

## 课程详述

## **COURSE SPECIFICATION**

以下课程信息可能根据实际授课需要或在课程检讨之后产生变动。如对课程有任何疑问,请联 系授课教师。

The course information as follows may be subject to change, either during the session because of unforeseen circumstances, or following review of the course at the end of the session. Queries about the course should be directed to the course instructor.

1.	课程名称 Course Title	动力学与机械振动 Dynamics and Vibration						
2.	授课院系 Originating Department	机械与能源工程系 Department of Mechanical and Energy Engineering						
3.	课程编号 Course Code	ME301-16	ME301-16					
4.	课程学分 Credit Value	2	2					
5.	课程类别 Course Type	专业基础课 Major Foun	专业基础课 Major Foundational Course					
6.	授课学期 Semester	秋季学期 Fall	秋季学期 Fall					
7.	授课语言 Teaching Language	英文 English						
8.	授课教师、所属学系、联系方 式(如属团队授课,请列明其 他授课教师)	郑裕基 机械与能源工程系 zhengy j@sustc. edu. cn						
	Instructor(s), Affiliation& Contact (For team teaching, please list all instructors)	U Kei Cheang Department of Mechanical and Energy Engineering						
9.	实验员/助教、所属学系、联系 方式	待公布 To be announced						
	Tutor/TA(s), Contact							
10.	选课人数限额(可不填) Maximum Enrolment (Optional)							
11.	授课方式 Delivery Method	讲授 Lectures	习题/辅导/讨论 Tutorials	实验/实习 Lab/Practical	其它(请具体注明) Other (Please specify)	总学时 Total		
	学时数 Credit Hours	24	0	16	0	40		



12.	先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	MAE203B 理论力学I-B Engineering Mechanics I - Statics and Dynamic MA201b 常微分方程 B Ordinary Differential Equation B
13.	后续课程、其它学习规划 Courses for which this course is a pre-requisite	
14.	其它要求修读本课程的学系 Cross-listing Dept.	
		教学大纲及教学日历 SYLLABUS
15.	教学目标 Course Objectives	

## This course provides students with necessary background of dynamics of particles, dynamics of rigid bodies, and dynamics of flexible bodies (vibration). Students will learn how to describe motion in different coordinate systems (kinematics) and how to develop the relationship between the forces applied on the system and the motion caused (kinetics). The approaches of differential equations, principle of work and energy, and principles of linear and angular impulse and moment are introduced to solve dynamic problems in different disciplines. Analysis for both free vibration and forced vibration for linear single degree-offreedom (SDOF), multiple degree-of-freedom (MDOF), and continuous systems are discussed.

#### 16. 预达学习成果 Learning Outcomes

After completing this course, the students should learn the basic concepts and principles of dynamics and vibration, develop problem-solving skills for applications in different engineering disciplines, and provide sound background for more advanced studies. Univer

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#### 17.

课程内容及教学日历(如授课语言以英文为主,则课程内容介绍可以用英文;如团队教学或模块教学,教学日历须注明 主讲人)

Course Contents (in Parts/Chapters/Sections/Weeks. Please notify name of instructor for course section(s), if this is a team teaching or module course.)

