Spring 2021
Registration Announcement

The University of Tennessee
Space Institute

411 B. H. Goethert Parkway
Tullahoma, TN 37388-9700
888-822-8874 ext. 37228
www.utsi.edu
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DATES ARE SUBJECT TO CHANGE
https://registrar.utk.edu/calendar/

CALENDAR - 2021 SPRING SEMESTER

Priority Registration .......................................................... November 1, 2020
Admission to Candidacy Forms for Spring 2021 Commencement ......................... January 15, 2021
Spring 2020 Graduation Application Deadline (submit online) ......................... January 15, 2021
Graduation Fee Payment Deadline (MS $30, PhD $75) ........................................ January 15, 2021
Priority registration payment deadline 4:30 p.m. EST ............................................. TBD
Late Registration and late fee begins ($100 Late Fee) ............................................. TBD
Classes begin ........................................................................... January 20, 2021
Last Day to final register, add, change grading options or drop without a “W” .......... TBD
Late registration payment deadline 4:30 p.m. EST .................................................. TBD
Martin Luther King Holiday .................................................................................... TBD
Late Registration and late fee begins (after 14th day) ($200 Late Fee)......................... TBD
Preliminary Thesis/Dissertation Review Deadline ............................................... February 26, 2021
Spring Break (No Classes) ...................................................................................... TBD
Drop without a “W” ......................................................................................... April 16, 2021
No Class Day ......................................................................................... TBD
Spring Recess (No Classes) .................................................................................. April 2, 2021
Thesis/Dissertation Deadline 5:00 p.m. EST (submitted and approved) ............... April 23, 2021
Thesis/Dissertation Approval Form ........................................................................ April 23, 2021
Dissertation Survey of Earned Doctorates Certificate ........................................... April 23, 2021
Submit Pass/Fail form (thesis/dissertation) ............................................................ April 23, 2021
Submit Pass/Fail form (non-thesis) .................................................................... April 23, 2021
All "INCOMPLETE" must be removed for Graduation .......................................... April 30, 2021
Graduating Summer 2021 and Graduation Application ...................................... TBD
Classes End .................................................................................. April 28, 2021
Total Withdraw from the University Deadline ................................................... TBD
Exam Period ................................................................................... April 29, 2021
Graduate Hooding Ceremony (UTK) ..................................................................... TBD
COMMENCEMENT (UTK) .............................................................................. TBD
Official Graduation Date ..................................................................................... May 8, 2021

Second thesis/dissertation deadlines
Defense Completed by April 30, 2021
Second Deadline Application Submitted by April 30, 2021
https://gradschool.utk.edu/forms-central/second-deadline-graduation-application/
Thesis/Dissertation Submitted and Accepted by 5:00 p.m. EST May 19, 2021
(Student will receive diploma summer 2020 semester, but will not be required to register for thesis/dissertation credits)

SUMMER SEMESTER 2020

Priority Registration .......................................................... TBD
Final Registration ................................................................. TBD
Memorial Day Holiday ........................................................... May 31, 2021
Classes begin .......................................................................... June 1, 2021
No Class Day ............................................................................................................................. TBD
Independence Holiday ........................................................................................................... July 5, 2021
Classes End ............................................................................................................................ July 30, 2021
Summer Graduation Date on Transcript (No Ceremony) ....................... July 31, 2021

Dates may be revised without notice. Please refer to the following sites for updates:
https://gradschool.utk.edu/graduation/
http://registrar.tennessee.edu/academic_calendar/index.shtml

SPRING SEMESTER 2021
FINAL STUDY DAY AND EXAM SCHEDULE

LAST DAY OF CLASSES ........................................................................................................ April 28, 2021
STUDY PERIOD ..................................................................................................................... April 29, 2021

