



Arab Academy for Science, Technology & Maritime Transport
 College of Engineering & Technology
 Mechanical Engineering Department

University/Academy: Arab Academy for Science, Technology & Maritime Transport
Faculty/Institute: College of Engineering & Technology
Program: B.Sc. Mechanical Engineering

Form no. (12): **Course Specification**

1- Course Data

Course Code: ME 458	Course Title: Mechanical vibrations	Academic Year/Level: 4th year / 7th semester	
Specialization: Mechanical	No. of Instructional Units 3 credits	Lecture 2 hrs.	Practical 2 hrs.

2- Course Aim

- To enable the student to recognize the importance and significance of the mechanical vibrations phenomena.

3- Intended Learning Outcomes

a- Knowledge and Understanding	<p>Through knowledge and understanding, students will be able to:</p> <p>a.4) Principles of design including elements design, process and/or a system related to specific disciplines.</p> <p>a.5) Methodologies of solving engineering problems, data collection and interpretation</p> <p>a.p.2) Internal combustion, pumps, turbines and compressors, classification, construction design concepts, Operation and characteristics</p> <p>a.p.6) Mechanical power and energy engineering contemporary issues</p>
b- Intellectual Skills	<p>Through intellectual skills, students will be able to:</p> <p>b.1) Select appropriate mathematical and computer-based methods for modeling and analyzing problems.</p> <p>b.2) Select appropriate solutions for engineering problems based on analytical thinking.</p> <p>b.3) Think in a creative and innovative way in problem solving and design</p> <p>b.6) Investigate the failure of components, systems, and processes.</p> <p>b.11) Analyze results of numerical models and assess their limitations.</p> <p>b.12) Create systematic and methodic approaches when dealing with new and advancing technology.</p>
c- Professional Skills	<p>Through professional and practical skills, students will be able to:</p> <p>c.2) Professionally merge the engineering knowledge, understanding, and feedback to improve design, products and/or services</p> <p>c.3) Create and/or re-design a process, component or system, and carry out</p>

	<p>specialized engineering designs</p> <p>c.5) Use computational facilities and techniques, measuring instruments, workshops and laboratory equipment to design experiments, collect, analyze and interpret results</p> <p>c.6) Use a wide range of analytical tools, techniques, equipment, and software packages pertaining to the discipline and develop required computer programs.</p> <p>c.7) Apply numerical modeling methods to engineering problems</p> <p>c.8) Apply safe systems at work and observe the appropriate steps to manage risks.</p> <p>c.11) Exchange knowledge and skills with engineering community and industry</p> <p>c.p.1) Use basic workshop equipment safely and appropriately.</p> <p>c.p.6) Carry out preliminary designs of fluid transmission networks, internal combustion and steam engines and solve their operational problems</p>
d- General Skills	<p>Through general and transferable skills, students will be able to:</p> <p>d.3) Communicate effectively</p> <p>d.4) Demonstrate efficient IT capabilities.</p> <p>d.5) Lead and motivate individuals</p>

4- Course Content

Week No.1	Introduction, Harmonic and periodic motions
Week No.2	Equivalent systems
Week No.3	Equivalent systems (contd.)
Week No.4	Free vibrations of single degree of freedom systems
Week No.5	Free vibrations of single degree of freedom systems (contd.)
Week No.6	Free vibrations of single degree of freedom systems (contd.)
Week No.7	Forced vibrations of single degree of freedom systems / 7th week evaluation
Week No.8	Transmissibility
Week No.9	Vibration measurements
Week No.10	Vibration measurements (contd.)
Week No.11	Vibration under general forcing conditions
Week No.12	Two degree of freedom systems / 12th week evaluation
Week	Two degree of freedom systems (contd.).

No.13

Week Multi-degree of freedom systems (Eigen value and Eigen vector problems)
No.14

Week Multi-degree of freedom systems (Eigen value and Eigen vector problem)
No.15

Week Final Examination
No.16

5- Teaching and Learning Methods

- Lectures
- Tutorials
- Reports & sheets
- Laboratories
- Seminars

6-Teaching and Learning Methods for Students with Special Needs

- Lectures
- Tutorials
- Reports & sheets
- Laboratories
- Seminars

Engineering Requirements and Design Considerations in college Buildings and its Leading Passages

- The design of college buildings and pedestrian passages leading to it are sloppy to allow the transportation of the handicapped;
- Doors are wide enough to let wheel chairs pass through easily and conveniently.
- Lifts are provided for movement between floors.
- Doors are made from light weight materials to make it easy for the handicapped suffering from weakness in limb muscles or those handicapped using prosthetic limbs to deal with them with the least muscular effort.
- Class floors are made from non-slippery materials to prevent falls on the part of the handicapped.
- Sudden changes in the floor level are prevented.

Design Considerations of the Classes

- Class boards are placed at 60 cm high to allow wheeled chair users or those suffering from limited arm mobility use them.
- Enough spaces are left between seats and benches to prevent hindering the movement of wheeled chairs between them.
- Handicapped students sit among normal people in class to be able to interact with them. Nevertheless, in urgent cases according to the nature of the disability, the handicapped students sit in fixed suitable places whether at the front or the back of the class.
- Handicapped students sit close to the main exits of the class to be able to evacuate in case of emergencies.

Academic Support:

- The general academic advisor appoints an academic supervisor for handicapped students.
- Continuous follow ups are made for handicapped students after each assessment to evaluate their

academic level of achievement

7- Student Assessment

a-Procedures used	1-Written Examinations to assess The Intended Learning Outcomes. 2-Class Activities (Reports, Discussions, -----) to assess The Intellectual and general Skills.	
b- Schedule:	Assessment 1 Assessment 2 Assessment 3 Assessment 4	7 th Week Assessment 12 th Week Assessment Continuous Assessments 16 th Week Final Written Exam
c- Weighing of Assessment	7 th Week Evaluation 12 th Week Evaluation Final-term Examination Oral Examination Practical Examination Semester Work Total	30 % 20 % 40 % 00 % 00 % 10 % 100%

8- List of References:

a- Course Notes	N/A
b- Required Books (Textbooks)	• Singiresu. S.Rao, "Mechanical vibrations ", Addison – Wesley Publishing company, latest Edition.
c- Recommended Books	• William Thomson, "Theory of vibrations and applications ", prentice Hall. Victor Wowk, "machinery vibrations measurements and analysis", Mc Graw Hill , Inc. Daniel J. Inman, "Engineering vibration ", Prentice Hall International, Inc.
d- Periodicals, Web Sites, etc.	N/A

Course Instructor: Prof. El-Sayed Saber

Head of Department: Prof. El-Sayed Saber

Program Manager: Prof. El-Sayed Saber

Dean of College of Engineering and
Technology of AASTMT

Executive Manager of Quality Assurance
Center of AASTMT

Name: **Prof. Moustafa Hussein Aly**
Signature:

Name: **Prof. Aziz Ezzat**
Signature: