# 森林學系

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## 教育目標

本系設立之宗旨乃在培育國家森林經營管理、森林生物與保育以及林產物與生物材料永續利用研究發展所需之高級人才，以提昇學術研究水準及推廣應用技術，結合產、官、學之力量，並為林業之永續經營與管理奠定良基。

## 課程規劃

本系設有大學部、碩士班及博士班，依實際教學需求不同，各分為林學組及木材科學組招生及授課。林學組以森林生態系為教學研究對象，主要探討森林生物學及森林經營學 2 大領域。大學部課程包含：樹木學、育林學、森林生態、林木生理及遺傳、森林環境、測計、遙感探測、評價、經營及遊樂等，部份課程需進行實驗課，學生於寒暑假時赴本校實驗林場進行 4 個林場實習。

木材科學組分為木材物理及木材化學 2 大領域。大學部課程包含木材組織學、物理及結構力學、化學、製漿造紙、木材塗料、膠合劑、生物複合材料、生質能源等，本系注重理論與實務操作，各主要課程均需修習實驗或實習課程。

## 主要研究領域

- ◆ **森林植物分類及生態：**進行臺灣原生植物清單之調查與物候學、臺灣主要生態系組成、外來植物、重要林木生育地等之調查與研究。
- ◆ **林木生理、遺傳及育林：**研究育林、森林景觀規劃、林木生理、基因體學及系統生物學。
- ◆ **森林水化學及養分循環：**長期調查分析森林生態系中之水分，以驗證森林生態系服務功能。
- ◆ **林政學、竹林經營、森林測計及森林經營：**林業政策之理論及實務。竹林碳貯存量及碳吸存量模式之建立。林分材積、生物量及碳貯存量推估。人工林疏伐效益及其與天然林之經營。
- ◆ **木材組織、鑑別、性質及處理：**工程木材之開發與工程特性評估、非破壞檢測技術之應用。
- ◆ **林產物之利用、改良與開發：**木質材料與生物複合材料之廢料回收與利用、非破壞檢測、功能性生物複合材料之開發與應用。
- ◆ **木材塗料之研究：**以植物油為基質之環保型木材塗料及水性塗料之合成與應用。
- ◆ **生物炭與醋液之製造：**木、竹炭與木、竹醋液製造技術研發及其於植物生長促進劑、重金屬吸附、木材防腐等應用。


▲雪山圈谷 2010-2012 年玉山杜鵑開花物候。
Flowering phenology of *Rhododendron pseudochrysanthum* in the Syueshan Glacial Cirques during 2010-2012.

▲植物冠層分析儀(CI-110)。
Plant Canopy Analysis CI-110

▲竹活性碳塗料。
Bamboo activated carbon coating

- ◆ **製漿造紙與機能紙開發：**廢紙脫墨及改質之研究、開發特種紙或機能紙及非木造紙纖維。
- ◆ **生質材料應用與保存：**開發生質材料的功能性與應用，研發新型生質材料保存劑型。
- ◆ **林木代謝體研究及天然藥物開發：**牛樟芝活性研究及代謝物解析、木材香味成分與森林芬多精之解析及其對動物中樞神經(CNS)之影響、具活性林木成分之篩選及其作用機制。
- ◆ **生質物與生質能之開發與應用：**利用流體化床氣化技術轉換木質生質物作為熱電應用。

## 教研成果

本系於本校創校時即成立，已逾 96 年，畢業系友超過 3,700 餘人，分佈於各行各業，表現卓著，於國內大專院校、中央及地方林業相關單位，如：農委會、林務局、林試所、特有生物保育中心、國家公園、觀光局、縣市政府農業局等擔任要職。歷年來有 6 位系友獲頒中興大學傑出校友殊榮。本系現有專任教師 16 位，榮獲校內外多項獎項，包含農委會植樹節表彰林業及自然保育有功人士獎、全國十大傑出農業專家、楊祥發院士傑出農業科學年輕學者獎、中華林學會學術獎、中華林產事業協會學術獎、中興大學特聘教授、教學特優、建教合作研究計畫績優獎。近五年本系執行之研究計畫平均每年 40 餘件約 3 千多萬元。研究成果發表於國際 SCI 期刊、國內外學術期刊、研討會等 300 餘篇。

Department of Forestry

## Mission

The Department of Forestry is aimed at providing the best scientific training programs for its undergraduate and graduate students, having students well prepared for pursuing advanced studies or careers in the natural resource management or forest products industries.

## Curriculum

The Department offers degrees in Bachelor of Science (BS), Master of Science (MS) and Doctor of Philosophy (Ph.D.). The curricula for the undergraduate program are subdivided into forest science division and wood science division. Students can choose forest management major or forest biology and conservation major in the forest science division. Students can choose wood chemistry major or wood physics major in the wood science division. Each division is characterized by a series of core and elective courses. A minimum of 138 credits of course work is required for a 4-year Bachelor of Science (B.S.) degree.

The graduate program offers in-depth curricula for students pursuing the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees. The M.S. and Ph.D. degree programs each require the completion of a minimum of 30 credits and 36 credits of course work, respectively. The students in the graduate programs are also required to conduct independent research and complete with a thesis (M.S.) or a dissertation (Ph.D.).

## Core Research Topics

- Forest policy, management, economics and evaluation: Building growth and yield models for important species of plantations in Taiwan, establishment of carbon sequestration for bamboo forests, assessing thinning effects on plantations, and analysis of afforestation policy.
- Taxonomy, forest ecology and biodiversity
- Tree physiology, genetics, genomics and conservation biology.
- Nutrient cycling of forest ecosystem: Samples of both transient and permanent component of the forest ecosystem were collected for nutrient measurements to identify the service functions of forest ecosystem.
- Wood anatomy and processing
- Forest products utilization, improvement, and development: Manufacture of bio-charcoal and vinegars Wood coating: Synthesis and application of vegetable oil-based environmental friendly wood coatings and waterborne wood coatings. Development of produced techniques for wood and bamboo charcoal and vinegars and its applications on plant growth promoter, absorbance of heavy metals and wood preservatives etc.
- Pulping and functional paper making
- Plant secondary metabolites
- Applications and preservations of bio-based materials: Development of functional bio-based materials and its application, and new formulation technologies for preservation of lignocellulosic materials.
- Biomass energy and its applications: Converting woody biomass by fluidization gasification for heat and power applications.

▲Forest Camp of Dendrology/樹木學林場實習

▲10 kWe Movable Agriculture and Livestock Waste Gasification Power System/10 kWe 移動式小型農牧廢棄物氣化發電系統

▲Scanning Electron Microscope/掃瞄式電子顯微鏡

▲Gas Chromatography–Mass Spectrometry/氣相層析質譜儀-火焰離子化檢測器

## Achievements

Research conducted by faculties and students of the department has resulted in enormous accomplishments including publications in high impact journals, building growth and yield models for important species of plantations in Taiwan, development of dual-curable UV curing wood coatings, synthesis and applications of high performances vegetable oil-based waterborne wood coatings, manufacture and applications of bamboo charcoals, activated carbon and vinegars. Research on functional hydrogel for controlled release of water. Installing a 30 kWth bubbling fluidized bed gasifier, and establishing the operational conditions for biomass gasification to provide the information for future commercial design.