

**Graduate Institute of Manufacturing Technology**  
**Reference Books for Basic Course Ph.D. Qualification Exam**

ver. 103 (2014)

Course name	Reference Books	Notes
Engineering Mathematics	Reference book : Advanced Engineering Mathematics, O'Neil. Exam topics: 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.	
Automatic Control Systems	Reference book : Automatic Control Systems, B.C. Kuo Exam topics: 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	
Manufacturing	Reference book : Manufacturing Engineering and Technology, S. Kalpakjian, S.R. Schmid Exam topics: 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>Engineering Mechanics  (Statics, Dynamics)</p>	<p>Reference books :</p> <ol style="list-style-type: none"> <li>1. Engineering Mechanics: Statics, R.C. Hibbeler</li> <li>2. Engineering Mechanics: Dynamics, R.C. Hibbeler</li> </ol> <p>Exam topics:</p> <ol style="list-style-type: none"> <li>1. Equilibrium of a Particle</li> <li>2. Equilibrium of a Rigid Body</li> <li>3. Structural Analysis</li> <li>4. Friction</li> <li>5. Virtual Work</li> <li>6. Kinematics of a Particle</li> <li>7. Kinetics of a Particle: Force and Acceleration</li> <li>8. Kinetics of a Particle: Work and Energy</li> <li>9. Kinetics of a Particle: Impulse and Momentum</li> <li>10. Planar Kinematics of a Rigid Body</li> <li>11. Planar Kinetics of a Rigid Body: Force and Acceleration</li> <li>12. Planar Kinetics of a Rigid Body: Work and Energy</li> <li>13. Planar Kinetics of a Rigid Body: Impulse and Momentum</li> </ol>	
<p>Engineering Materials</p>	<p>Reference books :</p> <ol style="list-style-type: none"> <li>1. Materials Science and Engineering, W.D. Callister, D.G. Rethwisch, WILEY.</li> <li>2. The Science and Engineering of Materials by D.R. Askeland, P.P. Phule, International student edition, THOMSON.</li> </ol> <p>Exam topics:</p> <ol style="list-style-type: none"> <li>1. Atomic structure and interatomic bonding</li> <li>2. The structure of crystalline solids</li> <li>3. Imperfections in solids</li> <li>4. Diffusion</li> <li>5. Mechanical properties of metals</li> <li>6. Dislocations and strengthening mechanisms</li> <li>7. Failure</li> <li>8. Principles of solidification</li> <li>9. Phase diagrams</li> <li>10. Phase transformation: development of microstructure and alteration of mechanical properties</li> <li>11. Application and processing of metal alloys</li> </ol>	
<p>Thermodynamics</p>	<p>Reference book :</p> <p>Fundamental of Engineering Thermodynamics, M. Shapiro</p> <p>Exam topics:</p> <ol style="list-style-type: none"> <li>1. Basic concept and definitions;</li> <li>2. Evaluating properties;</li> <li>3. Conservation of mass and energy – the first law of thermodynamics</li> <li>4. Fundamental concept of thermodynamic cycles</li> <li>5. Second law of thermodynamics and entropy</li> <li>6. Irreversibility and exergy analyses</li> <li>7. Application of gas and vapor cycles</li> </ol>	

<p>Electronics</p>	<p>Reference books :</p> <ol style="list-style-type: none"> <li>1. Electronic Devices conventional current Version, T.L. Floyd</li> <li>2. Electronic foundational: Circuits, Devices, and Applications, T.L. Floyd</li> <li>3. Electronic Devices and Circuit theory, R.L. Boylestad, L. Nashelsky</li> </ol> <p>Exam topics:</p> <ol style="list-style-type: none"> <li>1. Basic circuit (including, series circuit, parallel circuit, power calculation)</li> <li>2. Thevenin's theorem and Norton's theorem</li> <li>3. RC circuit (charge and discharge circuit)</li> <li>4. Concept of P Type and N type device structure</li> <li>5. Diode devices</li> <li>6. Concept and application of Transistor (including , IJBT or MOSFET control)</li> <li>7. Transistor on-off and power control circuit</li> <li>8. Basic OP-amp application</li> <li>9. OP-amp circuits calculation (positive feedback and negative feedback)</li> <li>10. Thyristor and basic application</li> </ol>	
<p><b>Factory Management</b></p>	<p>Reference book :</p> <p><b>Operations Management, 11e, W.J. Stevenson / 華泰圖書、滄海圖書</b></p> <p>Exam topics:</p> <ol style="list-style-type: none"> <li>1. Competitiveness, Strategy and Productivity</li> <li>2. Forecasting</li> <li>3. Product and Service Design</li> <li>4. Product and Service Strategical Capacity Planning</li> <li>5. Process Selection and Facility Layout</li> <li>6. Design to Work Systems and Exposure</li> <li>7. Location Planning and Analysis</li> <li>8. Quality Control</li> <li>9. TQM and Quality Tools</li> <li>10. MRP and ERP</li> <li>11. Inventory Management</li> <li>12. JIT and Lean Production</li> <li>13. Supply Chain Management</li> </ol>	<p>Since Academic year 102 (2013)</p>
<p>Innovative Design</p>	<p>Reference books :</p> <ol style="list-style-type: none"> <li>1. Creative design of mechanical devices, H.S. Yan, Springer</li> </ol> <p>Exam topics:</p> <ol style="list-style-type: none"> <li>1. Mechanical devices</li> <li>2. Creative problem solving techniques</li> <li>3. A creative design methodology</li> </ol> <p>2. Hands-on systematic innovation for technical systems, D. Mann, IFR press</p> <p>Exam topics:</p> <ol style="list-style-type: none"> <li>1. Process overview of TRIZ (Theory of inventive principle)</li> <li>2. Problem Definition ( Problem / opportunity Explorer/ Function &amp; Attribute Analysis)</li> <li>3. Problem solving tools (Technical contradiction/ inventive principles)</li> <li>4. Problem Solving Tools (physical contradiction)</li> <li>5. Solution Evaluation</li> </ol>	<p>Since Academic year 102 (2013)</p>