

機電學院機電科技博士班機械組（機電組）資格考基礎科目參考用書
Reference Books and Scope for Qualify (for Mechatronic Engineering Division)

科目名稱 Subject	參考用書 Reference Books	備註
<p>工程數學 Engineering Mathematics</p>	<p>參考用書： Advanced Engineering Mathematics, O'Neil. 考試大綱： 1. First-Order Differential Equations. 2. Linear Second-Order Equations. 3. The Laplace Transform 4. Series Solutions. 5. Vectors And Vector Spaces. 6. Matrices And Linear Systems. 7. Determinants. 8. Eigenvalues. 9. Vector Differential Calculus. 10. Vector Integral Calculus.</p>	
<p>自動控制 Automatic Control</p>	<p>參考用書： Automatic Control Systems, B.C. Kuo 考試大綱： 1. Mathematical Foundation 2. Block Diagram and Signal-Flow Graphs 3. Modeling of Physical Systems 4. State Variable Analysis 5. Stability of Linear Control Systems 6. Time-Domain Analysis of Control Systems 7. Root-Locus Technique 8. Frequency-Domain Analysis 9. Design of Control Systems</p>	
<p>製造學 Manufacturing Processes</p>	<p>參考用書： Manufacturing Engineering and Technology, Serope Kalpakjian, Steven R. Schmid 考試大綱： 1. Nonferrous Metals and Alloys: Production, General Properties, and Applications 2. Ceramics, Graphite, Diamond, and Nanomaterials: Structure, General Properties, and Applications 3. Ceramics, Glasses, and Superconductors: Processing and Equipment 4. Rapid-Prototyping Processes and Operations 5. Fundamentals of Machining 6. Advanced Machining Processes 7. Fabrication of Microelectronic Devices 8. Fabrication of Microelectromechanical Devices and Systems and Nanoscale Manufacturing 9. Brazing, Soldering, Adhesive-Bonding, and Mechanical-Fastening Processes 10. Surface Treatments, Coatings, and Cleaning 11. Automation of Manufacturing Processes 12. Computer-Aided Manufacturing</p>	

<p>工程力學 Engineering Mechanics</p> <p>(靜力學 Statics、動力學 Dynamics)</p>	<p>參考用書：</p> <ol style="list-style-type: none"> 1. Engineering Mechanics: Statics, by R. C. Hibbeler 2. Engineering Mechanics: Dynamics, by R. C. Hibbeler <p>考試大綱:</p> <ol style="list-style-type: none"> 1. Equilibrium of a Particle 2. Equilibrium of a Rigid Body 3. Structural Analysis 4. Friction 5. Virtual Work 6. Kinematics of a Particle 7. Kinetics of a Particle: Force and Acceleration 8. Kinetics of a Particle: Work and Energy 9. Kinetics of a Particle: Impulse and Momentum 10. Planar Kinematics of a Rigid Body 11. Planar Kinetics of a Rigid Body: Force and Acceleration 12. Planar Kinetics of a Rigid Body: Work and Energy 13. Planar Kinetics of a Rigid Body: Impulse and Momentum 	
<p>材料學 Materials Science and Engineering</p>	<p>參考用書：</p> <ol style="list-style-type: none"> 1. Materials Science and Engineering by William D. Callister, David G. Rethwisch, WILEY. 2. The Science and Engineering of Materials by Donald R. Askeland, Pradeep P. Phule, International student edition, THOMSON. <p>考試大綱:</p> <ol style="list-style-type: none"> 1. Atomic structure and interatomic bonding 2. The structure of crystalline solids 3. Imperfections in solids 4. Diffusion 5. Mechanical properties of metals 6. Dislocations and strengthening mechanisms 7. Failure 8. Principles of solidification 9. Phase diagrams 10. Phase transformation: development of microstructure and alteration of mechanical properties 11. Application and processing of metal alloys 	
<p>熱力學 Thermodynamics</p>	<p>參考用書：</p> <p>Fundamental of Engineering Thermodynamics / Moran Shapiro</p> <p>考試大綱:</p> <ol style="list-style-type: none"> 1. Basic concept and definitions; 2. Evaluating properties; 3. Conservation of mass and energy – the first law of thermodynamics 4. Fundamental concept of thermodynamic cycles 5. Second law of thermodynamics and entropy 6. Irreversibility and exergy analyses 7. Application of gas and vapor cycles 	
<p>電子學 Electronics</p>	<p>參考用書：</p> <ol style="list-style-type: none"> 1. Electronic Devices conventional current Version, Thomas L. Floyd 2. Electronic foundational: Circuits, Devices, and Applications, Thomas L. Floyd 3. Electronic Devices and Circuit theory, Robert L. Boylestad Louis Nashelsky <p>考試大綱:</p>	

	<ol style="list-style-type: none">1. Basic circuit (including, series circuit, parallel circuit, power calculation)2. Thevenin's theorem and Norton's theorem3. RC circuit (charge and discharge circuit)4. Concept of P Type and N type device structure5. Diode devices6. Concept and application of Transistor (including, IJBT or Mos FET control)7. Transistor on-off and power control circuit8. Basic OP-amp application9. OP-amp circuits calculation (positive feedback and negative feedback)10. Thyristor and basic application	
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