

REVISED SYLLABUS

MEC 465/565, Spring 2024 (SBU)

Aerospace Propulsion

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Class Time and Location: Tuesdays, Thursdays: 4:00 PM – 5:20 PM (In-Person FREY HALL 317 WEST CAMPUS)

Instructor: Professor Foluso Ladeinde

Office Location: Heavy 224

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

Instructor Office Hours (Tentative): Tuesdays, 10:00 AM – 12:00 Noon, 1:00 – 2:00 PM (Primarily by Zoom):

Join Zoom Meeting

<https://stonybrook.zoom.us/j/99623360362?pwd=Y1d6Tjg4TS9GOFp1NENCdDFub1FIQT09>

Meeting ID: 996 2336 0362 Passcode: 717228

Textbook: Aircraft Propulsion, Saeed Farokhi, Third Edition, 2022, Wiley Publ. 2014, ISBN 978-1119718642.

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.(3 Credits)

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	1/22-1/26 (2024)	1, Instructor's Notes (IN)
Week 2	Review of Gas Dynamics	1/29-2/2	2, IN
Week 3	Review of Gas Dynamics	2/5-2/9	2, IN
Week 4	Engine Thrust and Performance Parameters	2/12-2/16	3

Week 5	Gas Turbine Engine Cycle Analysis	2/19-2/23	4
Week 6	Gas Turbine Engine Cycle Analysis	2/26 - 3/1	4
Week 7	Aircraft Engine Inlets and Nozzles	3/4-3/8	6
Week 8	SPRING BREAK	3/11-3/17	
Week 9	Aircraft Engine Inlets and Nozzles,	3/18-3/22	6
Week 10	Combustion Chambers	3/25-3/29	7
Week 11	Combustion Chambers	4/1 - 4/5	7
Week 12	Axial Compressors, Axial Turbines	4/8-4/12	8, 9, 10
Week 13	Axial Compressors, Axial Turbines	4/15 - 4/19	8, 9, 10
Week 14	Axial Compressors, Axial Turbines	4/22-4/26	8, 9, 10
Week 15	Chemical Rocket and Hypersonic Propulsion	4/29-5/3	12
	SBU End of Classes May 5 (Saturday)		

Weeks 16/17 Finals: May 7 – 15

Final Exam in MEC 465/565:
TBD
Commencement 5/17 (Friday)

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 Rules:

- 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
- Office Hours is primarily via Zoom at the link below. However, you are more than welcome to schedule in-person meetings with me during office hours.

Join Zoom Meeting

<https://stonybrook.zoom.us/j/99623360362?pwd=Y1d6Tjg4TS9GOFp1NENCdDFub1FIQT09> Meeting ID: 996 2336 0362 Passcode: 717228

Homework: Approximately two homework assignments every three weeks. Homework will be due one week after it is assigned. Late homework will receive half credit before the solutions are posted and will not be accepted after that.

Exams: Midterm exams will be scheduled in-person. No makeup exam unless arranged prior to the exam.

Grading Scale: Will grade on a curve

Grading Scheme (Subject to Change):

MEC 465 Grading Scheme (Subject to Change):

Quizzes: 10%
Midterm: 20% (Blackboard, In-Person)
Final (Comprehensive, Blackboard, In-Person): 35%
Homework: 30% (Blackboard)
Attendance: 5%

MEC 565 Grading Scheme (Subject to Change):

Quizzes: 10%
Midterm: 30% (Blackboard, In-Person)
Final (Comprehensive, Blackboard, In-Person): 40%
Homework: 15% (Blackboard)
Attendance: 5%

Homework and exams are 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.

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 Student Conduct and Community Standards any disruptive behavior that interrupts their ability to teach,

compromises the safety of the learning environment, or inhibits students' ability to learn. Until/unless the latest COVID guidance is explicitly amended by SBU, during Spring 2022 "disruptive behavior" will include refusal to wear a mask during classes.

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.

Make-up classes:

In the event that, for any reasons, I am not able to attend one or more of our regularly scheduled classes, as is the case when I go to conferences or attend to urgent family issues, I will make all efforts to get a substitute who is competent in teaching this course. Otherwise, I will make up missed classes at a mutually convenient time. I will announce suggested make up times well in advance, and make sure that they are reasonable for everyone.