## 國立彰化師範大學 科學教育研究所博士班畢業條件表暨課程架構表 108學年度入學學生適用 列印日期: 2018/10/31

|     |      | 1005   1005  | 列印日期:20  | 018/10/31           |
|-----|------|--------------|--|---------------------|
|     | 第一學年 |              | 第二學年   |                     |
|     | 科目   | 上 下 學學學 分時分時 | 科目   | 上 下學學學              |
| 系必修 |      |              | 高等科學教育專題討論(一) Advanced Research Seminar on Science Education (I) 高等科學教育專題討論(二) Advanced Research Seminar on Science Education (II) 博士論文 Doctoral Dissertation 論文指導(一) Thesis Supervision (I) 論文指導(二) Thesis Supervision (II) | 2 2 2 0 0 0 3 0 3 0 |

| 系 | 研                     | 多變量統計                                   |   |   | 3 | 3 | 高等非制式科學學習專題研究(一)   | 1 | 1  |   |  |
|---|-----------------------|---|---|---|---|---|--|---|----|---|--|
| 選 | 究                     | Multivariate Statistics                 |   |   |   |   | Advanced Topics in Informal Science                                |   |    |   |  |
| 修 | 領                     | 非制式科學學習專題研究(一)                          | 1 | 1 |   |   | Learning (I)   |   |    |   |  |
| ' | 域                     | Topics in Informal Science Learning (I) |   |   |   |   | 高等非制式科學學習專題研究(二)   |   |    | 1 | 1                                      |
|   |                       | 非制式科學學習專題研究(二)                          |   |   | 1 | 1 | Advanced Topics in Informal Science                                |   |    |   |  |
|   | 至                     | Topics in Informal Science Learning     |   |   |   |   | Learning (II)  |   | _  |   |  |
|   | 少                     | (II)                                    |   |   |   |   | 高等科學教育專題討論(三)  | 2 | 2  |   |  |
|   | $\stackrel{\circ}{6}$ | 數理師資培育專題研究 (一)                          | 1 | 1 |   |   | Advanced Research Seminar on Science                               |   |    |   |  |
|   | 學                     | Study of Teacher Education on           | - |   |   |   | Education (III)  |   |    | 0 | $\begin{vmatrix} 1 \\ 2 \end{vmatrix}$ |
|   | 學分                    | Science/Mathematics (I)                 |   |   |   |   | 高等科學教育專題討論(四)  |   |    | 4 | 4                                      |
|   | 5                     | · · ·                                   |   |   | 1 |   | Advanced Research Seminar on Science                               |   |    |   |  |
|   | ľ                     | 數理師資培育專題研究(二)                           |   |   | 1 |   | Education (IV)<br>高等教育統計   |   |    | 3 | 3                                      |
|   |                       | Study of Teacher Education on           |   |   |   |   | 同于教月統制<br>Advanced Educational Statistics                          |   |    | " | "                                      |
|   |                       | Science/Mathematics (II)                | 3 | 3 |   |   | 高等數理師資培育專題研究(一)  | 1 | 1  |   |  |
|   |                       | 數理教育統計                                  | 3 | ၂ |   |   | Advanced Topics in Teacher Education on                            | 1 | -  |   |  |
|   |                       | Science/Mathematics Educational         |   |   |   |   | Science/Mathematics (I)  |   |    |   |  |
|   |                       | Statistics                              | , |   |   |   | 高等數理師資培育專題研究(二)  |   |    | 1 | 1                                      |
|   |                       | 數理教學專題研究(一)                             | 1 | 1 |   |   | Advanced Topics in Teacher Education on                            |   |    |   |  |
|   |                       | Topics in Science/Mathematics Teaching  |   |   |   |   | Science/Mathematics (II)   |   |    |   |  |
|   |                       | (I)                                     |   |   |   |   | 高等數理教學專題研究(一)  | 1 | 1  |   |  |
|   |                       | 數理教學專題研究(二)                             |   |   | 1 | 1 | Advanced Topics in Science/Mathematics                             |   |    |   |  |
