

REVISED SYLLABUS

MEC 465/565, Spring 2021 (SBU)

Aerospace Propulsion

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Class Time and Location: Mondays, Wednesdays: 2:40 – 4:00 PM (ZOOM Meeting ID: 961 3445 3420 Passcode: 724880)

Instructor: Professor Foluso Ladeinde

Office Location: Heavy 224

Preferred E-mail Address: foluso.ladeinde@stonybrook.edu

Instructor Office Hours (Tentative): Tu, Th: 1:00 – 2:30 PM (ZOOM Meeting ID: 950 8281 4887, Passcode: 583428)

TA: Abdullah Al Mut Sharfuddin

Office Hours: TBD

Textbook: Aircraft Propulsion, Saeed Farokhi, Second Edition, 2014, Wiley Publ. 2014, ISBN 978-1-118-80677-7.

Recommended Books:

1. Jet Propulsion, Nicholas Cumpsty, Second Edition, 2003, Cambridge University Press Publ.
2. Mechanics and Thermodynamics of Propulsion, Philip Hill and Carl Peterson, Second Edition, 1992, Addison Wesley Publ.

Prerequisite: MEC 301, MEC 305, MEC 364, or Written Permission of the Instructor.

Course Description: Fundamentals of propulsion; performance parameters, thermodynamic cycles. Introduction to combustion and combustors. Performance and cycle analysis of various flight propulsion systems: turbojets, turbofans, turboprops, ramjets, scramjets, rockets, propellers. Design of supersonic inlet nozzles, component matching and map.

Schedule (Subject to Change):

Week	Description	Date	Chapters in Text
Week 1	Introduction: Historical Perspective, Thrust Generation – Propeller, Rocket, Ramjet, Scramjet, Pulsejet, Turbojet, Turbofan, Turboprop, Reciprocating Engines	2/1-2/5 (2021)	1, Instructor's Notes (IN)
Week 2	Review of Gas Dynamics	2/8-2/12	2, IN
Week 3	Review of Gas Dynamics	2/15-2/19	2, IN
Week 4	Engine Thrust and Performance Parameters	2/22-2/26	3
Week 5	Gas Turbine Engine Cycle Analysis	3/1 - 3/5	4
Week 6	Gas Turbine Engine Cycle Analysis	3/8 - 3/12	4

Week 7	Aircraft Engine Inlets and Nozzles	3/15 - 3/19	6
Week 8	Aircraft Engine Inlets and Nozzles, Midterm: March 24 (Wednesday)	3/22 - 3/26	6
Week 9	Accommodation – No Classes	3/29 - 4/4	
Week 10	Combustion Chambers	4/5-4/9	7
Week 11	Combustion Chambers	4/12 - 4/16	7
Week 12	Axial Compressors, Axial Turbines	4/19 - 4/23	8, 9, 10
Week 13	Axial Compressors, Axial Turbines Aircraft Engine Component Matching and Off- Design Analysis	4/26 - 4/30 Assigned Homework Reading	8, 8, 10 11
Week 14	Chemical Rocket and Hypersonic Propulsion End of Classes May 8 (Saturday)	5/3 – 5/7	12
Weeks 15/16	Finals: May 11 – 19 Final Exam in MEC 465/565: Thursday, May 13, 11:15 AM – 1:45 PM Commencement 5/21 (Friday)		

Online Class Delivery Requirements:

Online Live Lectures: All classes in this course will be delivered online as a precaution against infection by the coronavirus. **The online classes will be scheduled during the regular class time originally allocated for the course by the university at the beginning of the semester.**

The classes will be delivered in Zoom Web Conferencing software package. The meeting ID and password are given above.

Assignments, lecture notes, and other course materials will be emailed to you or uploaded to Blackboard.

If you experience any technical difficulties that could prevent you from attending the online meetings, please contact the TAs for this course or DoIT. DoIT can be reached by calling (631) 632-9800. The contact emails for the TAs have been given to you in prior communications from me.

Assignments will be posted on Blackboard. You should submit your solutions electronically via Blackboard. You will be taking an online final exam, in either structured or Take-Home format. Details will be provided to you in due course of time.