FINAL EXAMS

<table>
<thead>
<tr>
<th>REGULAR CLASS TIME</th>
<th>(Same Classroom)</th>
<th>EXAM TIME</th>
</tr>
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<tbody>
<tr>
<td><strong>1st Day – Friday, April 30, 2021</strong></td>
<td></td>
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<tr>
<td>7:45 - 9:00</td>
<td>M/Th</td>
<td>7:45 - 9:45</td>
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<tr>
<td>10:45 - 12:00</td>
<td>M/Th</td>
<td>10:15 - 12:15</td>
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<tr>
<td>9:15 - 10:30</td>
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<td>1:00 - 3:00</td>
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<tr>
<td>2:30 - 3:45</td>
<td>M/Th</td>
<td>3:30 - 5:30</td>
</tr>
</tbody>
</table>

| **2nd Day – Monday, May 3, 2021** | | |
| 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 – Tuesday, May 4, 2021** | | |
| 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 2021

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 Affairs 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)-37228
Budget and Finance Office: ..............................1-888-822-UTSI (8874)-37297
Student Affairs .................................................................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 Charlene Hane, Student 
Affairs, University of Tennessee Space Institute, MS-7, 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 Charlene Hane at (931) 393-7228 or 888-822-
8874 ext. 37228 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 Affairs, 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 
Affairs, 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 Affairs 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

Nine credit hours are considered full-time for graduate students. Graduate Research Assistants 
(GRAs) with one-half assistantship are required to register for at least 6 credit hours during the 
fall/spring semesters and 3 credit hours during the summer semester. GRAs must also register 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.

The residency requirement for doctoral students is 9 credit hours for two consecutive semesters or 
6 credit hours for three consecutive semesters.

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 2021 must remove all INCOMPLETE GRADES by April 30, 2021. Contact Charlene Hane, Student Affairs 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 Affairs.

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, and other milestones depending upon the program.

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. For more information, go to: https://catalog.utk.edu/content.php?catoid=27&navoid=3506#leave_absence_reinstate

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 Affairs. 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 2020-2021 academic year is provided by United HealthCare Student Resources. The premium must be paid before registration. Contact the Student Affairs 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 29, 2021
Final Exams – April 30, May 3 & 4, 2021

FINANCIAL CALENDAR, FEES, REFUNDS, AND TUITION
Please click [http://onestop.utk.edu/tuition-fees/](http://onestop.utk.edu/tuition-fees/) link to the most current information.

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/](http://onestop.utk.edu/pay/).

**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](http://catalog.utk.edu). The student handbook “Hilltopics” is available online at [https://hilltopics.utk.edu/](https://hilltopics.utk.edu/)

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 2021 Course Listings

AEROSPACE ENGINEERING

AE  500 Master’s Thesis (1-15)
SEC.  012 CRN 23785 Abedi
      013 CRN 23786 Kreth
      014 CRN 23787 Moeller
      015 CRN 23788 Schmisseur
      021 CRN 33279 Solies
      022 CRN 33281 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 23793 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 23794
TEXT: *Viscous Fluid Flow*; Frank M. White; McGraw Hill; 3rd Edition
TIME: Tuesday & Thursday 2:40 – 3:55 Zoom
PROF: Dr. Mark Gragston

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  518 Computational Fluid Dynamics (3)
SEC.  002 CRN 28322
TEXT: TBD
TIME: Tuesday & Thursday 8:50 – 10:05 Online

Cross-listed: (Same as Mechanical Engineering 518; Biomedical Engineering 518.)

Recommended Background: Fluid mechanics, differential equations, and compressible flows.

Registration Permission: Consent of instructor.

AE  557  Aerospace Vehicle Flutter and Vibration (3)
SEC.  001  CRN  29717
TEXT: Aircraft Vibration and Flutter; Scanlan, R.H. and Rosenbaum, R; Dover Publications; New York, NY; 1968
TIME:  Tuesday and Friday  2:30 – 3:45    E-111
PROF:  Dr. Peter Solies

Aerelastic phenomena. Structural and aerodynamic operators. Stability criteria for airfoils operating in oscillating stream. Two- and three-dimensional flutter of wings, control surfaces and empennages.

(DE) Prerequisites 551.