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• Fundamentals of Dynamics       0.5         • Rectilinear Continuous Motion       1         • Rectilinear Motion with Constant Acceleration       0.5         • Rectilinear Erratic Motion       1         • Curvilinear Motion Rectangular Components       0.5         • Motion of a Projectile       0.5         • Curvilinear Motion Normal and Tangential Components, Cylindrical Components       1.5         • Absolute Dependent Motion Analysis       0.5         • Relative Motion of two Particles       0.5         • The Work of a Force       0.5         • Drive Vork of a Force       0.5         • Drive Vork of a Force       0.5         • Drive and Efficiency       0.5         • Conservation of Linear Momentum       0.5         • Conservation of Linear Momentum for a System of Particles       0.5         • Impact and the Coefficient of Resitution       0.5         • Rigid Body Planar Motion. Translation       0.5         • Relative Motion Analysis Using Rotating Axes       1         • Relative Motion of Planar Motion: General plane motion       0.5         • Relative Motion Analysis Using Rotating Axes       1         • Mass Moment of Inertia       1         • Mass Moment of Rigid Body Planar Motion       0.5         • Motion of Plan	Kinen	natics and Kinetics of Particles	Hours		
• Rectilinear Continuous Motion       1         • Rectilinear Continuous Motion       0.5         • Rectilinear Motion Rectangular Components       0.5         • Motion of a Projectile       0.5         • Curvilinear Motion Normal and Tangential Components, Cylindrical Components       1.5         • Absolute Dependent Motion Analysis       0.5         • Relative Motion of Two Particles       0.5         • Relative Motion Rectangular Coordinates, Normal and Tangential Coordinates, Cylindrical       1.5         • Absolute Dependent Motion Acatysis       0.5         • Relative Motion Rectangular Coordinates, Normal and Tangential Coordinates, Cylindrical       1.5         • Conservation of Energy       0.5         • Principle of Work and Energy       0.5         • Conservation of Linear Momentum       0.5         • Conservation of Linear Momentum       0.5         • Conservation of Linear Momentum for a System of Particles       0.5         • Impact and the Coefficient of Restitution       0.5         • Rotation about a Fixed Axis       1         • General Plane Motion. Translation       0.5         • Mass Moment of Inertia       1         • Meast Moment for Rigid Body Planar Motion       1.5         • Mass Moment of Inertia       1         • Mass Moment of Inert	•	Fundamentals of Dynamics	0.5		
Rectilinear Motion with Constant Acceleration     Rectilinear Erratic Motion     Rectilinear Erratic Motion     Rectilinear Erratic Motion     Rectilinear Erratic Motion     Rectainear Motion Normal and Tangential Components     Cylindrical Components     Soft     Curvilinear Motion Normal and Tangential Coordinates     Cordinates     Relative Motion of Two Particles     Soft     Relative Motion Rectangular Coordinates, Normal and Tangential Coordinates, Cylindrical     Coordinates     Relative Motion Rectangular Coordinates, Normal and Tangential Coordinates, Cylindrical     Coordinates     Requires     Rever and Efficiency     Soft     Principle of Work and Energy     Soft     Principle of Work and Energy     Soft     Principle of Linear Impulse and Momentum     Soft     Conservation of Linear Momentum for a System of Particles     Soft     Reparation about a Fixed Axis     Restation analysis Using Rotating Axes     Mass Moment of Inertia     Equations of Motion for Planar Motion: Translation     Kortation of SDOF Systems     Vibration of MDOF Systems     Soft Angular Experiment     Vibration of MDOF Systems     Soft Angular Experiment     Vibration of SDOF Systems     Vibration of Construct Systems     Soft Angular Experiment     Vibration of SDOF Systems     Vibration of SDOF Systems     Vibration of Construct System	•	Rectilinear Continuous Motion	1		
<ul> <li>Rectilinear Erratic Motion</li></ul>	•	Rectilinear Motion with Constant Acceleration	0.5		
<ul> <li>Curvilinear Motion_Rectangular Components</li> <li>Motion of a Projectile</li> <li>Curvilinear Motion Normal and Tangential Components, Cylindrical Components</li> <li>Absolute Dependent Motion Analysis</li> <li>Relative Motion Rectangular Coordinates, Normal and Tangential Coordinates, Cylindrical</li> <li>Relative Motion Rectangular Coordinates, Normal and Tangential Coordinates, Cylindrical</li> <li>Coordinates</li> <li>Equations of Motion Rectangular Coordinates, Normal and Tangential Coordinates, Cylindrical</li> <li>The Work of a Force</li> <li>O5</li> <li>Principle of Work and Energy</li> <li>Conservation of Energy</li> <li>Conservation of Energy</li> <li>Conservation of Linear Momentum</li> <li>Conservation of Interia</li> <li>Rigid Body Planar Motion. Translation</li> <li>Relative Motion Analysis Using Rotating Axes</li> <li>Relative Motion Analysis Using Rotating Axes</li> <li>Mass Momentum for Rigid Body Planar Motion</li> <li>Equations of Motion for Planar motion: General plane motion</li> <li>Work and Energy for Rigid Body Planar Motion</li> <li>Work and Energy for Rigid Body Planar Motion</li> <li>Vibration of SDOF Systems</li> <li>Vibration of SDOF Systems</li> <li>Vibration of MDOF Systems</li> <li>Vibration of MOC Systems</li> <li>Vibration o</li></ul>	•	Rectilinear Erratic Motion	1		