|   |                       | Topics in Science/Mathematics Teaching  |   |   |   |   | Teaching (I)   |   |    |   |  |
|   |                       | (II)                                    |   |   |   |   | 高等數理教學專題研究(二)  |   |    | 1 | 1                                      |
|   |                       | 數理認知心理專題研究(一)                           | 1 | 1 |   |   | Advanced Topics in Science/Mathematics                             |   |    |   |  |
|   |                       | Topics in Cognitive Psychology of       |   |   |   |   | Teaching (II)  |   | ١, |   |  |
|   |                       | Science/Mathematics (I)                 |   |   |   |   | 高等數理認知心理專題研究(一)  | 1 | 1  |   |  |
|   |                       | 數理認知心理專題研究(二)                           |   |   | 1 | 1 | Advanced Topics in Cognitive Psychology of                         |   |    |   |  |
|   |                       | Topics in Cognitive Psychology of       |   |   |   |   | Science/Mathematics (I)<br>高等數理認知心理專題研究(二)                         |   |    | 1 | 1                                      |
|   |                       | Science/Mathematics (II)                |   |   |   |   | 同寻数连訟和心连寺超術九(一)<br>Advanced Topics in Cognitive Psychology of      |   |    | 1 | 1                                      |
|   |                       | 數理學習專題研究(一)                             | 1 | 1 |   |   | Science/Mathematics (II)   |   |    |   |  |
|   |                       | Topics in Science/Mathematics Learning  |   |   |   |   | 高等數理學習專題研究(一)  | 1 | 1  |   |  |
|   |                       | (I)                                     |   |   |   |   | Advanced Topics in Science/Mathematics                             |   |    |   |  |
|   |                       | 數理學習專題研究(二)                             |   |   | 1 | 1 | Learning (I)   |   |    |   |  |
|   |                       | Topics in Science/Mathematics Learning  |   |   |   |   | 高等數理學習專題研究(二)  |   |    | 1 | . 1                                    |
|   |                       | (II)                                    |   |   |   |   | Advanced Topics in Science/Mathematics                             |   |    |   |  |
|   |                       | 數學探究學習與教學專題研究(一)                        | 1 | 1 |   |   | Learning (II)  |   |    |   |  |
|   |                       | Mathematics Inquiry Learning and        |   |   |   |   | 高等數學探究學習與教學專題研究(一)   | 1 | 1  |   |  |
|   |                       | Teaching Case Studies (I)               |   |   |   |   | Advanced Topics in Mathematics                                     |   |    |   |  |
|   |                       | 數學探究學習與教學專題研究(二)                        |   |   | 1 | 1 | Inquriy-based Learning and Teaching (I)                            |   |    |   |  |
|   |                       | Mathematics Inquiry Learning and        |   |   |   |   | 高等數學探究學習與教學專題研究(二)   |   |    | 1 | 1                                      |
|   |                       | Teaching Case Studies (II)              |   |   |   |   | Advanced Topics in Mathematics                                     |   |    |   |  |
|   |                       | 質的研究法                                   |   |   | 3 | 3 | Inquriy-based Learning and Teaching (II)                           | 9 | 3  |   |  |
|   |                       | Qualitative Research                    |   |   |   |   | 數理教育論文閱讀與寫作(一)   | 3 | 3  |   |  |
|   |                       | Anatitative vegeticii                   |   |   |   |   | Academic Reading and Writing for Science/Mathematics Education (I) |   |    |   |  |
|   |                       |   |   |   |   |   | 數理教育論文閱讀與寫作(二)   |   |    | 3 | 3                                      |
|   |                       |   |   |   |   |   | 製理教育論文閱讀與為作(一)<br>Academic Reading and Writing for                 |   |    |   |  |
|   |                       |   |   |   |   |   | Science/Mathematics Education (II)                                 |   |    |   |  |
