Admission to Candidacy Forms for Spring 2018 Commencement	December 5, 2017
Spring 2018 Graduation Application Deadline (submit online)	December 5, 2017
Graduation Fee Payment Deadline (MS \$30, PhD \$75).....	December 5, 2017
Priority registration payment deadline 4:30 p.m. EST.....	January 8, 2018
Late Registration and late fees begin (\$100 Late Fee).....	January 10, 2018
Classes begin.....	January 10, 2018
Martin Luther King Holiday	January 15, 2018
Last Day to final register, add, change grading options or drop without a “W”.....	January 19, 2018
Late Registration and late fees after 14 th day (\$200)	January 24, 2018
Preliminary Thesis/Dissertation Review Deadline	February 23, 2018
Spring Break (No Classes).....	March 12 - 16, 2018
Last day to schedule final exam (non-thesis/thesis/dissertation)	March 29, 2018
Spring Recess (No Classes)	March 30, 2018
Drop with a “W”	April 3, 2018
Last day to take final exam (non-thesis/thesis/dissertation)	April 6, 2018
Thesis/Dissertation Deadline 5:00 p.m. EST	April 20, 2018
Submit report of final examination (Pass/Fail) form	April 20, 2018
All "INCOMPLETE" must be removed for Graduation.....	April 27, 2018
Deadline for Submission of Admission to Candidacy for students Graduating Summer 2018 and Graduation Application.....	April 27, 2018
Classes End.....	April 27, 2018
Total Withdraw from the University Deadline	April 27, 2018
Study Period.....	April 30, 2018
Exam Period.....	May 1, 2, & 3, 2018
Graduate Hooding Ceremony (UTK)	May 10, 2018
COMMENCEMENT (UTK)	May 10 - 12, 2018
Official Graduation Date.....	May 12, 2018

Second thesis/dissertation deadlines

Defense Completed by April 27, 2018

Second Deadline Application Submitted by April 27, 2018

<http://gradschool.utk.edu/forms/Second%20Deadline%20Graduation%20Application.pdf>

Thesis/Dissertation Submission Deadline by May 18, 2018

(Student will receive diploma summer 2018 semester, but will not be required to register for thesis/dissertation credits)

SUMMER SEMESTER 2018

Priority Registration.....	TBD
Final Registration	TBD
Memorial Day Holiday	May 28, 2018
Classes begin.....	May 31, 2018
July 4 th Holiday	July 4, 2018
Classes End.....	August 10, 2018
Summer Graduation Date on Transcript (No Ceremony).....	August 11, 2018

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

<http://gradschool.utk.edu/ddategraduation.shtml>

http://registrar.tennessee.edu/academic_calendar/index.shtml

**SPRING SEMESTER 2018
FINAL STUDY DAY AND EXAM SCHEDULE**

LAST DAY OF CLASSES.....April 27, 2018

STUDY PERIODApril 30, 2018

FINAL EXAMS

REGULAR CLASS TIME	(Same Classroom)	EXAM TIME
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1st Day – Tuesday, May 1, 2018

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 2, 2018

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 May 3, 2018

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

Graduation and Graduate Hooding Ceremony dates to be announced go to:

<http://gradschool.utk.edu/graduation/graduate-hooding-ceremony/>

REGISTRATION ANNOUNCEMENT SPRING SEMESTER 2018

REGISTRATION PROCEDURE

GRADUATE ACADEMIC ADVISING

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

REGISTRATION

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

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

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

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

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

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

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

TOLL-FREE NUMBERS

For a specific office: 1-888-822-UTSI (8874) and the extension number.
For general information: 1-888-822-UTSI (8874)
Admissions Office: 1-888-822-UTSI (8874)-37234
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 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 completed online at <https://www.applyweb.com/utg> and accompanied by a \$60.00 non-refundable application fee made 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 three letters of recommendation when applying. International applicants will also need to include TOEFL scores. GRE scores are a requirement of all departments at UTSI except the Master of Science degree in Industrial Engineering/Engineering Management concentration. Please select UT Space Institute if you plan to attend the Tullahoma campus location. All applications need to be submitted online to the office of Graduate Admissions Knoxville, TN.