<ul> <li>Motion of a Projectile</li> <li>Curvilinear Motion Normal and Tangential Components, Cylindrical Components</li> <li>1.5</li> <li>Absolute Dependent Motion Analysis</li> <li>Relative Motion of Two Particles</li> <li>Equations of Motion Rectangular Coordinates, Normal and Tangential Coordinates, Cylindrical Coordinates</li> <li>The Work of a Force</li> <li>Principle of Work and Energy</li> <li>Conservation of Energy</li> <li>Conservation of Energy</li> <li>Conservation of Energy</li> <li>Principle of Linear Momentum for a System of Particles</li> <li>Impact and the Coefficient of Restitution</li> <li>Conservation of Linear Momentum</li> <li>Stimunatics and Kinetics of Rigid Bodies</li> <li>Impact and the Coefficient of Restitution</li> <li>Rotation about a Fixed Axis</li> <li>Rotation about a Fixed Axis</li> <li>Relative Motion Analysis Using Rotating Axes</li> <li>Mass Moment of Inertia</li> <li>Equations of Motion for Planar Motion: Translation and Rotation</li> <li>Equations of Motion for Planar Motion:</li> <li>Equations of Motion for Planar Motion:</li> <li>Equations of Motion for Planar Motion:</li> <li>Ubration of SDOF Systems</li> <li>Vibration of SDOF Systems</li> <li>Vibration of SDOF Systems</li> <li>Vibration of MDOF Systems</li> <li>Vibration of MDOF Systems</li> <li>Vibration of Modelling using LabVIEW</li> <li>Examinet Moter Rigid Body Planar Motion</li> <li>Examinet Moter Exam (Week 9)</li> <li>Final Exam (Week 17 or 18)</li> </ul>	•	Curvilinear Motion Rectangular Components	0.5		
<ul> <li>Curvilinear Motion Normal and Tangential Components, Cylindrical Components</li> <li>Absolute Dependent Motion Analysis</li> <li>Relative Motion of Two Particles</li> <li>Relative Motion of Two Particles</li> <li>Equations of Motion Rectangular Coordinates, Normal and Tangential Coordinates, Cylindrical Coordinates</li> <li>The Work of a Force</li> <li>Principle of Work and Energy</li> <li>Power and Efficiency</li> <li>Conservation of Energy</li> <li>Principle of Linear Momentum</li> <li>Conservation of Linear Momentum</li> <li>Conservation of Linear Momentum for a System of Particles</li> <li>Impact and the Coefficient of Restitution</li> <li>Angular Impulse and Momentum</li> <li>General Plane Motion: Translation</li> <li>Relative Motion for Planar Motion: Translation and Rotation</li> <li>Equations of Motion for Planar Motion</li> <li>Equations of Motion for Planar Motion</li> <li>Equations of Motion for Planar Motion</li> <li>Ubration of SDOF Systems</li> <li>Vibration of SDOF Systems</li> <li>Vibration of Continuous Systems</li> <li>Vibration of Continuous Systems</li> <li>Ubration of Continuous Systems</li> <li>Dynamic modelling using MATLAB</li> <li>Dynamic modelling using LabVIEW</li> <li>Examination (Week 17 or 18)</li> </ul>	•	Motion of a Projectile	0.5		
<ul> <li>Absolute Dependent Motion Analysis</li> <li>Relative Motion of Two Particles</li> <li>Relative Motion of Two Particles</li> <li>Stations of Motion Rectangular Coordinates, Normal and Tangential Coordinates, Cylindrical Coordinates</li> <li>The Work of a Force</li> <li>Principle of Work and Energy</li> <li>Conservation of Energy</li> <li>Conservation of Linear Momentum</li> <li>Conservation of Linear Momentum for a System of Particles</li> <li>Impact and the Coefficient of Restitution</li> <li>Conservation of Linear Momentum</li> <li>Conservation of Unice Momentum</li> <li>Rigid Body Planar Motion. Translation</li> <li>Rotation about a Fixed Axis</li> <li>Relative Motion Analysis, Instantaneous Center of Zero Velocity, and Absolute Motion Analysis</li> <li>Relative Motion for Planar Motion: Translation and Rotation</li> <li>Equations of Motion for Planar Motion: Translation and Rotation</li> <li>Equations of Motion for Planar Motion: General plane motion</li> <li>Equations of Motion for Planar Motion</li> <li>Equations of Motion for Rigid Body Planar Motion</li> <li>Urbration of SDOF Systems</li> <li>Vibration of SDOF Systems</li> <li>Vibration of MDOF Systems</li> <li>Vibration of Continuous Systems</li> <li>Vibration of Continuous Systems</li> <li>Vibration of Continuous Systems</li> <li>Dynamic modelling using ADAMS</li> <li>Dynamic modelling using ADAMS</li> <li>Dynamic modelling using ADAMS</li> <li>Pynamic modelling using ADAMS</li> <li>Final Exam (Week 17 or 18)</li> </ul>	•	Curvilinear Motion Normal and Tangential Components, Cylindrical Components	1.5		
<ul> <li>Relative Motion of Two Particles</li> <li>Equations of Motion Rectangular Coordinates, Normal and Tangential Coordinates, Cylindrical Coordinates</li> <li>The Work of a Force</li> <li>The Work of a Force</li> <li>Principle of Work and Energy</li> <li>Conservation of Energy</li> <li>Angular Impulse and Momentum</li> <li>Conservation abuat a Fixed Axis</li> <li>Relative Motion Analysis Using Rotating Axes</li> <li>Relative Motion Analysis Using Rotating Axes</li> <li>Relative Motion for planar Motion: Translation and Rotation</li> <li>Equations of Motion for planar Motion: Translation and Rotation</li> <li>Equations of Motion for planar Motion: Translation and Rotation</li> <li>Uptration of SDOF Systems</li> <li>Vibration of SDOF Systems</li> <li>Vibration of MDOF Systems</li> <li>Vibration of MDOF Systems</li> <li>Vibration of MDOF Systems</li> <li>Vibration of Octinuous Systems</li> <li>Vibration of Continuous Systems</li> <li>Vibration of Continuous Systems</li> <li>Vibration of Continuous Systems</li> <li>Dynamic modelling using ADAMS</li> <li>Dynamic modelli</li></ul>	•	Absolute Dependent Motion Analysis	0.5		