|   |                       |   |   |   |   |   | 質的資料分析   | 3 | 3  |   |  |
|   |                       |   |   |   |   |   | Qualitative Data Analysis  |   |    |   |  |

| 7. | T137 | ル留かたもみ   | 3 | 3 |   |   | <b>小贸/邮贸加贸加升加工的</b>                                   | 13 | 3 |   |   |
|----|------|--|---|---|---|---|---|----|---|---|---|
| 系選 | 理論   | 化學教育專論 Chanial Taning on Chamiatan Education   | 3 |   |   |   | 科學/數學教學理論與研究<br>Theories and Research on              | 3  | ا |   |   |
|    | 領    | Special Topics on Chemistry Education          |   |   | 3 | 3 | Science/Mathematics Teaching                          |    |   |   |   |
| 修  | 域域   | 生物教育專論   |   |   | ٥ | ٦ | 科學/數學數位教學與學習  |    |   | 3 | 3 |
|    |      | Special Topics on Biology Education<br>物理教育專論  |   |   | 3 | 3 | Science/Mathematics Teaching and e-Learning           |    |   |   |   |
|    | 至    | Special Topics on Physics Education            |   |   |   |   | 科學/數學課程理論與研究  | 3  | 3 |   |   |
|    | 少    | 後設認知與數理學習導論                                    |   |   | 3 | 3 | Theories and Research on                              |    |   |   |   |
|    | 6    | Introduction to Metacognition and              |   |   |   |   | Science/Mathematics Curriculum                        |    |   | 3 | 3 |
|    | 學    | Science/Mathematics Learning                   |   |   |   |   | 科學教育視導與評鑑   |    |   | S | 3 |
|    | 分    | 科學/數學師資培育理論與研究                                 |   |   | 3 | 3 | Science Supervision and Evaluation                    |    |   | 3 | 3 |
|    |      | Theories and Research on                       |   |   |   |   | 科學認識觀<br>Science Epistemological Beliefs              |    |   | J | J |
|    |      | Science/Mathematics Teacher Education          |   |   |   |   | 眼動與科學教育特論   | 3  | 3 |   |   |
|    |      | 科學/數學評量理論與研究                                   | 3 | 3 |   |   | Special Topics in Eye Movement and Science            |    |   |   |   |
|    |      | Theories and Research on                       |   |   |   |   | Education   |    |   |   |   |
|    |      | Science/Matheamtics Assessment                 |   |   |   |   | 資訊教育專題討論  | 3  | 3 |   |   |
|    |      | 科學/數學學習理論與研究                                   |   |   | 3 | 3 | Seminar on Information and Computer                   |    |   |   |   |
|    |      | Theories and Research on                       |   |   |   |   | Education   |    |   |   |   |
|    |      | Science/Matheamtics Learning                   |   |   |   |   | 數位學習理論與實務特論   | 3  | 3 |   |   |
|    |      | 科學/數學歷史與哲學                                     |   |   | 3 | 3 | Special Topics of Theories and Practice on            |    |   |   |   |
|    |      | Science/Mathematics History and                |   |   |   |   | e-Learning<br>數理資優教育專論                                | 3  | 3 |   |   |
|    |      | Philosophy                                     |   |   |   |   | - 数珪貝笈孜月号岫<br>- Special Topics in Science/Mathematics |    |   |   |   |
|    |      | 科學本質實務與研究                                      |   |   | 3 | 3 | Gifted Education                                      |    |   |   |   |
|    |      | Practice and Theories in Nature of             |   |   |   |   | 數學教育專題討論  | 3  | 3 |   |   |
|    |      | Science  |   |   |   |   | Research Seminar in Mathematics Education             |    |   |   |   |
|    |      | 科學探究與創造力                                       | 3 | 3 |   |   | 數學教育理論與研究   | 3  | 3 |   |   |
|    |      | Science Inquiry and Creativity                 |   |   |   |   | Theories and Research on                              |    |   |   |   |
|    |      | 科學教育的歷史與哲學                                     | 3 | 3 |   |   | Science/Mathematics Education                         |    |   |   |   |
|    |      | History and Philosophy of Science              |   |   |   |   |   |    |   |   |   |