Graduate Research Assistantship applications need to be submitted to Clara Ferguson, Office of Admissions and Recruiting, University of Tennessee Space Institute, MS-6, Tullahoma, TN 37388-9700. Assistantship applications must include GRE test scores and three letters of recommendation. All International applicants will need to provide TOEFL test scores in addition to GRE's. Official transcripts and test scores should be sent to College Code 1843, Graduate Admissions Office, 201 Student Services Building, Knoxville, TN 37996-0221. Once admitted, a full admission will not be granted until all official test scores and degree confirmation are received in the Graduate Admissions Office in Knoxville. Please contact Clara Ferguson at (931) 393-7234 or 888-822-8874 ext. 37234 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 D-100, (931) 393-7228.

GRADUATE STUDENTS CHANGE OF REGISTRATION AFTER THE DEADLINE

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

FULL-TIME STUDENTS

Students enrolled in at least 9 semester hours during the Fall/Spring/Summer semesters are considered full-time. Full-time enrollment for two consecutive semesters is required to full fill the admission to candidacy doctoral degree residency requirement. Graduate Research Assistants (GRAs) must be enrolled for 9 hours during the Fall/Spring semesters and 6 hours during the Summer. GRAs must also enroll in one of the MABE 595 seminars or a PHYS 599 seminar each semester in which seminars are offered, 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 Spring Semester 2018 must remove all INCOMPLETE GRADES by April 27, 2018. 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 2017-2018 academic year is provided by United HealthCare Student Resources. The premium must be paid before registration. Contact the Student Services Office (room D-100 ext. 37228) 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 Day – April 30, 2018
Final Exams – May 1, 2, & 3, 2018

FINANCIAL CALENDAR, FEES, REFUNDS, AND TUITION

Please click <http://onestop.utk.edu/tuition-fees/> link to the most current information. You may also contact Jennifer Boyles in the Business and Finance Office at jboyles@utsi.edu or phone number 931-393-7297.

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. Priority registration payment deadline is January 8, 2018 by 4:30 p.m. Eastern Time.

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
Spring 2018 Course Listings**

AEROSPACE ENGINEERING

AE	500	Master's Thesis (1-15)	
SEC.	009	CRN 24099	Abedi
	011	CRN 24100	Balas
	012	CRN 24101	Brooks
	013	CRN 24102	Moeller
	014	CRN 24103	Schmisseur
	015	CRN 24104	Solies
	016	CRN 24105	Vakili
	021	CRN 24110	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 24112	Moeller

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

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated.

Credit Restriction: May not be used toward degree requirements.

Credit Level Restriction: Graduate credit only.

Registration Restriction(s): Minimum student level – graduate

AE	512	Viscous Flow (3)	
SEC.	001	CRN 24113	
TEXT:	<i>Viscous Flow</i> ; Frank M. White; 3 rd Edition		
TIME:	Monday & Wednesday	2:40 – 3:55	E-110
PROF:	Dr. Ahmad Vakili		

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

Registration Permission: Consent of instructor.

AE	566	Electric Propulsion (3)	
SEC.	001	CRN 29031	

TEXT: *Physics of Electric Propulsion* (textbook is available from Amazon.com); Robert G. Jahn; Dover Publications; ISBN 10:0486450406; 13: 978-0486450407
 TIME: Monday & Thursday 1:00 – 2:15 E-113
 PROF: Dr. Trevor Moeller

Engineering concepts of electric propulsion and its application to modern satellites and deep space probes. Topics include physical principles, practical designs, and performance levels of electrically-powered space propulsion thrusters including: ion engines; pulsed and steady-state (fixed field) plasma and MHD thrusters, including Hall Thrusters, and others.

Recommended Background: Rocket propulsion.

Registration Permission: Consent of Instructor.

