| **Course Map** | | |
| --- | --- | --- |
| **Outline** | | |
| Department Name | Department of Forestry | |
| Class | Wood Science  Note: 2023 2nd Course Meeting - The courses 'Lab of Pulping' and 'Papermaking Laboratory' have been changed to electives. | |
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| **Educational Objectives** | | |
| **No.** | **Item** | |
| 1 | Cultivate professionals in the sustainable utilization of forest resources and biological materials with integration, innovation capabilities and international perspectives | |
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|  |  | |
| **Student’s Core Competencies** | | |
| **No.** | **Item** | **Corresponding to Educational Objectives No.** |
| 1 | Basic knowledge and skills in forestry | 1 |
| 2 | Theories and practices in characteristics of biomaterial | 1 |
| 3 | Theories and practices in the development and application of forest resources | 1 |
| 4 | Theories and practices of functional biomaterials (including pulp and paper) | 1 |
| 5 | Theories and practices of bioenergy development | 1 |

| **Lesson Plan** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Chinese Name** | **Course English Name** | **Planning points (See note)** | | | | **Corresponding core competency No.** | **Sugges-ted grade level** | **Offering department** | **Notes** |
| 1 | 2 | 3 | 4 |
| **College Core Courses (If not exempted, please state compulsory or electives)** | | | | | | | | | |
|  |  |  |  |  |  |  |  |  |  |
| **Compulsory Courses** | | | | | | | | | |
| 普通化學 | General Chemistry | U | A | S | 3 | 1-20,2-20,3-20  4-20,5-20 | 1 | Department of Chemistry |  |
| 微積分(一) | Calculus(I) | U | A | S | 2 | 1-100 | 1 | Department of Applied Mathematics |  |
| 微積分(二) | Calculus(II) | U | A | S | 2 | 1-100 | 1 | Department of Applied Mathematics |  |
| 木材組織學 | Wood Anatomy | U | A | S | 2 | 1-25,2-25,3-25  4-25 | 1 | Department of Forestry |  |
| 木材組織學實驗 | Lab of Wood Anatomy | U | B | S | 1 | 1-25,2-25,3-25  4-25 | 1 | Department of Forestry |  |
| 樹木學概論 | Introduction to Dendrology | U | A | S | 2 | 1-100 | 1 | Department of Forestry |  |
| 木材物理及力學 | Wood Physics and Mechanics | U | A | S | 2 | 1-10,2-40,3-20  4-15,5-15 | 2 | Department of Forestry |  |
| 木材物理及力學實驗 | Lab of Wood Physics and Mechanics | U | B | S | 1 | 1-10,2-40,3-20  4-15,5-15 | 2 | Department of Forestry |  |
| 木材化學及實驗 | Wood Chemistry with Lab | U | AB | S | 3 | 1-20,2-20,3-20  4-20,5-20 | 2 | Department of Forestry |  |
| 木材膠合劑學 | Wood Adhesives | U | A | S | 2 | 1-25,2-25,3-25  4-25 | 3 | Department of Forestry |  |
| 木材膠合劑學實習 | Lab of Wood Adhesives | U | B | S | 1 | 1-25,2-25,3-25  4-25 | 3 | Department of Forestry |  |
| 製漿學 | Pulping Process | U | A | S | 2 | 1-10,2-20,3-20  4-50 | 3 | Department of Forestry |  |