AE  590  Selected Engineering Problems (2-6)
SEC.  001  CRN  23799  Abedi
  007  CRN  25073  Kreth
  012  CRN  33283  Moeller
  013  CRN  33284  Schmisseur
  014  CRN  33286  Solies
  015  CRN  33287  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  23800
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 UT.}

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated. Maximum 20 hours.

AE  599  Special Topics: Nuclear Space Propulsion (3)
SEC.  001  CRN  23802 (Same as ME 599 002 CRN 26343)
TIME:  Tuesday & Friday  1:00 – 2:15    E-113
PROF:  Dr. Trevor Moeller
This is an introductory course nuclear thermal propulsion and nuclear electric propulsion. The primary focus will be on propulsion aspects of nuclear thermal rockets. Topics covered include: rocket engine fundamentals, nuclear rocket engine cycles, thermal fluid aspects of nuclear rockets, materials for nuclear rockets, and an introduction to interplanetary mission analysis. Nuclear electric propulsion will be introduced, leaving in-depth coverage of electric propulsion to AE 566 Electric Propulsion. AE 581 Rocket Propulsion I is recommended, but not required.

Repeatability: May be repeated. Maximum 6 hours.

AE  599 Special Topics: Partial Differential Equations (3)
SEC.  011 CRN  27343   (Same as ME 599 030 CRN 32444)
TIME:  Tuesday & Friday       9:30 – 10:45       E-111
PROF:  Dr. Monty Smith

Mathematical and numerical solutions to classic problems in partial differential equations and their physical interpretation. Topics to be covered include: the heat equation, separation of variables methods, Fourier series, vibrating strings and membranes, the wave equation, Sturm-Liouville eigenvalue and eigenfunction problems, and introduction to finite difference methods.

Repeatability: May be repeated. Maximum 6 hours.

AE  599 Special Topics: Aircraft Flight Control (3)
SEC.  013 CRN  28305   (Same as AVSY 516 001 CRN 23862)
TIME:  Tuesday & Friday       11:00 – 12:15      E-111
PROF:  Dr. Peter Solies

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

Repeatability: May be repeated. Maximum 6 hours.

AE  599 Special Topics: Experimental Flight Mechanics Fixed Wing Stability & Control (3)
SEC.  014 CRN  28307   (Same as AVSY 522 001 CRN 33703)
TIME:  Wednesday         1:00 – 3:45       E-111
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 several virtual flight simulator labs.

(DE) Prerequisite(s): AVSY 516. Repeatability: May be repeated. Maximum 6 hours.

AE  600 Doctoral Research/Dissertation (3-15)
SEC.  010 CRN  23808   Abedi
013 CRN  23811   Kreth
015 CRN  25074   Moeller
AE 601 Doctoral Research Methodology (3)
SEC. 002 CRN 28191
TEXT: TBD
TIME: TBD
PROF: Dr. Kivanc Ekici

Methods of planning and conducting original research and proposal writing.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: Maximum 6 hours. May be repeated once.
Registration Restriction(s): Minimum student level – graduate / doctoral students.
Registration Permission: Departmental approval.

AVIATION SYSTEMS

AVSY 516 Aircraft Flight Controls (Same as AE 599 013 CRN 28305) (3)
SEC. 001 CRN 23862
TIME: Tuesday & Friday 11:00 – 12:15 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 522 Experimental Flight Mechanics: Fixed Wing Stability and Control (3)
(Same as AE 599 014 CRN 28307) (3)
SEC. 001 CRN 33703
TIME: Wednesday 1:00 – 3:45 E-111
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 several virtual flight simulator labs.
(DE) Prerequisite(s): AVSY 516.

BIOMEDICAL ENGINEERING

BME 500 Master’s Thesis (1-15)
Grading Restriction: P/NP only.  
Repeatability: May be repeated.  
Credit Level Restriction: Graduate credit only.  
Registration Restriction(s): Minimum student level – graduate.

