機電學院機電科技博士班車輛組資格考核科目抵考規定

【112 學年起適用】

Arrival Regulations for Qualification Examination Subjects (for Vehicle Engineering Division)

97 年 4 月 1 日學術委員會會議通過
100 年 3 月 1 日學術委員會會議修正通過
100 年 6 月 28 日期末系務會議修正通過
103 年 8 月 14 日學術委員會會議通過
108 年 10 月 1 日學術委員會議通過
111 年 11 月 15 日學術委員會議通過
112 年 11 月 7 日學術委員會議通過
113 年 9 月 6 日學術委員會議通過

1. 依據機電學院規定，自 96 學年度起入學之博士生，選定資格考核科目若為就讀博士班期間修習之科目，且該科目成績前 30%者，得視為通過此科目之資格考，並以該科目學期成績為資格考核科目之成績；學生申請資格考試抵免，得以已修習科目抵免或以 SCI 論文抵免。

1. According to the regulations of the College of Mechanical and Electrical Engineering, the doctoral students enrolled since the 96 academic year, if the chosen qualifying exam subject is a subject studied during the doctoral program, and the score of the subject is in the top 30%, it can be regarded as passing the qualifying examination of this subject. Among them, the semester grades of this subject will be used as the score of the qualifying examination subjects. The doctoral students apply for passing the qualifying examination can be credited to the subjects taken or the SCI papers.

2. 各組抵考科目如下：

2. The subjects for each category are as follows:

(1) 能源與動力組

※ 流體力學抵考：計算流體力學。
※ 熱力學抵考：能源系統分析、潔淨動力系統特論。
※ 熱傳學抵考：高等熱傳學。

(1) Energy and Power Category

※ Fluid Mechanics: Computational Fluid Dynamics.
※ Thermodynamics: Energy System Analysis, Special Topics on Clean Power.
※ Heat Transfer: Advanced Heat Transfer

(2) 機電與控制組

※ 自動控制抵考：含本所相關課程如 1.控制理論、2.智慧型控制、3.數位控制理論與實務，外所課程則需經本組審查。
※ 電子學抵考：含各電子、電力電子、光電元件、晶片設計、類比信號處理課程；但不含影像處理、隨機程序、通訊、數位信號處理等課程。
※ 電機學抵考：含各電機與電路設計、AC/DC 電路分析等課程；但不含電力系統、積體電路設計等課程。

(2) Mechatronics and Control Category

※ Automatic control: including courses related to this institute such as 1. Control Theory, 2. Intelligent Control, 3. Digital Control Theory and Practice, and courses from other

institutes need to be reviewed by Vehicle Engineering Division.

※ Electronics: including courses in electronics, power electronics, optoelectronic components, chip design, and analog signal processing; but excluding courses in image processing, random process, communication, and digital signal processing.

※ Electric Machinery: including courses in electric machines and circuit design, AC/DC circuit analysis, etc.; but excluding courses in power system and integrated circuit design.

(3) 設計與分析組

※ 振動學抵考：高等振動學、車輛噪音

※ 車輛動力學抵考：高等車輛動力學

※ 材料力學抵考：有限元素分析、工程最佳化與應用

※ 機動學抵考：懸吊系統特論、機構運動分析、機構運動合成

(3) Design and Analysis Category

※ Mechanical Vibration: Advanced Mechanical Vibration, Vehicle Acoustics

※ Vehicle Dynamics: Advanced Vehicle Dynamics

※ Mechanics of Materials: Finite Element Analysis, Engineering Optimization Methods and Applications.

※ Mechanisms and Dynamics of Machinery: Special Topics on Suspension Systems, Kinematic Analysis of Mechanisms, Kinematic Synthesis of Mechanisms

機電學院機電科技博士班 112 年入學生資格考試科目表

Institute of Mechanical and Electrical Engineering

Ph.D. Qualifying Exam Subject (for Students enrolled on Academic Year 112)