| 造紙學 | Papermaking Science | U | A | S | 2 | 1-10,2-20,3-20  4-50 | 3 | Department of Forestry |  |
| 木材塗料學 | Wood Coatings | U | A | S | 2 | 1-10,2-30,3-20  4-30,5-10 | 3 | Department of Forestry |  |
| 木材塗料學實習 | Lab of Wood Coatings | U | B | S | 1 | 1-10,2-30,3-20  4-30,5-10, | 3 | Department of Forestry |  |
| 生物複合材料加工利用 | Processing and Utilization of Bio-Based Composites | U | A | S | 2 | 1-20,2-20,3-20  4-40 | 4 | Department of Forestry |  |
| 生物複合材料加工利用實習 | Lab of Processing and Utilization of Bio-Based Composites | U | B | S | 1 | 1-20,2-20,3-20  4-40 | 4 | Department of Forestry |  |
| 專題討論(一) | Seminar (Ι) | U | C | S | 1 | 2-25,3-25,4-25  5-25 | 4 | Department of Forestry |  |
| 專題討論(二) | Seminar (Π) | U | C | S | 1 | 2-25,3-25,4-25  5-25 | 4 | Department of Forestry |  |
| 森林學 | Forestry | U | A | S | 2 | 1-60,2-10,3-10,  4-10,5-10 | 1 | Department of Forestry |  |
| 生質能源實習 | Lab of Biomass Energy | U | B | S | 1 | 2-5,5-95 | 2 | Department of Forestry |  |
| 生質能源 | Biomass Energy | U | A | S | 2 | 2-5,5-95 | 2 | Department of Forestry |  |
| 普通物理學 | General Physics | U | A | S | 3 | 1-100 | 1 | Department of Physics |  |
| 有機化學 | Organic Chemistry | U | A | S | 3 | 1-100 | 1 | Department of Chemistry |  |
| 統計學 | Statistics | U | A | S | 3 | 1-100 | 1 | Department of Forestry | 2013-S2 added |
| 能高森林講座 | Nenggao Forestry Lecture | U | C | S | 2 | 1-20,2-20,3-20  4-20,5-20 | 3 | Department of Forestry | 2015-S2 added |
| 木質結構設計學 | Wood Construction Design | U | A | S | 2 | 1-20,2-20,4-60 | 3 | Department of Forestry | 2015-S2 added; 2016-M5 name change |
| 木質結構設計學實習 | Lab of Wood Construction Design | U | B | S | 1 | 1-20,2-20,4-60 | 3 | Department of Forestry | 2016-S2 added |
| 生物材料保存與改質 | Preservation and Modification of Biomaterials | U | A | S | 2 | 1-25,2-25,3-25  4-25 | 3 | Department of Forestry | 2015 name change & made compulsory |
| 普通化學實驗 | Lab of General Chemistry | U | B | S | 1 | 1-40,2-15,3-15  4-15,5-15 | 1 | Department of Chemistry | 2021-M1 made compulsory |

| **Lesson Plan** | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Chinese Name** | | **Course English Name** | **Planning points (See note)** | | | | **Correspond-ing core competency No.** | **Sugges-ted grade level** | **Offering departm-ent** | **Notes** |
| 1 | 2 | 3 | 4 |
| **Elective Courses** | | | | | | | | | | |
| 製漿學實驗 | | Lab of Pulping | U | B | S | 1 | 1-10,2-20,3-20  4-50 | 3 | Department of Forestry | 2023-M2 made elective |
| 造紙學實驗 | | Papermaking Laboratory | U | B | S | 1 | 1-10,2-20,3-20  4-50 | 3 | Department of Forestry | 2023-M2 made elective |
| 森林昆蟲學 | | Forest Entomology | U | AB | S | 3 | 1-40,2-30,3-30 | 4 | Department of Entomology | 2022-M5 newly opened |
| 生質物氣化程序 | | Biomass Gasification Process | U | A | S | 3 | 5-100 | ≧ 4 | Department of Forestry | 2022-M5 newly opened; both MSc & Bachelo; EMI |