<ul> <li>Equations of Motion Rectangular Coordinates, Normal and Tangential Coordinates, Cylindrical Coordinates</li> <li>The Work of a Force</li> <li>Principle of Work and Energy</li> <li>Power and Efficiency</li> <li>Conservation of Energy</li> <li>Conservation of Linear Impulse and Momentum</li> <li>Conservation of Linear Momentum for a System of Particles</li> <li>Conservation of Linear Momentum for a System of Particles</li> <li>Conservation of Linear Momentum</li> <li>Conservation of Rigid Body</li> <li>Rigid Body Planar Motion. Translation</li> <li>Relative Motion Analysis, Instantaneous Center of Zero Velocity, and Absolute Motion Analysis</li> <li>Relative Motion for Planar Motion: Translation and Rotation</li> <li>Equations of Motion for Planar Motion: Translation and Rotation</li> <li>Equations of Motion for Planar Motion: Translation and Rotation</li> <li>Equations of Motion for Planar Motion: Translation and Rotation</li> <li>Equations of Motion for Planar Motion: Translation and Rotation</li> <li>Work and Energy for Rigid Body Planar Motion</li> <li>Ubration of SDOF Systems</li> <li>Vibration of Continuous Systems</li> <li>Vibration of Continuous Systems</li> <li>Vibration of MDOF Systems</li> <li>Vibration of Continuous Systems</li> <li>Dynamic modelling using ADAMS</li> <li>Dynamic modelling using ADAMS</li> <li>Dynamic modelling using ADAMS</li> <li>Pynamic modelling using LabVIEW</li> <li>Final Exam (Week 17 or 18)</li> </ul>	•	Relative Motion of Two Particles	0.5		
<ul> <li>The Work of a Force</li> <li>Principle of Work and Energy</li> <li>Onservation of Energy</li> <li>Conservation of Linear Impulse and Momentum</li> <li>Conservation of Linear Momentum for a System of Particles</li> <li>Conservation of Linear Momentum for a System of Particles</li> <li>Conservation of Linear Momentum for a System of Particles</li> <li>Conservation of Linear Momentum for a System of Particles</li> <li>Conservation of Linear Momentum for a System of Particles</li> <li>Conservation of Linear Momentum for a System of Particles</li> <li>Conservation of Linear Momentum for a System of Particles</li> <li>Angular Impulse and Momentum</li> <li>S</li> <li>Kinematics and Kinetics of Rigid Bodies</li> <li>Rigid Body Planar Motion. Translation</li> <li>Rotation about a Fixed Axis</li> <li>General Plane Motion: Relative Motion Analysis, Instantaneous Center of Zero Velocity, and Absolute Motion Analysis</li> <li>Relative Motion for Planar Motion: Translation and Rotation</li> <li>Equations of Motion for Planar Motion: General plane motion</li> <li>Equations of Motion for planar Motion</li> <li>Equations of Motion for planar Motion</li> <li>Urbaration</li> <li>Vibration of SDOF Systems</li> <li>Vibration of MDOF Systems</li> <li>Vibration of MDOF Systems</li> <li>Vibration of MDOF Systems</li> <li>Vibration of Of MDOF Systems</li> <li>Dynamic modelling using ADAMS</li> <li>Dynamic modelling using LabVIEW</li> <li>Examinations</li> <li>Final Exam (Week 9)</li> <li>Final Exam (Week 17 or 18)</li> </ul>	•	Equations of Motion Rectangular Coordinates, Normal and Tangential Coordinates, Cylindrical Coordinates	1.5		
<ul> <li>Principle of Work and Energy</li> <li>Power and Efficiency</li> <li>Conservation of Energy</li> <li>Conservation of Linear Momentum</li> <li>Conservation of Linear Momentum for a System of Particles</li> <li>Conservation of Linear Momentum for a System of Particles</li> <li>Conservation of Linear Momentum for a System of Particles</li> <li>Angular Impulse and Momentum</li> <li>Angular Impulse and Momentum</li> <li>Angular Impulse and Momentum</li> <li>Rigid Body Planar Motion. Translation</li> <li>Relative Motion Analysis Using Rotating Axes</li> <li>Relative Motion for Planar Motion: Translation and Rotation</li> <li>Equations of Motion for Planar Motion</li> <li>Equations of Motion for planar motion: General plane motion</li> <li>Work and Energy for Rigid Body Planar Motion</li> <li>Impulse and Momentum for Rigid Body Planar Motion</li> <li>Ubration of SDOF Systems</li> <li>Vibration of SDOF Systems</li> <li>Vibration of MODF Systems</li> <li>Vibration of MODF Systems</li> <li>Dynamic modelling using MATLAB</li> <li>Dynamic modelling using ADAMS</li> <li>Dynamic modelling using LabVIEW</li> <li>Examinations</li> <li>Final Exam (Week 17 or 18)</li> </ul>	•	The Work of a Force	0.5		
<ul> <li>Power and Efficiency</li> <li>Conservation of Energy</li> <li>Conservation of Linear Momentum for a System of Particles</li> <li>Conservation of Linear Momentum for a System of Particles</li> <li>Impact and the Coefficient of Restitution</li> <li>Angular Impulse and Momentum</li> <li>Angular Impulse and Momentum</li> <li>Angular Impulse and Momentum</li> <li>Angular Impulse and Momentum</li> <li>Rigid Body Planar Motion. Translation</li> <li>General Plane Motion: Relative Motion Analysis, Instantaneous Center of Zero Velocity, and Absolute Motion Analysis</li> <li>Relative Motion for Planar Motion: Translation and Rotation</li> <li>Relative Motion for Planar Motion: Translation and Rotation</li> <li>Equations of Motion for Planar Motion: Translation and Rotation</li> <li>Equations of motion for planar Motion</li> <li>Ubration</li> <li>Vibration of SDOF Systems</li> <li>Vibration of MODF Systems</li> <li>Vibration of MODF Systems</li> <li>Vibration of Continuous Systems</li> <li>Dynamic modelling using MATLAB</li> <li>Dynamic modelling using MATLAB</li> <li>Dynamic modelling using ADAMS</li> <li>Dynamic modelling using LabVIEW</li> <li>Examinations</li> <li>Final Exam (Week 17 or 18)</li> </ul>	•	Principle of Work and Energy	0.5		