AE	590	Selected Engineering Problems (2-6)	
SEC.	001	CRN 24118	Abedi
	003	CRN 24119	Brooks
	004	CRN 25544	Moeller
	005	CRN 25545	Schmisseur
	006	CRN 25546	Solies
	007	CRN 25547	Vakili
	008	CRN 25548	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 24120
 TEXT: None
 TIME: Will be announced through email
 PROF: Dr. Trevor Moeller

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: Atmospheric Sciences for Aerospace & Mechanical Engineers (3)
 SEC. 001 CRN 24122
 TEXT: *Atmospheric Science: An Introductory Survey*; Wallace and Hobbs; Academic Press; 2nd Edition; February 15, 2006; ISBN 13: 978-0127329512
 TIME: Tuesday & Friday 1:00 – 2:15 E-113
 PROF: Dr. Steve Brooks

Structure of the atmosphere, energy balance, turbulent boundary layer, solar forcing, satellite drag, aero-maneuvers and de-orbits, and hypersonic flight in the upper atmosphere. These will be extended to the Venusian, Martian and Jovian atmospheres.

Repeatability: May be repeated. Maximum 6 hours.

AE 599 Special Topics: Aircraft Flight Controls (Same as AVSY 516 001 CRN 24193) (3)
 SEC. 005 CRN 25410

TEXT: Nelson, Robert C; *Flight Stability and Automatic Control*; 2nd Edition 1988 or later; McGraw-Hill, NY; ISBN 0-07-046273-9
 TIME: Tuesday & Friday 1:00 – 2:15 E-111
 PROF: Dr. Peter Solies

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

Repeatability: May be repeated. Maximum 6 hours.

AE 599 Special Topics: Computational Fluid Dynamics I (3)
 SEC. 011 CRN 28071 (Same as ME 599 005 CRN 27030)
 TEXT: *Applied Computational Aerodynamics: A Modern Engineering Approach*; Russell M. Cummings, William H. Mason, Scot A Morton, David R. McDaniel
 TIME: Monday & Wednesday 4:10 – 5:25 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

AE 599 Special Topics: Experimental Flight Mechanics: Fixed Wing Performance (3)
 SEC. 014 CRN 29174 (Same as AVSY 521 001 CRN 24194)
 TEXT: *Flight Testing of Fixed Wing Aircraft*; Ralph D. Kimberlin; AIAA; First 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 performance. Topics: air data system calibration, takeoff and landing performance, turn performance, cruise performance, energy concepts, and aerodynamic modeling. Weekly classroom academics with approximately 4-6 flight labs.

(RE) Prerequisite(s): 503 or Aerospace Engineering 515.

Repeatability: May be repeated. Maximum 6 hours.

AE 600 Doctoral Research/Dissertation (3-15)
 SEC. 018 CRN 25300 Abedi
 007 CRN 24130 Balas
 008 CRN 24131 Brooks
 009 CRN 24132 Moeller
 010 CRN 24133 Schmisser
 013 CRN 24136 Solies
 015 CRN 25550 Vakili
 017 CRN 24138 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 29040
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 690 Advanced Topics: Computer Methods in Dynamics of Continua (3) **CANCELLED**
SEC. 001 CRN 27003

TEXT: Course notes are sufficient, but below is a list of relevant books:

[Strikwerda, 2004] Strikwerda, J. C. (2004). Finite difference schemes and partial differential equations. SIAM.

[Hughes, 2012] Hughes, T. J. (2012). The finite element method: linear static and dynamic finite element analysis. Courier Corporation.

[Bathe, 2006] Bathe, K.-J. (2006). Finite element procedures. Klaus-Jurgen Bathe.

[Farlow, 2012] Farlow, S. J. (2012). Partial differential equations for scientists and engineers. Courier Corporation.

[LeVeque, 2002] LeVeque, R. L. (2002). Finite Volume Methods for Hyperbolic Problems. Cambridge University Press.