| 高分子化學概論 | | Introduction to Polymer Chemistry | U | A | S | 2 | 1-10,2-30,3-20,4-40 | 2 | Department of Forestry | 2022-M3 newly opened; EMI |
| 農業英文 | | English for Agriculture | U | A | S | 1 | 1-100 | 2 | College of Agriculture and Natural Resources | 2022-S1 newly opened; EMI |
| 生質化學品 | | Chemicals from Biomass | U | A | S | 2 | 1-10,2-30,3-30  4-30 | 2 | Department of Forestry | 2018-S2 newly opened |
| 生物炭與醋液之製造與應用 | | Manufacture and Utilization of Bio-Charcoals and Vinegars | U | A | S | 2 | 1-10,2-20,3-30  4-10,5-30 | 2 | Department of Forestry | 2018-S1 newly opened |
| 木質材料工程學 | | Wood Engineering | U | A | S | 2 | 1-20,2-20,3-30  4-30 | 4 | Department of Forestry | 2015-S2 newly opened |
| 生物材料保存與改質實習 | | Lab of Preservation and Modification of Biomaterials | U | B | S | 1 | 1-25,2-25,3-25  4-25 | 3 | Department of Forestry | 2015-S2 name change |
| 生質物熱化學轉換技術 | | Biomass Thermochemical Conversion Technology | U | A | S | 2 | 5-100 | 3 | Department of Forestry | 2014-S1 newly opened |
| 生質能源熱電實驗 | | Lab of Biomass Power and Heat Application | U | B | S | 1 | 5-100 | 3 | Department of Forestry | 2014-S1 newly opened |
| 生質能熱電應用與產業管理 | | Application and Industry Management of Biomass Power and Heat | U | A | S | 2 | 5-100 | 3 | Department of Forestry | 2014-S1 newly opened |
| 生質物熱電應用技術創意實作 | | Creative Pracitices for Biomass Power and Heat Applications | U | A | S | 2 | 5-100 | 4 | Department of Forestry | 2014-S1 newly opened |
| 森林保護學 | | Forest Protection | U | A | S | 2 | 1-100 | 3 | Department of Forestry | 2012-S1 added |
| 林木分子遺傳學 | | Forest Tree Molecular Genetics | U | A | S | 3 | 1-100 | 3 | Department of Forestry | 2012-S1 newly opened |
| 紙品性能檢驗學 | | Testing Methods of Paper Products | U | A | S | 2 | 2-20,4-80 | 4 | Department of Forestry | 2010-S1 newly opened |
| 木材乾燥學及實驗 | | Wood Drying with Lab | U | AB | S | 2 | 1-20,2-40,3-20  4-20 | 2 | Department of Forestry |  |
| 家具製造學 | | Furniture Making | U | A | S | 2 | 1-20,2-30.3-30  4-10,5-10 | 3 | Department of Forestry |  |
| 家具製造學實習 | | Lab of Furniture Making | U | B | S | 1 | 1-20,2-30,3-30  4-10,5-10 | 3 | Department of Forestry |  |
| 木材鑑別與分級及實習 | | Wood Identification and Lumber Grading with Practice | U | AB | S | 2 | 1-40,2-40,3-20 | 2 | Department of Forestry |  |
| 生物化學 | | Biochemistry | U | A | S | 3 | 1-100 | 3 | Department of Food Science and Biotechnol-ogy |  |
| 森林遊樂學 | | Forest Recreation | U | A | S | 3 | 1-100 | 2 | Department of Forestry |  |
| 林政學 | | Forest Policy | U | A | S | 2 | 1-100 | 4 | Department of Forestry |  |
| 林業行政管理 | | Forestry Administration | U | A | S | 2 | 1-100 | 4 | Department of Forestry |  |
| 森林生態學 | | Forest Ecology | U | A | S | 3 | 1-100 | 3 | Department of Forestry |  |
| 森林經營學 | | Forest Management | U | A | S | 2 | 1-100 | 4 | Department of Forestry |  |