<ul> <li>Conservation of Energy</li> <li>Principle of Linear Impulse and Momentum</li> <li>Conservation of Linear Momentum for a System of Particles</li> <li>Conservation of Linear Momentum for a System of Particles</li> <li>Impact and the Coefficient of Restitution</li> <li>Angular Impulse and Momentum</li> <li>Angular Impulse and Momentum</li> <li>Rigid Body Planar Motion. Translation</li> <li>Rotation about a Fixed Axis</li> <li>Relative Motion Analysis, Instantaneous Center of Zero Velocity, and Absolute Motion Analysis</li> <li>Relative Motion Analysis Using Rotating Axes</li> <li>Relative Motion of Planar Motion: Translation and Rotation</li> <li>Equations of Motion for Planar Motion: Ceneral plane motion</li> <li>Equations of Motion for Planar Motion: General plane motion</li> <li>Work and Energy for Rigid Body Planar Motion</li> <li>Impulse and Momentum for Rigid Body Planar Motion</li> <li>Urbration</li> <li>Vibration of SDOF Systems</li> <li>Vibration of Continuous Systems</li> <li>Vibration of Continuous Systems</li> <li>Vibration of Continuous Systems</li> <li>Dynamic modelling using MATLAB</li> <li>Dynamic modelling using MATLAB</li> <li>Dynamic modelling using MATLAB</li> <li>Midterm Exam (Week 9)</li> <li>Final Exam (Week 17 or 18)</li> </ul>	•	Power and Efficiency	0.5		
<ul> <li>Principle of Linear Impulse and Momentum for a System of Particles</li> <li>Conservation of Linear Momentum for a System of Particles</li> <li>Impact and the Coefficient of Restitution</li> <li>Angular Impulse and Momentum</li> <li>Angular Impulse and Momentum</li> <li>Angular Impulse and Momentum</li> <li>Rigid Body Planar Motion. Translation</li> <li>Rigid Body Planar Motion. Translation</li> <li>Rotation about a Fixed Axis</li> <li>Relative Motion Analysis, Instantaneous Center of Zero Velocity, and Absolute Motion Analysis</li> <li>Relative Motion Analysis Using Rotating Axes</li> <li>Relative Motion for Planar Motion: Translation and Rotation</li> <li>Equations of Motion for Planar Motion: Translation and Rotation</li> <li>Equations of Motion for Planar Motion</li> <li>Equations of Motion for Planar Motion</li> <li>Ubration of SDOF Systems</li> <li>Vibration of SDOF Systems</li> <li>Vibration of Continuous Systems</li> <li>Vibration of Continuous Systems</li> <li>Ubration of Continuous Systems</li> <li>Dynamic modelling using MATLAB</li> <li>Dynamic modelling using ADAMS</li> <li>Dynamic modelling using LabVIEW</li> <li>Examinations</li> <li>Final Exam (Week 9)</li> <li>Final Exam (Week 17 or 18)</li> </ul>	•	Conservation of Energy	0.5		
<ul> <li>Conservation of Linear Momentum for a System of Particles</li> <li>Impact and the Coefficient of Restitution</li> <li>Angular Impulse and Momentum</li> <li>Rigid Body Planar Motion. Translation</li> <li>Rotation about a Fixed Axis</li> <li>General Plane Motion: Relative Motion Analysis, Instantaneous Center of Zero Velocity, and Absolute Motion Analysis</li> <li>Relative Motion Analysis Using Rotating Axes</li> <li>Mass Moment of Inertia</li> <li>Equations of Motion for Planar Motion: Translation and Rotation</li> <li>Equations of Motion for Planar Motion: General plane motion</li> <li>Work and Energy for Rigid Body Planar Motion</li> <li>Impulse and Momentum for Rigid Body Planar Motion</li> <li>Impulse and Momentum for Rigid Body Planar Motion</li> <li>Vibration of SDOF Systems</li> <li>Vibration of Continuous Systems</li> <li>Vibration of Continuous Systems</li> <li>Dynamic modelling using MATLAB</li> <li>Dynamic modelling using LabVIEW</li> <li>Midterm Exam (Week 17 or 18)</li> </ul>	•	Principle of Linear Impulse and Momentum	0.5		
<ul> <li>Impact and the Coefficient of Restitution</li> <li>Angular Impulse and Momentum</li> <li>Angular Impulse and Momentum</li> <li>Rigid Body Planar Motion. Translation</li> <li>Rigid Body Planar Motion. Translation</li> <li>Rotation about a Fixed Axis</li> <li>General Plane Motion: Relative Motion Analysis, Instantaneous Center of Zero Velocity, and Absolute Motion Analysis</li> <li>Relative Motion Analysis Using Rotating Axes</li> <li>Mass Moment of Inertia</li> <li>Equations of Motion for Planar Motion: Translation and Rotation</li> <li>Equations of Motion for Planar Motion: Translation and Rotation</li> <li>Equations of motion for planar motion: General plane motion</li> <li>Work and Energy for Rigid Body Planar Motion</li> <li>Impulse and Momentum for Rigid Body Planar Motion</li> <li>Impulse and Momentum for Rigid Body Planar Motion</li> <li>Vibration of SDOF Systems</li> <li>Vibration of MDOF Systems</li> <li>Vibration of Continuous Systems</li> <li>Vibration of Continuous Systems</li> <li>Dynamic modelling using ADAMS</li> <li>Dynamic modelling using LabVIEW</li> <li>Midterm Exam (Week 9)</li> <li>Final Exam (Week 17 or 18)</li> </ul>	•	Conservation of Linear Momentum for a System of Particles	0.5		
<ul> <li>Angular Impulse and Momentum</li> <li>0.5</li> <li>Kinematics and Kinetics of Rigid Bodies</li> <li>Rigid Body Planar Motion. Translation</li> <li>0.5</li> <li>Rotation about a Fixed Axis</li> <li>General Plane Motion: Relative Motion Analysis, Instantaneous Center of Zero Velocity, and Absolute Motion Analysis</li> <li>Relative Motion Analysis Using Rotating Axes</li> <li>Mass Moment of Inertia</li> <li>Equations of Motion for Planar Motion: Translation and Rotation</li> <li>Equations of Motion for Planar Motion: Translation and Rotation</li> <li>Equations of motion for planar motion: General plane motion</li> <li>Work and Energy for Rigid Body Planar Motion</li> <li>Impulse and Momentum for Rigid Body Planar Motion</li> <li>Vibration of SDOF Systems</li> <li>Vibration of Continuous Systems</li> <li>Vibration of Continuous Systems</li> <li>Dynamic modelling using ADAMS</li> <li>Dynamic modelling using LabVIEW</li> <li>Examinations</li> <li>Midterm Exam (Week 9)</li> <li>Final Exam (Week 17 or 18)</li> </ul>	•	Impact and the Coefficient of Restitution	0.5		