|    |      | Education                                      |   |   |   |   |   |    |   |   |   |
|    |      | 科學教育專題   | 3 | 3 |   |   |   |    |   |   |   |
|    |      | Themes and Issues in Science Education         |   |   |   |   |   |    |   |   |   |
|    |      | 眼動與科學教育導論                                      |   |   | 3 | 3 |   |    |   |   |   |
|    |      | Introduction to Eye Movement and               |   |   |   |   |   |    |   |   |   |
|    |      | Science Education                              |   |   |   |   |   |    |   |   |   |
|    |      | 資訊教育專論   |   |   | 3 | 3 |   |    |   |   |   |
|    |      | Special Topics on Information and              |   |   |   |   |   |    |   |   |   |
|    |      | Computer Education                             |   |   |   |   |   |    |   |   |   |
|    |      | 認知神經科學與數理學習                                    | 3 | 3 |   |   |   |    |   |   |   |
|    |      | Cognitive Neuroscience and                     |   |   |   |   |   |    |   |   |   |
|    |      | Mathematic/Science Learning                    |   |   |   |   |   |    |   |   |   |
|    |      | 數位學習理論與實務導論                                    |   |   | 3 | 3 |   |    |   |   |   |
|    |      | Introduction to Theories and Practice          |   |   |   |   |   |    |   |   |   |
|    |      | on e-Learning<br>東西京時日本代表                      |   |   | 3 | 3 |   |    |   |   |   |
|    |      | 數理高階思考能力                                       |   |   | ٥ | ٥ |   |    |   |   |   |
|    |      | Higher Order Thinking Skills 數理基本公理與           |   |   | 3 | 3 |   |    |   |   |   |
|    |      | 數理教育心理學 Provided Lory of Science (Mothematics) |   |   | ١ | ٥ |   |    |   |   |   |
|    |      | Psychology of Science/Mathematics<br>Education |   |   |   |   |   |    |   |   |   |
|    |      | Education<br>數理認知心理學                           | 3 | 3 |   |   |   |    |   |   |   |
|    |      | 製度認知の理学<br>Cognitive Psychology in             |   |   |   |   |   |    |   |   |   |
|    |      | Science/Mathematics Education                  |   |   |   |   |   |    |   |   |   |
|    |      | 數理學習動機   | 3 | 3 |   |   |   |    |   |   |   |
|    |      | 发生子自助機<br>Learning Motivation in               |   |   |   |   |   |    |   |   |   |
|    |      | Science/Mathematics                            |   |   |   |   |   |    |   |   |   |
|    |      | 數學教育專論   | 3 | 3 |   |   |   |    |   |   |   |
|    |      | Special Topics in Mathematics Education        |   |   |   |   |   |    |   |   |   |
|    |      | represent matter backerion                     |   | ш |   |   |   |    | ш |   |   |

|  | 實 | 合作學習   |   |   | 3 | 3 | STEM教學與研究  | 3 | 3 | Γ |
|--|---|--|---|---|---|---|--|---|---|---|
|  | 務 | Cooperative Learning                         |   |   |   |   | Instruction and research in STEM                       |   |   |   |
|  | 領 | 批判思考   |   |   | 3 | 3 | 1  | 3 | 3 |   |
|  | 域 | Critical Thinking                            |   |   |   |   | Special Topics in Theories and Practice of             |   |   |   |
|  |   | 物理教學改革與研究                                    | 3 | 3 |   |   | Informal Science                                       | 3 | 3 |   |
|  | 至 | Innovation and Research in Physics           |   |   |   |   | 後設認知與數理學習特論  | 3 | J |   |
|  | 少 | Teaching                                     |   |   |   |   | Special Topics in Metacognition and                    |   |   |   |
|  | 6 | 非制式科學理論與實務導論                                 |   |   | 3 | 3 | Science/Mathematics Learning<br>科展活動設計與研究              |   |   | 3 |
|  | 學 | Introduction to Theories and Practice        |   |   |   |   | Science Fair Activity Design and Research              |   |   | " |
|  | 分 | in Informal Science                          |   |   |   |   | 科學讀寫理論與實務  | 3 | 3 |   |
|  | ) | 科普/數普著作賞析                                    | 3 | 3 |   |   | Theories and Practice of Science Reading               |   |   |   |