| 紙張性質學 | | Testing and Properties of Paper | U | B | S | 2 | 2-20,3-20,4-60 | 4 | Department of Forestry |  |
| 木材市場 | | Timber Marketing | U | A | S | 2 | 1-50,3-50 | 2 | Department of Forestry |  |
| 造紙纖維材料 | | Fibrous materials for Papermaking | U | A | S | 2 | 2-30,3-20,4-50 | 3 | Department of Forestry |  |
| 造紙單元操作學 | | Unit Operations of Papermaking | U | A | S | 3 | 1-25,3-25,4-50 | 3 | Department of Forestry |  |
| 林產工業安全與衛生 | | Occupational Safety and Health of Wood Industries | U | A | S | 2 | 1-25,2-25,3-25  4-25, | 2 | Department of Forestry |  |
| 製材學 | | Lumbering | U | A | S | 2 | 1-25,2-25,3-25  4-25 | 2 | Department of Forestry |  |
| 商用木材 | | Economical Timber | U | A | S | 2 | 1-25,2-25,3-25  4-25 | 2 | Department of Forestry |  |
| 林產特產物 | | Special Forest Products | U | A | S | 2 | 1-25,2-25,3-25  4-25 | 2 | Department of Forestry |  |
| 竹材加工技術與應用 | | Bamboo Processing Technology and Applications | U | A | S | 2 | 1-20,2-30,3-20  4-30 | 2 | Department of Forestry | 2018-S2 name change |
| 木材加工學 | | Wood Processing | U | A | S | 2 | 1-20,2-20,3-20  4-20,5-20 | 3 | Department of Forestry |  |
| 膠合設計 | | Adhesion Design | U | A | S | 2 | 1-25,2-25,3-25  4-25 | 3 | Department of Forestry |  |
| 世界經濟木材及實習 | | Commercial Timbers of the World with Practice | U | AB | S | 3 | 1-50,3-50 | 2 | Department of Forestry |  |
| 造紙工程學 | | Papermaking Engineering | U | A | S | 2 | 2-30,4-70 | 3 | Department of Forestry | 2019-S1 update to 2 credits |
| 紙加工學 | | Paper Converting | U | A | S | 2 | 2-20,3-20,4-60 | 4 | Department of Forestry | 2019-S1 update to 2 credits |
| 木材塗裝技術 | | Techniques of Wood Finishing | U | A | S | 2 | 1-10,2-40,3-20  4-20,5-10 | 3 | Department of Forestry |  |
| 家具成本分析 | | Cost Analysis of Furniture-Making | U | A | S | 2 | 1-10,2-30,3-30  4-20,5-10 | 3 | Department of Forestry |  |
| 木材界面性質與處理 | | Surface Property and Modification of Wood | U | A | S | 2 | 1-20,2-30,4-50 | 3 | Department of Forestry |  |
| 林產工業與污染防治概論 | | Introduction to the Pollution Abatement of Forest Products Industry | U | A | S | 2 | 1-20,2-20,3-20  4-20,5-20 | 4 | Department of Forestry |  |
| 環境材料設計 | | Eco-materials Design | U | A | S | 2 | 2-40,3-20,4-40 | 3 | Department of Forestry | 2015-S2 name change |
| 畢業論文 | | Thesis | U | C | Y | 2 | 1-20,2-20,3-20  4-20,5-20 | 4 | Department of Forestry |  |
| 休閒觀光之木材文化概論 | | Introduction to Wood Culture for Recreation and Tourism | U | A | S | 2 | 1-20,2-40,3-40 | 4 | Department of Forestry |  |
| 木材成分之生化特性與其生合成 | | Biochemistry and Biosynthesis of Wood Components | U | A | S | 2 | 1-10,2-20,3-30  4-20,5-20 | 3 | Department of Forestry |  |
| 木質環境科學概論 | | Introduction to Wooden Environmental Science | U | A | S | 2 | 1-20,2-40,3-20  4-20 | 1 | Department of Forestry |  |
| 木材古蹟維修概論 | | Introduction to Wooden Monuments Conservation and Restoration | U | A | S | 2 | 1-20,2-50,3-20  4-10 | 4 | Department of Forestry |  |