Kinematics and Kinetics of Rigid Bodies       0.5         • Rigid Body Planar Motion. Translation       0.5         • Rotation about a Fixed Axis       1         • General Plane Motion: Relative Motion Analysis, Instantaneous Center of Zero Velocity, and Absolute Motion Analysis       1.5         • Relative Motion Analysis Using Rotating Axes       1         • Mass Moment of Inertia       1         • Mass Moment of Inertia       1         • Equations of Motion for Planar Motion: Translation and Rotation       1.5         • Equations of Motion for planar motion: General plane motion       0.5         • Work and Energy for Rigid Body Planar Motion       1         • Impulse and Momentum for Rigid Body Planar Motion       1         • Vibration       1         • Vibration of SDOF Systems       1         • Vibration of MDOF Systems       1         • Ubration of MDOF Systems       1         • Vibration of Continuous Systems       1         • Dynamic modelling using MATLAB       6         • Dynamic modelling using LabVIEW       5         Examinations       5         • Midterm Exam (Week 9)       5         • Final Exam (Week 17 or 18)       6	•	Angular Impulse and Momentum	0.5		
<ul> <li>Rigid Body Planar Motion. Translation</li> <li>Rotation about a Fixed Axis</li> <li>General Plane Motion: Relative Motion Analysis, Instantaneous Center of Zero Velocity, and Absolute Motion Analysis</li> <li>Relative Motion Analysis Using Rotating Axes</li> <li>Mass Moment of Inertia</li> <li>Equations of Motion for Planar Motion: Translation and Rotation</li> <li>Equations of Motion for Planar Motion: General plane motion</li> <li>Equations of motion for planar motion: General plane motion</li> <li>Work and Energy for Rigid Body Planar Motion</li> <li>Impulse and Momentum for Rigid Body Planar Motion</li> <li>Impulse and Momentum for Rigid Body Planar Motion</li> <li>Vibration of SDOF Systems</li> <li>Vibration of MDOF Systems</li> <li>Vibration of Continuous Systems</li> <li>Dynamic modelling using ADAMS</li> <li>Dynamic modelling using LabVIEW</li> <li>Examinations</li> <li>Midterm Exam (Week 9)</li> <li>Final Exam (Week 17 or 18)</li> </ul>	<u>Kinen</u>	natics and Kinetics of Rigid Bodies			
<ul> <li>Rotation about a Fixed Axis</li> <li>General Plane Motion: Relative Motion Analysis, Instantaneous Center of Zero Velocity, and Absolute Motion Analysis</li> <li>Relative Motion Analysis Using Rotating Axes</li> <li>Relative Motion Analysis Using Rotating Axes</li> <li>Mass Moment of Inertia</li> <li>Equations of Motion for Planar Motion: Translation and Rotation</li> <li>Equations of motion for planar motion: General plane motion</li> <li>Work and Energy for Rigid Body Planar Motion</li> <li>Impulse and Momentum for Rigid Body Planar Motion</li> <li>Vibration of SDOF Systems</li> <li>Vibration of MDOF Systems</li> <li>Vibration of Continuous Systems</li> <li>Dynamic modelling using MATLAB</li> <li>Dynamic modelling using LabVIEW</li> <li>Examinations</li> <li>Midterm Exam (Week 9)</li> <li>Final Exam (Week 17 or 18)</li> </ul>	•	Rigid Body Planar Motion. Translation	0.5		
<ul> <li>General Plane Motion: Relative Motion Analysis, Instantaneous Center of Zero Velocity, and Absolute Motion Analysis</li> <li>Relative Motion Analysis Using Rotating Axes</li> <li>Mass Moment of Inertia</li> <li>Equations of Motion for Planar Motion: Translation and Rotation</li> <li>Equations of motion for planar motion: General plane motion</li> <li>Work and Energy for Rigid Body Planar Motion</li> <li>Impulse and Momentum for Rigid Body Planar Motion</li> <li>Vibration of SDOF Systems</li> <li>Vibration of MDOF Systems</li> <li>Vibration of Continuous Systems</li> <li>Dynamic modelling using MATLAB</li> <li>Dynamic modelling using LabVIEW</li> <li>Examinations</li> <li>Midterm Exam (Week 9)</li> <li>Final Exam (Week 17 or 18)</li> </ul>	•	Rotation about a Fixed Axis	1		
<ul> <li>Relative Motion Analysis Using Rotating Axes</li> <li>Mass Moment of Inertia</li> <li>Equations of Motion for Planar Motion: Translation and Rotation</li> <li>Equations of motion for planar motion: General plane motion</li> <li>Work and Energy for Rigid Body Planar Motion</li> <li>Impulse and Momentum for Rigid Body Planar Motion</li> <li>Impulse and Momentum for Rigid Body Planar Motion</li> <li>Vibration</li> <li>Vibration of SDOF Systems</li> <li>Vibration of Continuous Systems</li> <li>Vibration of Continuous Systems</li> <li>Dynamic modelling using MATLAB</li> <li>Dynamic modelling using ADAMS</li> <li>Dynamic modelling using LabVIEW</li> <li>Examinations</li> <li>Midterm Exam (Week 9)</li> <li>Final Exam (Week 17 or 18)</li> </ul>	•	General Plane Motion: Relative Motion Analysis, Instantaneous Center of Zero Velocity, and Absolute Motion Analysis	1.5		