TIME: Monday & Wednesday 10:10 – 11:25 E-110
PROF: Dr. Reza Abedi

Full description can be found at:

<http://rezaabedi.com/wp-content/uploads/Courses/DynamicsContinua2016/DynamicsOfContinuaSyllabus.pdf>

This course is intended to serve as a sequel to an introductory finite element or computational mechanics courses. It is designed to deepen student's understanding of the characteristics of elliptic, parabolic, and hyperbolic partial differential equations (PDE) and get familiar with solution techniques for dynamic problems.

Repeatability: May be repeated. Maximum 9 hours.

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

Registration Permission: Consent of instructor.

AE 690 Advanced Topics: Discontinuous Galerkin Finite Element Methods (3)
SEC. 004 CRN 27189
TEXT: None
TIME: Monday & Wednesday 11:40 – 12:55 E-110
PROF: Dr. Reza Abedi

This course is intended to serve as a sequel to an introductory finite element method (FEM) course where conventional (continuous) FEM method is covered. The main difference of Discontinuous Galerkin (DG) methods to continuous FEMs the weak enforcement of jump conditions on the boundary of the elements.

DG methods generally are more stable and perform better for dynamic problems involving shocks and other discontinuities. In this course we cover:

1. Rankine-Hugoniot jump conditions for conservation laws; Exact and some approximate Riemann solution schemes.
2. Differential forms (exterior calculus) to objectively express and combine space and time quantities.
3. Finite element formulation for DG methods.
4. Computational geometry aspects of DG methods (mesh smoothing, h-, p-, and hp-adaptive operations, moving boundaries, etc.).
5. Object-oriented design and implementation of DG (and FEM) methods

Repeatability: May be repeated. Maximum 9 hours.

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

Registration Permission: Consent of instructor.

AE 690 Advanced Topics: Fundamentals of Modern Hypersonics (3)

SEC. 006 CRN 31875

TEXT: *Hypersonic and High-Temperature Gas Dynamics*; 2nd Edition; J. Anderson; AIAA Education; ISBN 13:978-1563477805; ISBN 10:1563477807

TIME: Tuesday & Thursday 2:40 – 3:55

E-110

PROF: Dr. John Schmisser and Dr. Ryan Bond

Fundamentals of Modern Hypersonics will provide an introduction to the fundamental concepts of hypersonic aerothermodynamics appropriate for advanced graduate students. The course will be presented in three sections comprised of a review of inviscid and approximation methods for hypersonic aerodynamics, viscous aerothermodynamics and interactions, and an introduction to high-temperature gas dynamics.

Repeatability: May be repeated. Maximum 9 hours.

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

Registration Permission: Consent of instructor.

AVIATION SYSTEMS

AVSY 500 Master's Thesis (1-15)

SEC. 001 CRN 24182 Brooks

003 CRN 24183 Solies

Grading Restriction: P/NP only.

Repeatability: May be repeated.

Credit Level Restriction: Graduate credit only.

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

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

SEC. 001 CRN 24186 Brooks

003 CRN 24187 Solies

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

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated.

Credit Restriction: May not be used toward degree requirements.

Credit Level Restriction: Graduate credit only.

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

AVSY 515 Aviation Human Factors (3)
 SEC. 001 CRN 30028
 TEXT: *Human Factors in Aviation*; Salas; 2nd Edition 2010
 TIME: Tuesday & Friday 10:00 – 11:15 E-113
 PROF: Dr. Steven Brooks

Human factors pertinent to aviation: concept of human factors, human error, fatigue, body rhythms, performances, motivation, vision and visual illusions, communication, attitudes, training and devices, displays and controls, space and layout, anthropometry, flight deck design and evaluation, aircraft cabin design and evaluation, flying qualities evaluation, and performance measurement techniques. Applied aviation systems.

Repeatability: May be repeated. Maximum 9 hours.

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

Registration Permission: Consent of instructor.

