TEXAS A&M UNIVERSITY
GALVESTON CAMPUS.

## MASE 363 - Dynamics and Vibrations

*COURSE SYLLABUS*

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|---|---|
| COURSE INFORMATION | **Dynamics and Vibrations - MASE 363**<br>**Fall 2015** |
| COURSE INSTRUCTOR | Masoud Hayatdavoodi, Ph.D.<br>Instructional Assistant Professor<br>Ocean Engineering Department<br>*Office:* PMEC 117<br>*E-mail:* masoud@tamu.edu<br>*Website:*`http://people.tamu.edu/~masoud/` |
| TEACHING ASSISTANT | Shanran Tang<br>*Office:* PMEC 120<br>*Email:* srtang@tamu.edu |

CLASS SCHEDULE

- **Lecture:** Monday, Wednesday 04:00 PM to 04:50 PM at PMEC 146
- **Problem Solving:** Friday, 04:00 PM - 05:50 PM at PMEC 146

OFFICE HOURS

Monday, Wednesday, Friday: 02:00PM-03:00PM,
And by appointment.

GRADING

| | |
|---|---|
| Assignments | 20% |
| Midterm Exam | 30% |
| Project | 20% |
| Final Exam | 30% |

GRADING SCALE

| | |
|---|---|
| A | $\geq 90\%$ |
| B | $\geq 75\%$ |
| C | $\geq 60\%$ |
| D | $\geq 50\%$ |
| F | $< 50\%$ |

TEXTBOOK

- **Required:**
  Hibbeler, Russell C. (2015), "Engineering Mechanics: Dynamics," Prentice Hall; 14 edition, ISBN: 978-0133915389, 784 pp.

  Rao, Singiresu S. (2010), "Mechanical Vibration," Prentice Hall; 5 edition, ISBN: 978-0132128193, 1104 pp.

- **Alternative Reference Books:**
  Childs, Dara W. (2010), "Dynamics in Engineering Practice," CRC Press; 10 edition, ISBN: 978-1580534970, 390 pp.

  Thomson, William T. and Dahleh, Marie Dillon (1997), "Theory of Vibration with Applications," Prentice Hall; 5 edition, ISBN: 978-0136510680, 534 pp.

  Chakrabarti, Subrata K. (2002), "Advanced Series on Ocean Engineering, Volume 20: The Theory and Practice of Hydrodynamics and Vibration," World Scientific, ISBN: 978-981-02-4922-9, 484 pp.

**Course Communications**

Course-related material, along with class communications, are held on *eCampus* through *Howdy* portal. Students are expected to check and use the course webpage on regular basis.

**Course Description**

Application of Newtonian and energy methods to model dynamic systems with ordinary differential equations; dynamics and vibrations of linear single- and multi-degree of freedom systems of particles and rigid bodies; solutions of models using analytical approaches; interpreting solutions; application to simple floating systems.

**Learning Outcomes**

This course is intended to introduce the student to the fundamental aspects of dynamics and vibrations as it applies to machines, structures, and engineering components. Upon completion of this course, students will be able to apply the principal of Newton's 2nd law of motion in various forms. The student will also be exposed to the fundamental aspects of vibration analysis, which will pave the way for solving vibration problems based on conventional closed form analytical basis as well as numerical basis. The vibration state solving methods will serve as precursor to more advanced vibratory methods, which will be in future courses on the subject matter. This course supports ABET criteria A, E and K, and criteria 2 and 3.

**Prerequisites**

MASE 221 with a grade of C or better; MATH 308 with C or better; MASE 261. Enrollment in OCSE major degree sequence and junior or senior classification.

**Attendance and Make-up Polices**

Information concerning absences is contained in the University Student Rules Section 7 `http://www.tamug.edu/stulife/Academic%20Rules/Rule%207.pdf`.

The University views class attendance as an individual student responsibility. All students are expected to attend class and to complete all assignments. Late arrivals count as absences.Please consult the University Student Rules for reasons for excused absences, detailed procedures and deadlines as well as student grievance procedures (Part III, Section 45). If the absence is excused, the student will be provided an opportunity to make up any quiz, exam or other work that contributes to the final grade. The evaluation method will be decided by the instructor. The evaluation date is agreed upon by the student and instructor.

**Academic Integrity**

*An Aggie does not lie, cheat or steal, or tolerate those who do.*
For additional information visit: `http://www.tamug.edu/HonorSystem`.

**Americans with Disabilities Act (ADA)**

The Americans with Disabilities Act (ADA) is a federal non-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this law requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Counseling Office, Seibel Student Center, or call (409)740-4587. For additional information visit:
`http://www.tamug.edu/counsel/Disabilities.html`.

TENTATIVE SCHEDULE

| MONDAY | WEDNESDAY | FRIDAY |
|---|---|---|
| Aug 31st **1**<br>Course Introduction | Sep 2nd **2**<br>Preliminaries | 4th **3**<br>Preliminaries |
| 7th **4**<br>Equations of Motion | 9th **5**<br>Problem Solving | 11th **6**<br>Problem Solving |
| 14th **7**<br>Force and Acceleration | 16th **8**<br>Force and Acceleration | 18th **9**<br>Problem Solving |
| 21st **10**<br>Work and Energy | 23rd **11**<br>Work and Energy | 25th **12**<br>Problem Solving |
| 28th **13**<br>Impulse and Moment | 30th **14**<br>Impulse and Moment | Oct 2nd **15**<br>Problem Solving |
| 5th **16**<br>Rigid Body Motion | 7th **17**<br>Rigid Body Motion | 9th **18**<br>Problem Solving |
| 12th **19**<br>Rigid Body Motion | 14th **20**<br>**Midterm Review** | 16th **21**<br>**Midterm Exam** |
| 19th **22**<br>Fundamentals of Vibrations | 21st **23**<br>Fundamentals of Vibrations | 23rd **24**<br>Problem Solving |
| 26th **25**<br>Free Vibration | 28th **26**<br>Forced Vibration | 30th **27**<br>Problem Solving |
| Nov 2nd **28**<br>Damped Free Vibration | 4th **29**<br>Damped Free Vibration | 6th **30**<br>Problem Solving |
| 9th **31**<br>Damped Forced Vibration | 11th **32**<br>Damped Forced Vibration | 13th **33**<br>Problem Solving |
| 16th **34**<br>Project Submission | 18th **35**<br>Nonlinear Vibrations | 20th **36**<br>Problem Solving |
| 23rd **37**<br>Hydrodynamics and Vibrations | 25th **38**<br>Hydrodynamics and Vibrations | 27th<br>**Thanksgiving Holiday** |
| 30th **39**<br>Multi-degree Vibrations | Dec 2nd **40**<br>Multi-degree Vibrations | 4th **41**<br>Problem Solving |
| 7th **42**<br>Problem Solving | 9th **43**<br>**Final Exam Review** | 11th **44**<br>**Final Exam** |

**Final Exam:** Friday, December 11, 2015, 03:30 PM to 05:30 PM, PMEC 146.