<ul> <li>Mass Moment of Inertia</li> <li>Equations of Motion for Planar Motion: Translation and Rotation</li> <li>Equations of motion for planar motion: General plane motion</li> <li>Work and Energy for Rigid Body Planar Motion</li> <li>Impulse and Momentum for Rigid Body Planar Motion</li> <li>Impulse and Momentum for Rigid Body Planar Motion</li> <li>Vibration</li> <li>Vibration of SDOF Systems</li> <li>Vibration of MDOF Systems</li> <li>Vibration of Continuous Systems</li> <li>Vibration of Continuous Systems</li> <li>Dynamic modelling using MATLAB</li> <li>Dynamic modelling using ADAMS</li> <li>Dynamic modelling using LabVIEW</li> <li>Examinations</li> <li>Midterm Exam (Week 9)</li> <li>Final Exam (Week 17 or 18)</li> </ul>	•	Relative Motion Analysis Using Rotating Axes	1		
<ul> <li>Equations of Motion for Planar Motion: Translation and Rotation</li> <li>Equations of motion for planar motion: General plane motion</li> <li>Work and Energy for Rigid Body Planar Motion</li> <li>Impulse and Momentum for Rigid Body Planar Motion</li> <li>Impulse and Momentum for Rigid Body Planar Motion</li> <li>Vibration</li> <li>Vibration of SDOF Systems</li> <li>Vibration of MDOF Systems</li> <li>Vibration of Continuous Systems</li> <li>Dynamic modelling using MATLAB</li> <li>Dynamic modelling using LabVIEW</li> <li>Examinations</li> <li>Midterm Exam (Week 9)</li> <li>Final Exam (Week 17 or 18)</li> </ul>	•	Mass Moment of Inertia	1		
<ul> <li>Equations of motion for planar motion: General plane motion</li> <li>Work and Energy for Rigid Body Planar Motion</li> <li>Impulse and Momentum for Rigid Body Planar Motion</li> <li>Vibration</li> <li>Vibration of SDOF Systems</li> <li>Vibration of Continuous Systems</li> <li>Vibration of Continuous Systems</li> <li>Dynamic modelling using MATLAB</li> <li>Dynamic modelling using LabVIEW</li> <li>Examinations</li> <li>Midterm Exam (Week 9)</li> <li>Final Exam (Week 17 or 18)</li> <li>0.5</li> <li>0.</li></ul>	•	Equations of Motion for Planar Motion: Translation and Rotation	1.5		
<ul> <li>Work and Energy for Rigid Body Planar Motion</li> <li>Impulse and Momentum for Rigid Body Planar Motion</li> <li>Vibration</li> <li>Vibration of SDOF Systems</li> <li>Vibration of MDOF Systems</li> <li>Vibration of Continuous Systems</li> <li>Dynamic modelling using MATLAB</li> <li>Dynamic modelling using LabVIEW</li> <li>Examinations</li> <li>Midterm Exam (Week 9)</li> <li>Final Exam (Week 17 or 18)</li> </ul>	•	Equations of motion for planar motion: General plane motion	0.5		
<ul> <li>Impulse and Momentum for Rigid Body Planar Motion</li> <li>Vibration</li> <li>Vibration of SDOF Systems</li> <li>Vibration of MDOF Systems</li> <li>Vibration of Continuous Systems</li> <li>Dynamic modelling using MATLAB</li> <li>Dynamic modelling using ADAMS</li> <li>Dynamic modelling using LabVIEW</li> <li>Examinations</li> <li>Midterm Exam (Week 9)</li> <li>Final Exam (Week 17 or 18)</li> </ul>	•	Work and Energy for Rigid Body Planar Motion	1		
Vibration       So contracted         • Vibration of SDOF Systems       1         • Vibration of MDOF Systems       1         • Vibration of Continuous Systems       1 <b>Laboratory sessions</b> 1         • Dynamic modelling using MATLAB       6         • Dynamic modelling using ADAMS       5         • Dynamic modelling using LabVIEW       5 <b>Examinations</b> 5         • Midterm Exam (Week 9)       5         • Final Exam (Week 17 or 18)       6	•	Impulse and Momentum for Rigid Body Planar Motion	1		
<ul> <li>Vibration of SDOF Systems</li> <li>Vibration of MDOF Systems</li> <li>Vibration of Continuous Systems</li> <li>Dynamic modelling using MATLAB</li> <li>Dynamic modelling using ADAMS</li> <li>Dynamic modelling using LabVIEW</li> <li>Examinations</li> <li>Midterm Exam (Week 9)</li> <li>Final Exam (Week 17 or 18)</li> </ul>	<u>Vibra</u>	tion Star Star			
<ul> <li>Vibration of MDOF Systems</li> <li>Vibration of Continuous Systems</li> <li>Dynamic modelling using MATLAB</li> <li>Dynamic modelling using ADAMS</li> <li>Dynamic modelling using LabVIEW</li> <li>Examinations</li> <li>Midterm Exam (Week 9)</li> <li>Final Exam (Week 17 or 18)</li> </ul>	•	Vibration of SDOF Systems	1		
<ul> <li>Vibration of Continuous Systems</li> <li><u>Laboratory sessions</u></li> <li>Dynamic modelling using MATLAB</li> <li>Dynamic modelling using ADAMS</li> <li>Dynamic modelling using LabVIEW</li> <li><u>Examinations</u></li> <li>Midterm Exam (Week 9)</li> <li>Final Exam (Week 17 or 18)</li> </ul>	•	Vibration of MDOF Systems	1		
Laboratory sessions       6         • Dynamic modelling using MATLAB       6         • Dynamic modelling using ADAMS       5         • Dynamic modelling using LabVIEW       5         Examinations       5         • Midterm Exam (Week 9)       6         • Final Exam (Week 17 or 18)       6	•	Vibration of Continuous Systems	1		
<ul> <li>Dynamic modelling using MATLAB</li> <li>Dynamic modelling using ADAMS</li> <li>Dynamic modelling using LabVIEW</li> <li>Examinations <ul> <li>Midterm Exam (Week 9)</li> <li>Final Exam (Week 17 or 18)</li> </ul> </li> </ul>	Laboratory sessions				
<ul> <li>Dynamic modelling using ADAMS</li> <li>Dynamic modelling using LabVIEW</li> <li>Examinations <ul> <li>Midterm Exam (Week 9)</li> <li>Final Exam (Week 17 or 18)</li> </ul> </li> </ul>	•	Dynamic modelling using MATLAB	6		
<ul> <li>Dynamic modelling using LabVIEW</li> <li><u>Examinations</u></li> <li>Midterm Exam (Week 9)</li> <li>Final Exam (Week 17 or 18)</li> </ul>	•	Dynamic modelling using ADAMS	5		
<ul> <li>Examinations</li> <li>Midterm Exam (Week 9)</li> <li>Final Exam (Week 17 or 18)</li> </ul>	•	Dynamic modelling using LabVIEW	5		
<ul> <li>Midterm Exam (Week 9)</li> <li>Final Exam (Week 17 or 18)</li> </ul>	Examinations				
• Final Exam (Week 17 or 18)	•	Midterm Exam (Week 9)			
	•	Final Exam (Week 17 or 18)			

