

植物生物科技課程大綱

開 課 系 所 (Department)	熱帶植物科學與微生物研究所
課程名稱(中文) (Course name-Chinese)	植物生物科技
課程名稱(英文) (Course name-English)	Plant biotechnology
開課學年 (Year)	109
開課學期 (Semester)	<input type="checkbox"/> 上學期 <input checked="" type="checkbox"/> 下學期
授課對象(請圈選)	<input type="checkbox"/> 一年級 <input type="checkbox"/> 二年級 <input type="checkbox"/> 三年級 <input type="checkbox"/> 四年級 <input checked="" type="checkbox"/> 碩士班 <input checked="" type="checkbox"/> 博士班
課程所屬領域(請圈選)	<input checked="" type="checkbox"/> 環境變遷與糧食生產 <input checked="" type="checkbox"/> 藥用與經濟植物科學 <input type="checkbox"/> 水產生物科技
課程屬性碼	英文授課 (English course)
課程碼 (Course number)	
分班碼 (Class number)	
課程對應教育目標(請勾選，可複選)	<input checked="" type="checkbox"/> 培養紮實生物科學基礎研究訓練 <input checked="" type="checkbox"/> 具備轉譯生物跨領域高階專業人才
課程對應基本素養 (請勾選，可複選)	<input checked="" type="checkbox"/> 生命科學基本認知 Basic knowledges of life sciences <input checked="" type="checkbox"/> 實驗科學的態度 Attitude for experimental science <input checked="" type="checkbox"/> 培養同理心、尊重包容的公民素養 Develop the civic literacy of empathy, respect and inclusion <input checked="" type="checkbox"/> 對生命的社會關懷 The social care of lives <input checked="" type="checkbox"/> 生態保育的哲學觀與正義思維

	<p>The philosophy and justice thinking of ecological conservation</p> <p><input checked="" type="checkbox"/> 跨領域學習與國際視野</p> <p>Interdisciplinary learning and global vision.</p>
<p>核心能力</p> <p>Competence</p> <p>(請勾選,可複選)</p>	<p><input checked="" type="checkbox"/> 生命科學實驗操作及使用相關儀器的能力</p> <p>The experimental operation and the use of the instruments of life sciences</p> <p><input checked="" type="checkbox"/> 具備獨立思考與判斷的能力</p> <p>Capable of thinking and judging independently</p> <p><input checked="" type="checkbox"/> 具備有效溝通與解決問題的能力</p> <p>Capable of communicating effectively and solving the problem</p> <p><input checked="" type="checkbox"/> 跨領域知識整合與創新能力</p> <p>Integration of interdisciplinary knowledges and ability to innovate</p> <p><input checked="" type="checkbox"/> 展現團隊合作能力</p> <p>Capacity to show teamwork</p>
<p>先修科目或先備能力</p> <p>(Prerequisite Course(s))</p>	
<p>學分數</p> <p>(Credits)</p>	3
<p>開課教師</p> <p>(Instructors)</p>	李瑞花(Ruey-Hua Lee)、謝羅倫(Roland Schafleitner)、大林祝(Iwai Obayashi)
<p>教師聯絡資訊*</p> <p>Contact with teacher</p>	<p>謝羅倫 Roland Schafleitner: roland.schafleitner@worldveg.org 06-5837801 ext. 380</p> <p>李瑞花 Ruey-Hua Lee: shanhua@mail.ncku.edu.tw 06-2757575 ext. 58312</p> <p>大林祝 Iwai Obayashi: 10902017@gs.ncku.edu.tw 06-2757575 ext. 58118</p>
<p>Office Hours</p>	By appointment
<p>課程概述*</p> <p>(Course description)</p>	<p>Plant biotechnology encompasses the development, optimization and usage of biotechnological processes for the purpose of innovating and achieving greater efficiency in plant production. This discipline also opens up new opportunities for improving the sustainability of production. This course focuses on the emerging role of biotechnology in crop production, molecular farming, plant diversity and the global environment. Basic concepts in gene and recombinant DNA technology are introduced as a foundation of this course. This course will cover scientific principles and techniques in plant based food, medicine, and fuel and polymer production. The course will also cover application of the technology in studying plant diversity and environmental management. Current status of plant based biotechnology in Taiwan will also discuss. Controversial aspects of biotechnology are addressed, especially the ethical, legal and social implications of biotechnology.</p>
<p>課程學習目標* (Course goal)</p>	<ol style="list-style-type: none"> 1. The emerging role of biotechnology in crop production, molecular farming, plant diversity and the global environment. 2. Basic concepts in gene and recombinant DNA technology are introduced as a foundation of this course. 3. The scientific principles and techniques in plant based food, medicine, and fuel and polymer production. 4. Application of the technology in studying plant diversity and environmental management. 5. Current status of plant based biotechnology. 6. Controversial aspects of biotechnology are addressed, especially the ethical, legal and social implications

