**元智大學 生物科技與工程研究所碩士班 必修科目表**

**（一百零九學年度入學新生適用）**

**YZU Graduate School of Biotechnology and Bioengineering**

**Master Program Required Courses Table**

**(Applicable to 2020 newly admitted students)**

109.03.30~31 一○八學年度第二次課程委員會議暨工程教育認證諮詢委員會議訂定

109.05.06 一○八學年度第六次教務會議通過

Drawn up at the 2nd Curriculum Committee and Engineering Education Recognition Advisory Committee Meeting of 2019, dated Mar. 30~31, 2020

Passed by the 6th Academic Affairs Meeting, Academic Year 2019, on May 06, 2020

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 學年/學期/科目  Year/Semester/  Course | 第一學年 First Year | | 第二學年 Second Year | |
| 上 First Semester | 下 Second Semester | 上 First Semester | 下 Second Semester |
| 共同必修  Required Course | 書報討論  (Seminar)  BI501  (0) | 書報討論  (Seminar)  BI501  (0) | 書報討論  (Seminar)  BI501  (0) | 書報討論  (Seminar)  BI501  (0) |
|  |  |  | 碩士論文  (Thesis)  (6) |
| 學期學分小計  Semester Credits | 0 | 0 | 0 | 6 |
| 備註  Remarks | 1. 學期學分小計指必修課程部分。 2. 最低畢業25學分+碩士論文6學分。 3. 除必修論文6學分外，選修25學分須涵蓋生物科技相關課程與生物工程相關課程，每組課程至少須修9學分。 4. 本所書報討論（BI501）課程可擇化材所（CH505）、機械所（ME503）書報討論課程替代，但須先經所長同意。 5. 入學研究生須依本校學術研究倫理教育課程實施要點規定，於入學第一學期結束前完成學術研究倫理教育課程，最遲須於申請學位口試前補修完成，未完成本課程，不得申請學位口試。   1. Total of semester credits is for the required courses.  2. To graduate, students are required to complete 25 credits at least and 6-credits master thesis  3. In addition to 6 credits of required thesis, 25 credits of electives must cover about biotechnology and bioengineering courses, and each group of courses need to be at least 9 credits.  4. Students are allowed to choose （CH505）“Seminar” or （ME503）“Seminar” instead of （BI501）“Seminar” offered by the Graduate School, subject to the consent of the institute director.  5. Admission to graduate students must follow the Academic Research Ethics Education Course implementation requirements; complete the Academic Research Ethics Education Course before the end of the first semester. The deadline for master students required to complete the credits retroactively need to before apply for the degree of the oral examination, if do not complete the course, cannot apply for the degree of the oral examination. | | | |

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**元智大學　生物科技與工程研究所碩士班 選修科目表**

**（一百零九學年度入學新生適用）**

**YZU Graduate School of Biotechnology and Bioengineering Master Program**

**Table of Elective Courses Offered by the GSBB**

**(Applicable to 2020 newly admitted students)**

109.03.30~31 一○八學年度第二次課程委員會議暨工程教育認證諮詢委員會議訂定

109.05.06 一○八學年度第六次教務會議通過

111.03.04 一一○學年度第二次課程委員會議修訂

111.04.20 一一○學年度第六次教務會議通過

Drawn up at the 2nd Curriculum Committee and Engineering Education Recognition Advisory Committee Meeting of 2019, dated Mar. 30~31, 2020

Passed by the 6th Academic Affairs Meeting, Academic Year 2019, on May 06, 2020

Amended by the 2nd Curriculum Committee Meeting of 2021, dated Mar. 4, 2022

Amended by the 6th Academic Affairs Meeting, Academic Year 2021, on April 20, 2022