| 生質物應用概論 | | Introduction to Biomass Application | U | A | S | 2 | 1-25,2-25,3-25  4-25 | 2 | Department of Forestry | 2015-S2 name change |
| 木質結構設計 | | Design in Wooden Construction | U | A | S | 2 | 1-20,2-20,4-60 | 3 | Department of Forestry |  |
| 木質內裝設計 | | Design in Wooden Interior Decoration | U | A | S | 2 | 1-40,2-60 | 3 | Department of Forestry |  |
| 木質生活用品導論與設計 | | Introduction to Wooden Housewares and Design | U | A | S | 2 | 1-20,2-20,3-30  4-30 | 3 | Department of Forestry |  |
| 世界森林與木材 | | Forest and Wood Resources of the World | U | A | S | 2 | 1-50,3-50 | 3 | Department of Forestry |  |
| 林產品行銷管理 | | Forest Products Marketing Management | U | A | S | 2 | 1-100 | 4 | Department of Forestry |  |
| 林產產業經濟學 | | Industrial Economics of Forest Products Industry | U | A | S | 3 | 1-100 | 4 | Department of Forestry |  |
| 市場調查 | | Marketing Survey | U | A | S | 2 | 1-100 | 4 | Department of Forestry |  |
| 林產品採購管理 | | Forest Products Purchasing Management | U | A | S | 2 | 1-100 | 4 | Department of Forestry |  |
| 紙質文物保存與修復 | | Conservation & Reinstatement of Paper-Based Cultural Relics | U | A | S | 2 | 4-100 | 4 | Department of Forestry |  |
| 木材劣化學 | | Degradation of Wood | U | A | S | 2 | 1-25,2-25,3-25  4-25 | 3 | Department of Forestry |  |
| 樹木生物力學 | | Biomechanics of Tree | U | A | S | 2 | 1-30,2-70 | 3 | Department of Forestry |  |
| 再生能源概論 | | Introduction to Renewable Energy | U | A | S | 2 | 2-5,3-5,4-5  5-85 | 2 | Department of Forestry |  |
| 育林學原理 | | Principles of Silviculture | U | A | S | 2 | 1-100 | 3 | Department of Forestry |  |
| 育林學及實習 | | Silviculture with Practice | U | AB | S | 3 | 1-100 | 3 | Department of Forestry |  |
| 森林美學 | | Forest Esthetics | U | A | S | 2 | 1-100 | 1 | Department of Forestry |  |
| 造紙化學概論 | | Fundamentals in Paper Chemistry | U | A | S | 2 | 2-20,4-80 | 4 | Department of Forestry |  |
| 普通物理學實驗 | | Lab of General Physics | U | B | S | 1 | 1-100 | 1 | Department of Physics |  |
| 普通生物學 | | General Biology | U | A | S | 3 | 1-100 | 1 | Department of Life Sciences | 2021-M2 name change |
| 經濟學 | | Economics | U | A | S | 3 | 1-100 | 1 | Department of Applied Economics |  |
| 有機化學實驗 | | Lab of Organic Chemistry | U | B | S | 1 | 1-100 | 1 | Department of Chemistry |  |
| 分析化學實驗 | | Lab of Analytic Chemistry | U | B | S | 1 | 1-100 | 1 | Department of Chemistry |  |
| 分析化學 | | Analytic Chemistry | U | A | S | 3 | 1-100 | 1 | Department of Chemistry |  |
| 計算機概論 | | Introduction to Computer Science | U | A | S | 3 | 1-100 | 1 | Institute of Data Science and Information Computing |  |
| 農業概論 | | Introduction to Agriculture | U | A | S | 2 | 1-100 | 1 | College of Agriculture and Natural Resources |  |
| 高分子化學 | | Polymer Chemistry | U | A | S | 3 | 1-50,4-50 | 3 | Department of Chemical Engineering |  |