In summary:

- a) I will deliver the lectures online using the Zoom web conferencing software package
- b) The Zoom meeting ID number and passcode are given above

- c) I will use a whiteboard to display lecture contents and write on the board as I would in a conventional class. You are encouraged to interact with the instructor and ask questions during class
- d) I will try to record the lectures in Zoom, as backup, and for the benefit of students who might not be able to attend class. However, students are required to attend class, not only because of the nature of the subject matter of the course, but also because, for technology-related reasons, I cannot guarantee that the lectures will be successfully recorded and available to students.
- e) Office hours will be conducted via Zoom. Please see above for Meeting ID and Passcode for the office hours
- f) Exams will either be take-home (sent by email/Blackboard and student solutions collected via email/Blackboard) or via Blackboard, with/without Respondus.

Copyright Statement: Lecture notes, video recordings, examinations, homework problems and their solutions, and other items shared with you in the course of lecture delivery – be it in-person or online - constitute intellectual properties (IPs). Therefore, sharing these materials in any shape or form without a signed, written permission from me (Professor Foluso Ladeinde) constitute infringement for which a legal recourse is available in the court of law. This option will be exercised in the event of an IP infringement.

Course Grand Rules:

- Participation in the online live class meetings is required.
- You will need to learn to use Blackboard and Zoom. Please visit SBU's DoIT to do this: <https://sites.google.com/stonybrook.edu/keeplearning>
- Please keep abreast of class announcements, which would come from emails and/or Blackboard

MEC 465 Grading Scheme (Subject to Change):

Midterm: 30% (Blackboard)
Final (Comprehensive, Blackboard): 35%
Homework: 30% (Blackboard)
Attendance: 5%

MEC 565 Grading Scheme (Subject to Change):

Midterm: 40% (Blackboard)
Final (Comprehensive, Blackboard): 40%
Homework: 15% (Blackboard)
Attendance: 5%

Note: The homework sets and the exams for MEC 565 may from time to time contain problems that are more challenging compared to those for MEC 465.

Homework:

Approximately two homework assignments in three weeks.
Homework will be due one week after it has been assigned.

Late homework will receive half credit before the solutions are posted and will not be accepted after that.

Homework is to be done individually. Homework must be neat and orderly so that your work can be followed clearly. Solutions which are not clearly written and easy to follow (based on the judgment of the instructor) will not be graded.

Exams:

All exams will be scheduled as described above. No makeup exam unless arranged well in advance prior to the exam.

Grading Scale:

Will grade on the curve

Important Statement about Absences (New)

Students are expected to attend every class, report for examinations, and submit major graded coursework as scheduled. If a student is unable to attend lecture(s), report for any exams or complete major graded coursework as scheduled due to extenuating circumstances, the student must contact the instructor as soon as possible. Students may be requested to provide documentation to support their absence and/or may be referred to the Student Support Team for assistance. Students will be provided reasonable accommodations for missed exams, assignments or projects due to significant illness, tragedy or other personal emergencies. In the instance of missed lectures or labs, the student is responsible for reviewing recorded lectures and/or seeking notes from a classmate. Please note, all students must follow Stony Brook, local, state and Centers for Disease Control and Prevention (CDC) guidelines to reduce the risk of transmission of COVID. For questions or more information click [here](#).

Student Accessibility Support Center Statement

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Student Accessibility Support Center, ECC (Educational Communications Center) Building, Room 128, (631)632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Student Accessibility Support Center. For procedures and information go to the following website: <http://www.stonybrook.edu/ehs/fire/disabilities>

Academic Integrity Statement

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity,

including categories of academic dishonesty please refer to the academic judiciary website at http://www.stonybrook.edu/commcms/academic_integrity/index.html

Critical Incident Management

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of University Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.

Allowed Calculators

Following the Mechanical Engineering Department's mandatory calculator policy, **only** the following calculators will be allowed to be used on the midterm and final exams. **There will be no exceptions.** This list of calculators is identical to that allowed for the *National Council for Examiners for Engineering and Surveying* (NCEES) Fundamentals of Engineering (FE) exam that many of you will take in your senior year, as well as the Professional Engineering (PE) exam that you may take several years from now. The sooner you become comfortable on one of these calculators, the better. If you have any questions on this policy please feel free to contact me. The NCEES policy on calculators can be found here: <http://www.ncees.org/exams/calculators/>.

- Casio:** All **fx-115** models. Any Casio calculator must contain **fx-115** in its model name.
- Hewlett Packard:** The **HP 33s** and **HP 35s** models, but no others.
- Texas Instruments:** All **TI-30X** and **TI-36X** models. Any Texas Instruments calculator must contain either **TI-30X** or **TI-36X** in its model name.