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 選修Elective Course | 課號  Course Code | 中文課名  Chinese Course Name | 英文課名  English Course Name | 學分數  Credits |
| 生物科技相關課程  Biotechnology  Courses | BI504 | 生物化學特論 | Special Topics in Biochemistry | 3 |
| BI506 | 分子生物學 | Molecular Biology | 3 |
| BI507 | 微生物學特論 | Special Topics in Microbiology | 3 |
| BI509 | 細胞生物學 | Cell Biology | 3 |
| BI510 | 生物資訊學 | Bioinformatics | 3 |
| BI514 | 微生物學實驗 | Microbiology Laboratory | 3 |
| BI515 | 生物化學實驗 | Biochemistry Laboratory | 3 |
| BI517 | 環境微生物學 | Environmental Microbiology | 3 |
| BI530 | 基因體學與蛋白體學 | Genomics and Proteomics | 3 |
| BI531 | 生物統計學 | Biostatistics | 3 |
| BI535 | 微生物遺傳學 | Microbial Genetics | 3 |
| BI536 | 微生物生理學 | Microbial Physiology | 3 |
| BI539 | 基礎生物技術實驗 | Fundamentals of Biotechnology Laboratory | 3 |
| BI544 | 分子遺傳學 | Molecular Genetics | 3 |
| BI545 | 微生物與天然化合物 | Microbial Natural Compound | 3 |
| BI547 | 生質能源概論 | Introduction to Bioenergy | 3 |
| BI548 | 酵素與生質能 | Enzymes and Bioenergy | 3 |
| BI549 | 人體器官系統疾患導論 | Human Diseases: Introduction by Organ System | 2 |
| BI550 | 環境植物生理學 | Environmental Plant Physiology | 3 |
| BI557 | 生物科技倫理 | [Ethics of Biotechnology](http://www.google.com.tw/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&ved=0CEAQFjAB&url=http%3A%2F%2Farchive.innovation.gov.au%2FBiotechnologyonline%2Fbiotec%2Fethics.html&ei=0jEqUfi9G6mPiAfRoYHoDg&usg=AFQjCNEsGYDxy4ewbV9MJDMKoMOuaHcB8A) | 3 |
| BI559 | 食品衛生與安全 | Food Hygiene and Safety | 3 |
| BI561 | 動物細胞培養技術與應用 | Basic Techniques and Applications of Animal Cell Culture | 3 |
| BI562 | 生物科技探索 | Exploring Biotechnology | 3 |
| BI563 | 臨床醫學與生物技術特論 | Issues of Clinical Medicine and Biotechnology | 2 |
| BI564 | 細胞培養技術與應用 | Basic Techniques and Applications of Cell Culture | 3 |
| 生物工程相關課程  Bioengineering Courses | BI511 | 生物技術產業特論 | Special Topics in Biotechnology Industries | 3 |
| BI516 | 動植物細胞培養技術 | Plant/Animal Cell Culture Technology | 3 |
| BI519 | 發酵工程 | Fermentation Engineering | 3 |
| BI522 | 生物程序工程 | Bioprocessing Engineering | 3 |
| BI529 | 生醫材料 | Biomedical Materials | 3 |
| BI533 | 生化儀器分析 | Bioinstrumentation | 3 |
| BI534 | 生物分離技術 | Bioseparation Technology | 3 |
| BI538 | 環境生物技術 | Environmental Biotechnology | 3 |
| BI540 | 基因與蛋白質工程學特論 | Special Topics in Genetic and Protein Engineering | 3 |
| BI541 | 工業微生物學特論 | Special Topics in Industrial Microbiology | 3 |
| BI542 | 生化工程實驗 | Biochemical Engineering Laboratory | 3 |
| BI543 | 微生物與生物科技研究方法 | Methods in Microbiology and Biotechnology Research | 3 |
| BI546 | 臨床醫學概論 | Clinical Medicine | 2 |
| BI551 | 植物組織培養及生物技術 | Plant Tissue Culture and Biotechnology | 3 |
| BI554 | 生物技術與基因工程 | Biotechnology and Genetic Engineering | 3 |
| BI555 | 原料藥產業 | Active Pharmaceutical Ingredients, API | 3 |
| BI556 | 生物科技論文寫作 | Scientific Writing of Biotechnology | 3 |
| BI558 | 生物技術新論 | Current Issues in Biotechnology | 3 |
| BI560 | 食品生物技術 | Food Biotechnology | 3 |
| 備註  Remarks | 1. 除必修論文6學分外，選修25學分須涵蓋生物科技相關課程與生物工程相關課程，每組課程至少須修9學分。   1. In addition to 6 credits of required thesis, 25 credits of electives must cover about biotechnology courses and bioengineering courses, each group of courses need to be at least 9 credits. | | | |

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**元智大學　生物科技與工程研究所碩士班**

**可選修之他所（系）選修科目表**

**（一百零九學年度入學新生適用）**

**YZU Graduate School of Biotechnology and Bioengineering Master Program**

**Table of Elective Courses Offered by the Department/School beyond the GSBB**

**(Applicable to 2020 newly admitted students)**

109.03.30~31 一○八學年度第二次課程委員會議暨工程教育認證諮詢委員會議訂定

109.05.06 一○八學年度第六次教務會議通過

Drawn up at the 2nd Curriculum Committee and Engineering Education Recognition Advisory Committee Meeting of 2019, dated Mar. 30~31, 2020