|  |   | Reading and Analysis of Popular              |   |   |   |   | and Writing  |   |   |   |
|  |   | Science/mathematics Writings                 |   |   |   |   | · 統整科學   | 3 | 3 |   |
|  |   | 科普/數普影片賞析                                    |   |   | 3 | 3 |  |   |   |   |
|  |   | Watching and Analysis of Popular             |   |   |   |   | 博物館與科學教育   |   |   | 3 |
|  |   | Science/ mathematics Films                   |   |   |   |   | Museum and Science Education                           |   |   |   |
|  |   | 科學/數學遊戲設計                                    | 3 | 3 |   |   | 運算思維與創客  | 3 | 3 |   |
|  |   | Design of Science/Mathematics Games          |   |   |   |   | Computational thinking and maker                       |   |   |   |
|  |   | 科學活動設計                                       | 3 | 3 |   |   | 數理科電腦輔助教學設計  | 3 | 3 |   |
|  |   | Science Activity Design                      |   |   |   |   | Computer-Aid Instructional Design in                   |   |   |   |
|  |   | 科學教育專題特論                                     |   |   | 3 | 3 | Science/Mathematics                                    | 3 | 3 |   |
|  |   | Special Topics on Themes and Issues in       |   |   |   |   | 數理探究教學理論與實務特論  | 3 | J |   |
|  |   | Science Education                            |   |   |   |   | Special Topics in Theories and Practice of             |   |   |   |
|  |   | 高等數學思考                                       |   |   | 3 | 3 | Science/Mathematics Inquiry-based Teaching<br>數理創意教學資源 | 3 | 3 |   |
|  |   |  |   |   |   |   | 数年別息教学貞源<br>Creative Science/mathematics Teaching      |   |   |   |
|  |   | Advanced Mathematics Thinking<br>電腦在科學教育上的應用 | 3 | 3 |   |   | Resources  |   |   |   |
|  |   |  |   |   |   |   | 數學建模教學理論與實務  |   |   | 3 |
|  |   | Applying Computer on Science Education       |   |   | 3 | 3 | Theories and Practice of Mathematics                   |   |   |   |
|  |   | 數理科測驗與評量<br>Measurement and Evaluation in    |   |   |   |   | Modeling Teaching                                      |   |   |   |
|  |   |  |   |   |   |   |  |   |   |   |
|  |   | Science/Mathematics Education                |   |   | 3 | 3 |  |   |   |   |
|  |   | 數理探究教學理論與實務導論                                |   |   |   | ٥ |  |   |   |   |
|  |   | Introduction to Theories and Practice        |   |   |   |   |  |   |   |   |
|  |   | of Science/Mathematics Inquiry-based         |   |   |   |   |  |   |   |   |
|  |   | Teaching                                     |   |   | 3 | 3 |  |   |   |   |
|  |   | 數理教學模式                                       |   |   | ٦ | ٥ |  |   |   |   |
|  |   | Science/Mathematics Teaching Models          | 3 | 3 |   |   |  |   |   |   |
|  |   | 數學探究活動設計的理論與實務                               | 3 |   |   |   |  |   |   |   |
|  |   | Theory and Practice of Mathematics           |   |   |   |   |  |   |   |   |
|  |   | Inquiry Activity Design                      |   |   |   |   |  |   |   |   |
|  |   | 課程理論與實務                                      | 3 | 3 |   |   |  |   |   |   |
|  |   | Theories and Practice of                     |   |   |   |   |  |   |   |   |
|  |   | Science/Mathematics Curriculum               |   |   |   |   |  |   |   |   |
|  |   | 論證教學與學習                                      |   |   | 3 | 3 |  |   |   |   |
|  |   | Arguementation:Teaching and Learning         |   |   |   |   |  |   |   |   |

| 先修科目 |   |
|------|---|
| 畢業條件 | 一、本所最低畢業學分為35學分,包含必修4學分、選修31學分,不含論文指導6學分。 二、本所博士生於畢業前,須修習研究領域課程至少6學分、理論領域課程至少6學分、實務領域課程至少6學分。 三、凡選修本所開設科目一律採認為本所畢業學分;凡註冊後應至少修習一門科目(含論文)。 四、本所博士生可至外(校)系所自由選修6學分研究所層次課程,並承認為畢業學分數。 五、博士班研究生若於碩士班期間未曾修習「科學教育專論」及「科學教育研究法」,需於博一、博二時至本所碩士班修習該二門科目,且不計入博士班畢業學分數。 六、碩博合開課程可採計為畢業學分。 七、本所研究生欲修習教育學程者,須經本校甄選通過後始可修讀;教育學分不計入畢業學分。 八、通過學科資格考試。 九、通過論文計畫審查口試。 十、其餘畢業條件詳見本所當學年度研究生手冊。 十一、畢業總學分數之遠距教學課程學分數,不得超過畢業總學分數之二分之一。 十二、研究生應於申請學位考試前修習通過於「臺灣學術倫理教育資源中心」(https://ethics.nctu.edu.tw/)網路教學平台之「學術研究倫理教育」課程等相關規定。 |