BME  518  Computational Fluid Dynamics (3)  
SEC.  002  CRN  28323  
TEXT:  TBD  
TIME:  Tuesday & Thursday  8:50 – 10:05  Online  
PROF:  Dr. Kivanc Ekici  

Cross-listed: (Same as Aerospace Engineering 518; Mechanical Engineering 518;)  
Recommended Background: Fluid mechanics, differential equations, and compressible flows.  
Registration Permission: Consent of instructor.

BME  560  Tissue Engineering and Regenerative Medicine (3)  
SEC.  002  CRN  32602  
TEXT:  TBD  
TIME:  Tuesday & Thursday  1:50 – 3:05  Online  
PROF:  Dr. Sara Hanrahan  

Develop an understanding of cell-cell interactions and the role of the extracellular matrix in the structure and function of normal and pathological tissues. Topics include the harvesting of stem cells from specific tissues, the use of artificial and natural scaffolds in three-dimensional tissue culture, and the role of maintaining the stem cell state in culture.  
(DE) Prerequisite(s): 503, 511, 521.

BME  588  Cell and Tissue-Biomaterials Interaction (3)  
SEC.  003  CRN  33353  
TEXT:  TBD  
TIME:  Tuesday & Thursday  10:30 – 11:45  Online  
PROF:  Dr. Sara Hanrahan  

Study of the fundamental principles involved in materials / cell and tissue interactions. Students will learn the underlying cellular and molecular mechanisms in host response to biomaterials. Emphasis will be placed on the integration of biomaterials/neuronal cells and tissue interactions into the design of neural implants (sensors, scaffolds, and therapeutics delivery modalities, etc.). Additional research paper assignments will be given to graduate students registered for this course.  
Recommended Background: BME 474.  
Comment(s): Prior knowledge may satisfy prerequisites, with consent of instructor.


Repeatability: May be repeated. Maximum 6 hours.

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

Registration Permission: Consent of advisor.

BME 595 Biomedical Seminar (1)
SEC. 002 CRN 25694
TEXT: None
TIME: Will be announced through email
PROF: Dr. Jacqueline Johnson

All phases of biomedical engineering, reports on current research at UTK and UTSI.

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: May be repeated. Maximum 20 hours.

Credit Level Restriction: Graduate credit only.

Registration Restriction(s): Minimum student level – graduate

BME 599 Special Topics: Neuroscience & Neurotechnology (3)
SEC. 005 CRN 25708
TEXT: TBD
TIME: Tuesday & Thursday 7:10 – 8:25 Online
PROF: Dr. Sara Hanrahan

Repeatability: May be repeated. Maximum 12 hours.

Registration Permission: Consent of instructor.

BME 600 Doctoral Research/Dissertation (3-15)
SEC. 011 CRN 25560 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 28192
TEXT: TBD
TIME: TBD
PROF: Dr. Kivanc Ekici

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

Grading Restriction: Satisfactory/No Credit grading only.

Repeatability: Maximum 6 hours. May be repeated once.

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

Registration Permission: Consent of instructor.

BME 678 Magnetic Nanoparticles – From Fabrication to Clinical Applications (3)
SEC. 001 CRN 32995
TIME: Monday & Wednesday 12:10 – 1:25 Zoom
PROF: Dr. Jackie Johnson
Magnetic nanoparticles have a wide and varied use in medicine. They can be used in magnetic separation, molecular carriers for gene separation, drug delivery or drug carriers, and hyperthermia treatment and as an enhancer for magnetic resonance imaging. The course addresses synthesis, properties and characterization of the nanoparticles as well as optional functionalization and applications, in particular pertaining to cancer therapy, toxin removal, imaging, lab-on-a-chip and thrombosis.

(DE) Prerequisite(s): 578; Materials Science and Engineering 567.
Registration Restriction(s): Minimum student level – graduate.

### INDUSTRIAL ENGINEERING

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<th>Course Code</th>
<th>Course Title</th>
<th>Section</th>
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<tr>
<td>IE 500</td>
<td>Master’s Thesis (1-15)</td>
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<td>IE 501</td>
<td>Design Project (1-3)</td>
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<tr>
<td>IE 502</td>
<td>Registration for Use of Facilities (1-15)</td>
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<tr>
<td>IE 533</td>
<td>Theory and Practice of Engineering Management (3)</td>
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<td><strong>PROF:</strong> Dr. Denise Jackson</td>
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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.