Passed by the 6th Academic Affairs Meeting, Academic Year 2019, on May 06, 2020

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 類別/組別  Category/Group | 課號  Course Code | 中文課名  Chinese Course Name | 英文課名  English Course Name | 學分數  Credits |
| 工程學院  College of Engineering | EG401 | 能源概論 | Topics on Energy Resources and Energy Technologies | 3 |
| EG501 | 統計實驗設計與應用 | Statistical Experimental Design and Application | 3 |
| 化材系所  Chemical Engineering and  Materials Science | CH454 | 生醫材料 | Biomedical Materials | 3 |
| CH501 | 高等輸送現象 | Advanced Transport phenomena | 3 |
| CH502 | 科技英文 | Technical Writing | 3 |
| CH517 | 專題討論 | Seminars in Science and Engineering | 3 |
| CH525 | 高等儀器分析 | Advanced Instrumental Analysis | 3 |
| CH566 | 質子交換膜燃料電池特論 | Special Topics on Proton-exchange-membrane Fuel Cell | 3 |
| CH569 | 生物模擬材料 | Biomimetic Materials | 3 |
| CH579 | 製藥技術工程 | Pharmaceutical Engineering | 3 |
| CH584 | 高等生化工程 | Advanced Biochemical Engineering | 3 |
| CH586 | 環境生物技術 | Environmental Biotechnology | 3 |
| CH588 | 太陽能技術 | Solar Energy Technology | 3 |
| CH600 | 材料物理化學 | Physical Chemistry of Materials | 3 |
| CH607 | 奈米材料製備與觸媒應用 | Nanomaterial Preparation and Catalytic Application | 3 |
| CH609 | 再生醫學 | Regenerative Medicine | 3 |
| CH610 | 細胞訊息路徑 | Cellular Signal Transduction | 3 |
| 資工所  Computer Science and Engineering | CS504 | 資訊擷取 | Information Retrieval | 3 |
| CS 561 | 資料庫系統 | Database Systems | 3 |
| CS574 | 圖形識別 | Pattern Recognition | 3 |
| CS641 | 人工智慧 | Artificial Intelligence | 3 |
| CS567 | 影像處理 | Image Processing | 3 |
| CS569 | 計算機圖學 | Computer Graphics | 3 |
| CS657 | 機器學習 | Machine Learning | 3 |
| 工管所  Industrial Engineering and Management | IE507 | 數學規劃(I) | Mathematical Programming(I) | 3 |
| IE549 | 行為決策分析 | Behavioral Analysis of Decision Making | 3 |
| IE555 | 群體決策分析 | Group Decision Making | 3 |
| IE571 | 高等工程經濟 | Advanced Engineering Economics | 3 |
| IE607 | 啟發式最佳化 | Heuristic Optimization | 3 |
| 機械所  Mechanical Engineerin | ME522 | 電腦輔助實務分析與應用 | Computer Aided Analysis for Mechanical Design | 3 |
| ME545 | 燃料電池專題 | Special Topic in Fuel Cell | 3 |
| ME574 | 燃料電池理論與數值分析 | Numeric Analysis for Fuel Cell Systems | 3 |
| ME581 | 燃料電池技術與系統設計 | Fuel Cell Technology and System Dsgien | 3 |
| ME584 | 新能源技術 | Advanced Technologies in Energy and its Applications | 3 |
| ME590 | 醫學工程原理與應用 | Principle and Applications of Biomedical Engineering | 3 |
| ME594 | 微機電系統與檢測技術 | Micro-Electro Mechanical Systems and its testing Techniques | 3 |
| 備註  Remarks | 1.凡修習他所（系）課程，選課前須先徵詢授課老師和指導老師同意，學分採認以二門課為限。  1. Students before selecting the courses offered by the Department/School out of the GSBB are required to have the approval of the course instructor and their advisor, and credits are limited to two courses. | | | |

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**元智大學 生物科技與工程研究所碩士班修業規則**

（一百零九學年度入學新生適用）

109.03.30~31 一○八學年度第二次課程委員會議暨工程教育認證諮詢委員會議訂定

第 一 條：本所修業年限依教育部規定辦理為1至4年。

第 二 條：研究生得於每學年第一學期開學後一週內提出助學金申請，領取助學金之研究生，需擔任本所所安排之助教性質工作。有關獎學金之申請，依規定辦理。

第 三 條：研究生必須在開學後一週內，選定指導教授送交本所核定。所選定之指導教授若非本所之專任教師，則需至少一位本所專任助理教授以上之教師共同指導，共同指導教師由指導教授推薦，並經所務會議通過。