AVSY 516 Aircraft Flight Controls (Same as AE 599 005 CRN 25410) (3)
 SEC. 001 CRN 24193
 TEXT: Nelson, Robert C; *Flight Stability and Automatic Control*; 2nd Edition 1988 or later; McGraw-Hill, NY; ISBN 0-07-046273-9
 TIME: Tuesday & Friday 1:00 – 2:15 E-111
 PROF: Dr. Peter Solies

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

AVSY 521 Experimental Flight Mechanics: Fixed Wing Performance (3)
 SEC. 001 CRN 24194 (Same as AE 599 014 CRN 29174)
 TEXT: *Flight Testing of Fixed Wing Aircraft*; Ralph D. Kimberlin; AIAA; First 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 performance. Topics: air data system calibration, takeoff and landing performance, turn performance, cruise performance, energy concepts, and aerodynamic modeling. Weekly classroom academics with approximately 4-6 flight labs.

(RE) Prerequisite(s): 503 or Aerospace Engineering 515.

AVSY 550 Project in Aviation Systems (3)
 SEC. 001 CRN 24195 Brooks
 003 CRN 24196 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 26102 Johnson

Grading Restriction: P/NP only.

Repeatability: May be repeated.

Credit Level Restriction: Graduate credit only.

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

BME 529 Applications of Linear Algebra in Engineering Systems (3)
SEC. 001 CRN 24222 (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 590 Selected Biomedical Engineering Problems (2-6)
SEC. 001 CRN 27068 Johnson

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated. Maximum 6 hours.

Comment(s): Enrollment is limited to students in the non-thesis option.

Credit Level Restriction: Graduate credit only.

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

Registration Permission: Consent of instructor.

BME 595 Biomedical Seminar (1)
SEC. 002 CRN 26253
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 26103 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 29041
TEXT: TBD
TIME: TBD
PROF: Dr. Jeffery Reinbolt

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.

BME 610 Advanced Topics: Biofunctionalization of Nanomaterials
SEC. 005 CRN 26966
TEXT: Biofunctionalization of Nanomaterials; Edited by Challa Kumar
TIME: Tuesday & Thursday 10:10 – 11:25 E-110
PROF: Dr. Jackie Johnson

This course is the integration of nanomaterials and medicine and the exploration of potential future research projects in biomedical engineering.
The course will progress from predominantly instruction to discussion on a potential proposal to be summarized in a 4-page white paper, a cover sheet, mock budget and biosketch – the students can either work as a group or individually.
There will be no final exam.
Current research topics of interest in biomedical engineering.
Repeatability: May be repeated. Maximum 9 hours.
Registration Restriction(s): Minimum student level – graduate.
Registration Permission: Consent of instructor.

ENGINEERING MANAGEMENT

EM 500 Master's Thesis (1-15)
SEC. 001 CRN 27679 Simonton
002 CRN 28913 Yu

Grading 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 22043 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 22044 Simonton
002 CRN 29703 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 533 Theory and Practice of Engineering Management (3)
SEC. 001 CRN 22045 UTSI students participating at Tullahoma
002 CRN 22046 UTSI students participating elsewhere
003 CRN 22047 UTK students participating elsewhere

TEXT: **Required:** *Developing Effective Engineering Leadership, Ray Morrisson and Carl Ericsson, (2003), London: The Institute of Electrical Engineers ISBN-10: 85296 214 2*

Required: *The Fifth Discipline, P. M. Senge, P. M. (2006) New York: Doubleday ISBN-10: 0385517254*

Required: *Organizational Behavior: An Evidenced Based Approach, 13th edition, Fred, Brett & Kyle Luthans, (2015), IAP-Information Age Publishing, ISBN-13: 978-1-68123-119-8*

Reference only: *Managing Engineering and Technology (3rd ed.), D. L. Babcock, (2002), Upper Saddle River, New Jersey: Prentice-Hall, ISBN #0-13-061978-7*

TIME: Monday 4:00 – 6:35 E-113

PROF: ' U ' Y R Q V H - D F N

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

EM 534 Financial Management for Engineering Managers (3)
SEC. 001 CRN 22049 UTSI students participating at Tullahoma
002 CRN 22050 UTSI students participating elsewhere
003 CRN 22051 UTK students participating elsewhere