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<tbody>
<tr>
<td>IE 534</td>
<td>Financial Management for Engineering Managers (3)</td>
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<td>PROF:</td>
<td>Dr. Andrew Yu</td>
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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.

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<td>IE 539</td>
<td>Strategic Management in Technical Organization (3)</td>
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<tr>
<td>PROF:</td>
<td>Dr. Lynn Reed</td>
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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.*

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<tr>
<td>IE 542</td>
<td>Design of Experiments for Engineering Managers (3)</td>
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<td>PROF:</td>
<td>Dr. Tony Shi</td>
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Methodology for experiments in product, service, and process improvements. Factorial experiments, screening designs, variance reduction, and other selected topics for engineering managers. Taguchi philosophy and concepts. Optimization and response surface methods. Case studies.  
*(RE) Prerequisite(s): Industrial Engineering 516.*

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<td>IE 600</td>
<td>Doctoral Research/Dissertation (3-15)</td>
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Grading Restriction: P/NP only.
Repeatability: May be repeated.
Registration Restriction(s): Minimum student level – graduate.

IE 601 Systems Theory and Engineering (3)
SEC. 001 CRN 33102 UT Space Institute Campus
  002 CRN 33103 UT Knoxville Campus
  003 CRN 33104 Distance Education Campus
TIME: Tuesday 4:00 – 6:00 E-113
TEXT: TBD
PROF: Dr. Christopher Mears

Technology course that will examine theoretical foundations of General System Theory 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. Among the topics to be covered in the course are: the meaning of General Systems Theory (GST); GST and the unity of science; the concept of Equifinality; the characteristics and modeling of open systems; the concepts of the Learning Organization; the principle of Leverage; building Learning Organizations; and issues related to Socio-Technical Systems. Systems Engineering focuses on defining customer needs and required functionality early in the development cycle, documenting requirements, then proceeding with design synthesis and system validation while considering the complete problem including operations, performance, test, manufacturing, cost, and schedule. This subject emphasizes the links of systems engineering to fundamentals of decision theory, statistics, and optimization.

(RE) Prerequisite(s): 533.
Registration Restriction(s): Minimum student level – graduate.

MECHANICAL ENGINEERING

ME 500 Master’s Thesis (1-15)
SEC. 001 CRN 21552 Abedi
  021 CRN 21572 Kreth
  022 CRN 21573 Moeller
  023 CRN 21574 Schmisseur
  024 CRN 21575 Solies
  025 CRN 21576 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 24874 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 21588
TEXT: Adrian Bejan; Convection Heat Transfer; 4th Edition; John Wiley

Reference:

TIME: Monday & Wednesday 2:40 –3:55  Zoom

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 518  Computational Fluid Dynamics (3)
SEC. 003  CRN 28338
TEXT: TBD

TIME: Tuesday & Thursday 8:50 – 10:05  Online

PROF: Dr. Kivanc Ekici


Cross-listed: (Same as Aerospace Engineering 518; Biomedical Engineering 518.)

Recommended Background: Fluid mechanics, differential equations, and compressible flows.

Registration Permission: Consent of instructor.

ME 569  Principles of Additive Manufacturing (3)
SEC. 002  CRN 32760
TEXT: TBD

TIME: Tuesday & Thursday 8:50 – 10:05  Online

PROF: Dr. Sudarsanam Babu

Fundamentals of additive manufacturing processes within the context of traditional manufacturing life cycle including the basics of product design, processing mechanics and materials science to highlight the advantages of additive manufacturing.

Credit Restriction: Students cannot receive credit for both 469 and 569.

Recommended Background: Computer-aided design, materials science.

Registration Permission: Consent of Instructor.