第 四 條：研究生得更換指導教授，但必須取得原指導教授及新指導教授的同意，並將申請表填寫送交本所備查。

第 五 條：研究生選課、退選、加選科目，均需經指導教授同意。

第 六 條：每學期必須修讀並通過本所所開之書報討論課程（至少四學期，即兩學年）。若不及格，在畢業前必須補修完畢。

第 七 條：畢業學分31學分，除必修論文6學分外，選修25學分須涵蓋生物科技相關課程與生物工程相關課程，每組課程至少須修9學分。

第 八 條：外籍生經指導教授同意，可選修工程學院各系開放外籍生選修之英語授課課程，學分採認以二門課為限。

第 九 條：需通過論文初審，始得提出碩士論文口試申請，申請時程依校方規定辦理。

論文初審：本初審由指導教授召集，以三位助理級教授或相等資格以上之委員，組團審查。未能通過審查或已通過審查，但研究主題有更改之論文計畫，必須重新再審。提出再審時間至少需間隔一個月以上，以乙次為限。

第 十 條：入學研究生須依本校學術研究倫理教育課程實施要點規定，於入學第一學期結束前完成**學術研究倫理教育課程**，最遲須於申請學位口試前補修完成，未完成本課程，不得申請學位口試。

第十一條：其他本辦法未訂事宜，悉遵照學校「研究生學位考試細則」辦理。

第十二條：本辦法經所務會議通過，送教務處核備後實施，修正時亦同。

**Regulations Governing the Master Program of Graduate School of Biotechnology and Bioengineering**

(Applicable to 2020 newly admitted students)

Drawn up at the 2nd Curriculum Committee and Engineering Education Recognition Advisory Committee Meeting of 2019, dated Mar. 30~31, 2020

Article 1

The study deadline for master students in the Graduate School is set to one to four years as stipulated by the Ministry of Education’s related laws.

Article 2

The master students may file for a scholarship application within the first one week following commencement of the first semester of each school year; students who collect the scholarship are required to serve the teaching assistant work as arranged by the Graduate School. The particulars governing applying for the scholarship are to be implemented as per relevant stipulations.

Article 3

The master students are required to select an advisor within the first one week following the commencement of the first semester, which is to be submitted to the Graduate School. In the instance where the advisor selected is other than a full-time instructor at the Graduate School, at least one full-time assistant professor at the Graduate School or more is to be referred for joint guidance, which is subject to the motioning and consent at the school faculty meeting.

Article 4

A master student may change his/her advisor, which is subject to the consent of his/her former advisor and new advisor, with the application form to be filled out and forwarded to the Graduate School pending future verification.

Article 5

The master student’s course selection, withdrawal and extra subject selection are subject to the consent of his/her advisor.

Article 6

A master student is required to complete the “Seminar” course run by the Graduate School (at least four semesters, or two school years); when failing the course, the master students are required to complete the credits retroactively prior to graduation.

Article 7

31 credits for graduation, in addition to 6 credits of required thesis, 25 credits of electives must cover about biotechnology courses and bioengineering courses, each group of courses need to be at least 9 credits.

Article 8

After the advisor agrees, foreign students can choose any elective English courses which the College of Engineering opens to foreign students. Credits are limited to two courses.

Article 9

Master candidates who have passed the initial review of thesis may file for a master thesis oral examination within the application permissible time announced by the University.

Initial review of thesis: The team for initial review of thesis will be called up by the candidate’s advisor, which is required to consist of at least three faculty members on a full-time assistant professor level or higher. Those failing to pass the review or passing but considering changing their thesis research themes are required to undergo a subsequent review. The students are required to file for an re-review of thesis after one month and on a one-time basis.

Article 10

Admission to graduate students must follow the Academic Research Ethics Education Course implementation requirements; complete the Academic Research Ethics Education Course before the end of the first semester. The deadline for master students required to complete the credits retroactively need to before apply for the degree of the oral examination, if do not complete the course, cannot apply for the degree of the oral examination.

Article 11

Any matters not stipulated herein will be governed by Yuan Ze University’s Postgraduate Degree Examination Regulations.

Article 12

The Regulations herein will come into effect after approval by the School Faculty Meeting, and ratification by the Office of Academic Affairs. Amendments to the Regulations shall follow the same procedure.