### 18. 教材及其它参考资料 Textbook and Supplementary Readings

R.C. Hibbeler: Dynamics, 14<sup>th</sup> edition, Pearson Prentice Hall, 2016. S.S. Rao: Mechanical Vibrations. 5<sup>th</sup> Edition, Pearson Prentice Hall, 2011.

## 课程评估 ASSESSMENT

19.	评估形式 Type of Assessment	评估时间 Time	占考试总成绩百分比 % of final score	违纪处罚 Penalty	备注 Notes
	出勤 Attendance		10%		
	课堂表现 Class				



Performance		
小测验	20%	
Quiz	20/0	
课程项目 Projects		
林住-夾百 FT0ject5		
平时作业	10%	
Assignments		
期中考试	30%	
Mid-Term Test		
期末考试	30%	
Final Exam		
期末报告		
Final		
Presentation		
其它(可根据需要		
改写以上评估方		
式)		
Others (The		
above may be		
modified as		
necessary)		
neccosary)		

#### 20. 记分方式 GRADING SYSTEM

☑ A. 十三级等级制 Letter Grading 口 B. 二级记分制(通过/不通过) Pass/Fail Grading

#### 课程审批 REVIEW AND APPROVAL

University

acr 8

#### 21. 本课程设置已经过以下责任人/委员会审议通过

# ,eand This Course has been approved by the following person or committee of authority

机械与能源工程系教学委员会