ME 585  Turbomachinery Systems II (3)
SEC. 001  CRN 33026
This course will provide an in-depth analysis of rotating component performance for compressors and turbines. Compressor and turbine analysis will include: the Euler turbomachinery equation, velocity triangles, degree of reaction, blade performance and efficiency, and stage loading. Axial and centrifugal turbomachines will be analyzed. This course will further examine non-rotating turbine engine components, inlets, nozzles and combustors/augmentors. The course will emphasize the use of numerical simulations as tools for use in analyzing gas turbine engine/component performance.

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 (2-6)
SEC. 002 CRN 21597 Abedi
003 CRN 25291 Kreth
005 CRN 25292 Moeller
006 CRN 25293 Schmisseur
007 CRN 25294 Solies
008 CRN 25295 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 21598

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: Nuclear Space Propulsion (3)
SEC. 002 CRN 26343 (Same as AE 599 001 CRN 23802)


TIME: Tuesday & Friday 1:00 – 2:15 E-113
PROF: Dr. Trevor Moeller

This is an introductory course nuclear thermal propulsion. The primary focus will be on propulsion aspects of nuclear thermal rockets. Topics covered include: rocket engine fundamentals, nuclear rocket engine cycles, thermal fluid aspects of nuclear rockets, materials for nuclear rockets, and an introduction
to interplanetary mission analysis. Nuclear electric propulsion will be introduced, leaving in-depth coverage of electric propulsion to AE 566 Electric Propulsion. AE 581 Rocket Propulsion I is recommended, but not required.

Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

ME 599 Special Topics: Aerospace Ground Test Simulations and Facilities (3)
SEC. 013 CRN 27344
TEXT: None
TIME: Monday & Wednesday  2:30 – 3:45 Online
PROF: Dr. Milt Davis

- Provide a Fundamental Understanding of Aerospace Ground Test Simulation and Facilities
- How Ground Testing Provides Accurate Engineering Information
- Application of GT Information to Aerospace System
- Applicable Analysis Techniques
- Suitable Measurement Systems

Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

ME 599 Special Topics: Partial Differential Equations (3)
SEC. 030 CRN 32444 (Same as AE 599 011 CRN 27343)
TIME: Tuesday & Friday  9:30 – 10:45 E-111
PROF: Dr. Monty Smith

Mathematical and numerical solutions to classic problems in partial differential equations and their physical interpretation. Topics to be covered include: the heat equation, separation of variables methods, Fourier series, vibrating strings and membranes, the wave equation, Sturm-Liouville eigenvalue and eigenfunction problems, and introduction to finite difference methods.

Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

ME 600 Doctoral Research/Dissertation (3-15)
SEC. 016 CRN 21617  Abedi
018 CRN 21619  Krith
019 CRN 21620  Moeller
027 CRN 21628  Schmisseur
028 CRN 21629  Solies
029 CRN 25299  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 28193
TEXT: TBD
TIME: TBD
PROF: Dr. Kivanc Ekici

Methods of planning and conducting original research and proposal writing.  
*Grading Restriction: Satisfactory/No Credit grading only.*  
*Repeatability: Maximum 6 hours. May be repeated once.*  
*Registration Restriction(s): Minimum student level – doctoral student.*  
*Registration Permission: Departmental approval.*

**PHYSICS**

Phys 500 Master’s Thesis (1-15)  
SEC. 002 CRN 23288 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 23296

TEXT: Classic texts and literature  
TIME: 2nd & 4th Thursday TBD TBD  
PROF: Dr. Christian Parigger

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 541 Electromagnetic Theory (3)  
SEC. 002 CRN 24573

TIME: Monday, Wednesday & Friday 9:30 – 10:20 Zoom  
PROF: Dr. Christian Parigger

Review of electrostatics, magnetostatics, and quasi-static problems; Maxwell’s field equations and their solutions in dielectric and conducting media; electrodynamics and relativity, retarded potentials and gauge transformations, radiation produced by accelerating charges.  
(DE) Prerequisite(s): 571.

Phys 600 Doctoral Research/Dissertation (3-15)  
SEC. 002 CRN 23315 Parigger

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