TEXT: *Introduction to Management Accounting, 15th Edition, C. T. Horngren, G. L. Sundem, W. Stratton, D. Burgstahler, J. Schatzberg, ISBN-13: 978-0-13-610265-6*

TIME: Monday 4:00 – 6:35 E-111

PROF: Dr. Andrew Yu

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 538 New Venture Formation (3)
SEC. 001 CRN 27688 UTSI students participating at Tullahoma
002 CRN 27689 UTSI students participating elsewhere
003 CRN 27690 UTK students participating elsewhere
TEXT: **Required:** *Technology Ventures: From Idea to Enterprise*, Thomas H. Byers, Richard C. Dorf, Andrew Nelson, 4th edition, McGraw-Hill, ISBN # 13: 978-0073523422
Reference only: *Entrepreneurship and New Venture Formation*, 1st edition, Thomas W. Zimmerer and Norman M. Scarborough ISBN-13: 978-0024317407
TIME: Thursday 4:00 – 6:35 E-113
PROF: Dr. Sandra Affare

Factors other than mechanical or chemical which enter into successful establishment of manufacturing or service enterprise. Organizational and financial planning and evaluation. Cost and location studies and market analysis to determine commercial feasibility of new ventures.
Recommended Background: Graduate standing in Engineering or Business.

EM 541 Managing Change and Improvement in Technical Organizations (3)
SEC. 001 CRN 22053 (Pre-recorded)
TEXT: *The Prince*, Niccolo Machiavelli, Anthony Grafton, George Bull, Penguin Classics, Reissue edition (Feb 4, 2003), ISBN# 0140449159
The New Economics, W. Edwards Deming, MIT Press, 2nd ed, ISBN# 9780262541169
Organizational Culture & Leadership, Edgar H. Schein, Jossey-Bass Publisher, 4th ed, ISBN# 9780470190609
TIME: TBD
PROF: Dr. Janice Tolk

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

EM 600 Doctoral Research/Dissertation (3-15)
SEC. 001 CRN 25267 Simonton
003 CRN 28923 Yu

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

INDUSTRIAL ENGINEERING

IE 516 Statistical Methods in Industrial Engineering (3)
SEC. 002 CRN 31908 (Record Only)
TEXT: *Probability and Statistics for Engineers and Scientists*, Hayter, A. (2002). (2nd ed.), Duxbury Publishing, Belmont, CA. ISBN 10: 0534386695 / 0-534-38669-5

ISBN 13: 9780534386696

TIME: Tuesday

4:00 – 6:35

E-113

PROF: Dr. James Simonton

Application of classical statistical techniques to industrial engineering problems. Statistics and statistical thinking in managerial context of organizational improvement; descriptive statistics and distribution theory; relationship between statistical process control techniques and classical statistical tools; parameter estimation and hypothesis testing; goodness-of-fit testing; linear regression and correlation; analysis of variance; single and multiple factor experimental design.

Recommended Background: Statistics 251 or equivalent.

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

SEC. 001 CRN 21767 (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.

MATHEMATICS

MATH 535 Partial Differential Equations I (3)

SEC. 001 CRN 32081

TEXT: *Partial Differential Equations of Mathematical Physics and Integral Equations*; Ronald B. Buenther and John W. Lee

TIME: Monday & Wednesday

1:00 – 2:15

E-111

PROF: K. C. Reddy

First order partial differential equations, classification of second order partial differential equations, properties of elliptic, parabolic and hyperbolic partial differential equations.

Recommended Background: One year of advanced calculus.

MECHANICAL ENGINEERING

ME 500 Master's Thesis (1-15)

SEC. 001 CRN 21641 Abedi

021	CRN 21661	Balas
022	CRN 21662	Brooks
023	CRN 21663	Moeller
024	CRN 21664	Schmisser
025	CRN 21665	Solies
026	CRN 21666	Vakili
034	CRN 25798	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 25322 Moeller

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

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated.