組別 Academic Division	科目 Qualifying Exam Subject
機電組 Mechatronic Engineering	基礎科目： 八擇定一科(工程數學、自動控制、製造學、工程力學、材料學、熱力學、電子學、醫學概論) Basic subjects: choose one subject from the lists (Engineering Mathematics / Automatic Control / Manufacturing Processes / Engineering Mechanics/ Materials Science and Engineering/Thermodynamics / Electronics / Introduction to Medicine) 專業科目(一)、(二)：以學生入學年度機電整合研究所及製造科技研究所課程科目表中所列科目為準，任選兩科考之。 Professional subjects (1) and (2): Professional subjects are listed according to the curriculum of the Institute of Mechatronic Engineering and Graduate Institute of Manufacturing Technology for the year of admission. Two subjects shall be selected for the examination.
車輛組 Vehicle Engineering	應考科目分為 3 類，考生須選擇一類主修及一類副修，主修類考科任選 2 科應考，副修類考科任選 1 科應考。 分類及各分類之科目如下： 第 1 類(能源與動力組):流體力學、熱力學、熱傳學。 第 2 類(機電與控制組):自動控制、電機學、電子學。 第 3 類(設計與分析組):振動學、車輛動力學、材料力學、機動學。 The examinations are divided into 3 categories. The examinee must choose 1 main category for examination and 1 minor category for examination. Among them, the examinee must choose 2 examination subjects in the main category, and choose 1 examination subject in the minor category. The categories and the examination subjects of each category are as follows: Category 1 (Energy and Power Category): Fluid Mechanics, Thermodynamics, Heat Transfer. Category 2 (Mechatronics and Control Category): Automatic Control, Electric Machinery, Electronics. Category 3 (Design and Analysis Category): Mechanical Vibration, Vehicle Dynamics, Mechanics of Materials, Mechanisms and Dynamics of Machinery.
自動化組 Automation Engineering	基礎科目(三選一科)：高等工程數學、高等線性系統、數位影像處理。 Basic subjects: choose one from three (Advanced Engineering Mathematics / Advanced linear system / Digital image processing) 專業科目(任選二科)：以學生所修習之研究所課程科目表中所列科目為準，由指導教授指定考試科目。 Professional subjects (1) and (2): Subject to the subjects listed in the curriculum of the Gradate institute of Automation Technology for the year of admission, two subjects can be selected for .

機電學院機電科技博士班車輛組資格考基礎科目參考用書

Reference Books and Scope for Qualify (for Vehicle Engineering Division)

一、設計與分析組(Design and Analysis Category)

科目名稱 Subject	參考用書 Reference Books	考綱 Contents	備註
振動學 Mechanical Vibration	Mechanical Vibrations, S. S. Rao, Prentice-Hall, Inc.	1. Free vibration and forced vibration of vibration systems 2. Modal analysis of vibration systems 3. Vibration of continuous systems 4. Vibration control	
車輛動力學 Vehicle Dynamics	Theory of Ground Vehicle, J. Y. Wang, John Wiley & Sons, Inc. (Ch.1, 3, 5, 7)	1. Mechanics of Pneumatic Tires 2. Performance Characteristics of Road Vehicles 3. Handling Characteristics of Road Vehicles 4. Vehicle Ride Characteristics	
材料力學 Mechanics of Materials	Mechanics of Materials, Ferdinand P. Beer, E. Russell Johnston, JR, John T. DeWolf, McGraw-Hill Book Co.	1. Stress and Strain 2. Torsion 3. Pure Bending 4. Analysis and Design of Beams for Bending 5. Shearing Stresses 6. Transformations of Stress and Strain 7. Principal Stresses 8. Deflection of Beams 9. Columns	
機動學 Mechanisms and Dynamics of Machinery	Kinematics, Dynamics, and Design of Machinery, Kenneth J. Waldron & Gary L. Kinzel, John Wiley & Sons	1. Constraint Analysis 2. Analysis of Planar Linkages 3. Instant Centers of Velocity 4. Cams 5. Gears 6. Gear Trains	

二、機電與控制組(Mechatronics and Control Category)

科目名稱 Subject	參考用書 Reference Books	考綱 Contents	備註
自動控制 Automatic Control	Feedback Control of Dynamic Systems, G.F. Franklin, J.D. Powell, and A. Emami-Naeini, Pearson.	Fundamental Mathematics of Control Theory, Dynamic Models and Transfer Functions, Time-domain Analysis, Stability Analysis, Analysis and Design of Root-locus, Analyses of Bode and Nyquist Plots, PID Controller Design, Lead-Lag Controller Design, State-space Representation, Stability Analysis, Full-state Feedback Control Design	
電機學 Electric Machinery	Electric Machinery Fundamentals, Stephen Chapman	DC/AC circuit analysis, Electromagnetic effect, Transformers, AC machinery fundamentals, Synchronous machines, Induction motors, DC machinery fundamentals, and DC motors.	
電子學 Electronics	Electronic Devices (Conventional Current Version) , Thomas L. Floyd	Introduction to Semiconductors, Diodes and Applications, Special-Purpose Diodes, Bipolar Junction Transistors, Transistor Bias Circuits, BJT Amplifiers, BJT Power Amplifiers, Field-Effect Transistors (FETs)	