Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
Submit original form and 2 copies. Attach a course syllabus to each.

1. This request is submitted by the Department of ____________
   Aerospace Engineering

2. Course prefix, number and complete title AERO 612 Wave Propagation in Isotropic and Anisotropic Solids

3. Course description (not more than 50 words) Wave Propagation in Isotropic and Anisotropic Solids. Mathematical and experimental methods of studying stress waves with emphasis on anisotropic solids, e.g., fiber-reinforced composite materials; waves in an unbounded medium, in a half-space, in rods; waves in a general anisotropic medium; wave surface, slowness surface, velocity surface, energy velocity and group velocity.

4. Prerequisite(s) MEMA 601 or AERO 603 Cross-listed with MEMA 612
   Cross-listed courses require the signatures of both department heads.

5. Is this a variable credit course? ☐ Yes ☐ No If yes, from ________ to ________.

6. Is this a repeatable course? ☐ Yes ☐ No If yes, this course may be taken ________ times. Will the course be repeated within the same semester/term? ☐ Yes ☐ No

7. Has this course been taught as a 489/689? ☐ Yes ☐ No If yes, how many times? ________ Indicate the number of students enrolled for each academic period it was taught.

8. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
   N/A
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)
   Aerospace engineering and related engineering and geology/geophysics majors

9. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

10. Prefix | Course # | Title (exclude punctuation)
        AERO | 612 | WAVE PROPAGATION

<table>
<thead>
<tr>
<th>Lect.</th>
<th>Lab</th>
<th>SCH</th>
<th>Subject Matter Content Code</th>
<th>Admin. Unit</th>
<th>Acad. Year</th>
<th>FICE Code</th>
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<td>Level</td>
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Do not complete shaded area.

Approval recommended by:

Head of Department   Date
Head of Department (if cross-listed course)   Date
Chair, College Review Committee   Date
Dean of College   Date
Dean of College   Date

Submitted to Coordinating Board by:

Director of Academic Support Services   Date

Effective Date

To have this form reviewed, please send to Linda F. Lacey, Mail Stop 1265 or fax to 847-8737.
OAR/AS-5/04

RECEIVED
OCT 18 2007
N.K. A. Nand
MEMA 612 / AERO 612 - WAVE PROPAGATION IN ISOTROPIC AND ANISOTROPIC SOLIDS

Instructor: Vikram K. Kinra, 739 HRBB, 845-1667, kinra@tamu.edu. 
Semester/Time/Location: TBA

Course Description: Mathematical and experimental methods of studying stress waves with emphasis on anisotropic solids, e.g., fiber-reinforced composite materials; waves in an unbounded medium, in a half-space, in rods; waves in a general anisotropic medium; wave surface, slowness surface, velocity surface, energy velocity and group velocity. Materials with periodic structures: Brillouin zones, cut-off frequency and dispersion.

5. Additional references and journals as appropriate.

Prerequisite: AERO 603 or MEMA 601

Course Contents:

<table>
<thead>
<tr>
<th>Hours</th>
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<td>Why should we study wave propagation?</td>
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I. Introduction

II. Isotropic Solids

A. Unbounded Media
   Plane Waves | 1 |
   Cylindrical Waves | 2 |
   Spherical Waves | 2 |

B. Half-Space
   Reflection and Reflection at an interface | 3 |

C. Waveguides
   SH waves in a plate | 2 |
   Lamb waves | 2 |
   Waves in a circular rod
     (i) Torsional Waves | 1 |
     (ii) Longitudinal Waves | 2 |
     (iii) Flexural Waves | 2 |

III. Anisotropic Solids

A. Method of characteristics | 3 |
B. Huygen's principle; wave surface, velocity surface and slowness surface; energy and group velocity | 5 |
C. Materials with transverse isotrophy (unidirectional fiber-reinforced composite materials). | 5 |
D. Reflection and refraction at an isotropic/anisotropic interface | 3 |
E. Wave propagation in a medium with a periodic structure: Brillouin zones, cut-off frequency, dispersion, energy velocity | 6 |

IV. Experimental Methods (3 Hours)

   Shear Pendulum and Hopkinson Bar | 1 |
   Kolsky Bar | 1 |
   Ultrasonics | 1 |

Total | 42 |
Course Evaluation:

- Weekly abstracts of current journal publications 10%
- Mid-term Examination 20%
- Final Examination 25%
- Homework 20%
- Term Paper, including presentation to the class 25%
- Total 100%

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The Americans with Disabilities Act (ADA) is a federal antidiscrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation 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 Department of Student Life, Services for Students with Disabilities in Room B118 Cain Hall, or call 845-1637.

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