Credit Restriction: May not be used toward degree requirements.

Credit Level Restriction: Graduate credit only.

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

ME 512 Convection Heat Transfer (3)
 SEC. 001 CRN 21677
 TEXT: Adrian Bejan; *Convection Heat Transfer*; 4th Edition; John Wiley
 TIME: Tuesday & Thursday 1:10 – 2:25 E-110
 PROF: Dr. Feng Yuan Zhang

Models and equations for fluid motion, the general energy equation, and transport properties. Exact, approximate, and boundary layer solutions for laminar flow heat transfer problems. Heat transfer in internal and external forced and buoyancy driven flows. Application of similarity concepts and analogies to convection heat transfer.

Recommended Background: Undergraduate heat transfer course.

ME 529 Applications of Linear Algebra in Engineering Systems (3)
 SEC. 001 CRN 21681 (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 570 Numerical Methods for Engineers (3)
 SEC. 001 CRN 29216
 TEXT: TBD
 TIME: Monday & Wednesday 1:00 – 2:25 E-110
 PROF: Dr. Kivanc Ekici

Review and implementation of basic numerical techniques. Explicit and implicit solution techniques of ordinary differential equations and partial differential equations. Applications include heat transfer and fluid mechanics.
Recommended Background: Numerical analysis, fluid mechanics, heat transfer and differential equations.
Registration Permission: Consent of Instructor.

ME 590 Selected Engineering Problems (2-6)
 SEC. 002 CRN 21687 Abedi
 003 CRN 25786 Brooks
 005 CRN 25787 Moeller
 006 CRN 25788 Schmisser
 007 CRN 25789 Solies
 008 CRN 25790 Vakili
 009 CRN 25791 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 21688
 TEXT: None
 TIME: Will be announced through email
 PROF: Dr. Trevor Moeller

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 ME: Atmospheric Sciences for AE and ME Engineers (3)
 SEC. 002 CRN 26969 (Same as AE 599 001 CRN 24122)

TEXT: *Atmospheric Science: An Introductory Survey*; Wallace and Hobbs; Academic Press; 2nd Edition; February 15, 2006; ISBN 13: 978-0127329512
 TIME: Tuesday & Friday 1:10 – 2:15 E-113
 PROF: Dr. Steve Brooks

Structure of the atmosphere, energy balance, turbulent boundary layer, solar forcing, satellite drag, aeromaneuvers and de-orbits, and hypersonic flight in the upper atmosphere. These will be extended to the Venusian, Martian and Jovian atmospheres.

Repeatability: May be repeated. Maximum 6 hours

Registration Permission: Consent of instructor.

ME 599 Special Topics: Computational Fluid Dynamics I (3)
 SEC. 005 CRN 27030 (Same as AE 599 011 CRN 28071)
 TEXT: *Applied Computational Aerodynamics: A Modern Engineering Approach*; Russell M. Cummings, William H. Mason, Scot A Morton, David R. McDaniel
 TIME: Monday & Wednesday 4:10 – 5:25 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 21706 Abedi
 016 CRN 21707 Balas
 018 CRN 21709 Brooks
 019 CRN 21710 Moeller
 027 CRN 21718 Schmisser
 028 CRN 21719 Solies
 029 CRN 25794 Vakili
 030 CRN 25795 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 29042
 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.

ME 610 Advanced Topics: Computer Methods in Dynamics Continua (3) **CANCELLED**
SEC. 009 CRN 31905

TEXT: Course notes are sufficient, but below is a list of relevant books:

[Strikwerda, 2004] Strikwerda, J. C. (2004). Finite difference schemes and partial differential equations. SIAM.

[Hughes, 2012] Hughes, T. J. (2012). The finite element method: linear static and dynamic finite element analysis. Courier Corporation.

[Bathe, 2006] Bathe, K.-J. (2006). Finite element procedures. Klaus-Jurgen Bathe.

[Farlow, 2012] Farlow, S. J. (2012). Partial differential equations for scientists and engineers. Courier Corporation.

[LeVeque, 2002] LeVeque, R. L. (2002). Finite Volume Methods for Hyperbolic Problems. Cambridge University Press.

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

PROF: Reza Abedi

Full description can be found at:

<http://rezaabedi.com/wp-content/uploads/Courses/DynamicsContinua2016/DynamicsOfContinuaSyllabus.pdf>

This course is intended to serve as a sequel to an introductory finite element or computational mechanics courses. It is designed to deepen student's understanding of the characteristics of elliptic, parabolic, and hyperbolic partial differential equations (PDE) and get familiar with solution techniques for dynamic problems.

Advanced theory and applications in the thermal/fluid sciences.

Repeatability: May be repeated. Maximum 9 hours.

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

Registration Permission: Consent of instructor.

ME 610 Advanced Topics: Discontinuous Galerkin Finite Element Methods (3)
SEC. 010 CRN 31906

TEXT: None

TIME: Monday & Wednesday 11:40 – 12:55 E-110

PROF: Dr. Reza Abedi

This course is intended to serve as a sequel to an introductory finite element method (FEM) course where conventional (continuous) FEM method is covered. The main difference of Discontinuous Galerkin (DG) methods to continuous FEMs the weak enforcement of jump conditions on the boundary of the elements. DG methods generally are more stable and perform better for dynamic problems involving shocks and other discontinuities. In this course we cover:

1. Rankine-Hugoniot jump conditions for conservation laws; Exact and some approximate Riemann solution schemes.
2. Differential forms (exterior calculus) to objectively express and combine space and time quantities.
3. Finite element formulation for DG methods.
4. Computational geometry aspects of DG methods (mesh smoothing, h-, p-, and hp-adaptive operations, moving boundaries, etc.).
5. Object-oriented design and implementation of DG (and FEM) methods

Advanced theory and applications in the thermal/fluid sciences.
Repeatability: May be repeated. Maximum 9 hours.
Registration Restriction(s): Minimum student level – graduate.
Registration Permission: Consent of instructor.

PHYSICS

Phys 500 Master's Thesis (1-15)
SEC. 002 CRN 23588 Davis
003 CRN 23589 Parigger

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

Phys 599 Seminars (1)
SEC. 010 CRN 29032
TEXT: None
TIME: 2nd & 4th Thursday 3:30 – 5:00 H-111
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 23615 Davis
003 CRN 23616 Parigger

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

Phys 602 Atomic Physics (3)
SEC. 001 CRN 31907
TEXT: *Theoretical Atomic Physics* (primary course book reference for spring 2015) and a variety of selected sections from other books (such as F. Schwabl *Advanced Quantum mechanics*) and current research literature; H.S. Friedrich; Springer Verlag; Corr. 2nd printing edition (March 1, 2004); ISBN 10:3540641246; ISBN 13:978-3540641247
TIME: Thursday 1:00 – 3:35 E-111
PROF: Dr. Christian Parigger

Advanced problems.
Comment(s): For students specializing in the field.
Registration Restriction(s): Minimum student level – graduate.

Phys 642 Adv. Top: Nanophotonics and Nano-Optics (3)
SEC. 003 CRN 27179
TEXT: https://www.amazon.com/Principles-Nano-Optics-Lukas-Novotny-ebook/dp/B00INYGCQG/ref=mt_kindle?_encoding=UTF8&me=

Principles of Nano-Optics 2nd Edition, by Lukas Novotny (Author), Bert Hecht (Author)
TIME: Tuesday & Thursday 1:10 – 2:25 Zoom
PROF: Dr. Lloyd Davis

Optical phenomena on the nanometer scale, in nanoscience, and in nanotechnology; sub-diffraction microscopy, near-field probes, plasmonics/surface plasmons, forces in confined fields.

Advanced theoretical or experimental topics not covered in other courses.

Repeatability: May be repeated with consent of department. Maximum 9 hours.

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