	of biotechnology.			
課程進度* (Course Progress Outline) (請完整填 滿 18 週)	Plant Biotechnology 2022			
	Time: Monday 14:00 – 17:00			
	Place: 5F, meeting room			
	Week	Date	Topic	
	1	2/14	Introduction	ZH Liu (劉景煌)
	2	2/21	Crop biodiversity for plant breeding	Roland Schafleitner
	3	2/28	228 memorial day	
	4	3/7	Genomics assisted breeding	Roland Schafleitner
	5	3/14	Gene editing	Roland Schafleitner
	6	3/21	Exam	Roland Schafleitner
	7	3/28	International Orchid Show https://tios.tw/page/%E9%A6%96%E9%A0%81/1182	
	8	4/4	Spring break	
	9	4/11	Plant cell and tissue culture techniques in basic and applied research	Iwai Obayashi
	10	4/18	Techniques in plant transformation	Iwai Obayashi
	11	4/25	Biotechnology in crop pest and disease control	Iwai Obayashi
	12	5/2	Biotechnology in crop improvement against abiotic stress	Iwai Obayashi
	13	5/9	Exam	Iwai Obayashi
	14	5/16	Plant biotechnology in crop productivity	Ruey-Hua Lee
	15	5/23	Improvement of End-Use Qualities	Ruey-Hua Lee
	16	5/30	Plant-Made Pharmaceuticals	Ruey-Hua Lee
	17	6/6	Biofuel & Biomaterials	Ruey-Hua Lee
	18	6/13	Exam	Ruey-Hua Lee
	Roland Schafleitner 謝羅倫 roland.schafleitner@worldveg.org 06-5837801 x 380 (O) Iwai Obayashi 大林祝 10902017@gs.ncku.edu.tw 06-2757575 轉 58118 Ruey-Hua Lee 李瑞花, 06-2757575 x 58312 shanhua@mail.ncku.edu.tw			
教學方法* Teaching Approach(es) 務必填寫!	Lectures, presentation, group discussion and field trip			

課程教材* Course Material 務必填寫!	1. PPT files prepared by the lectures 2. Lecture notes compiled by the lectures.																																																																							
參考書目 (References)	1. William J. Thieman and Michael A. Palladino. 2013. Introduction to Biotechnology. 2. Chrispeels, MJ, Sadava, DE. 2002. Plants Genes and Crop Biotechnology. 2nd Ed. Jones & Bartlett publishers, Inc., ISBN : 0763715867, pp 562 3. Daugherty E. 2007. Biotechnology: Science for the New Millennium. 1st Edition. Paradigm Publishing Inc., ISBN 0-7638-2282-5. Pp 420. 4. Glick RR. And Pasternak JJ. 2003. Molecular Biotechnology: Principles and applications of recombinant DNA. 3rd Edition. ASM Press, USA. ISBN: 1-55581-224-4, pp760. 5. Slater A., Scott NW., and Fowler MR. 2003. Plant Biotechnology: The Genetic Manipulation of Plants. 1st Edition. Oxford University Press, USA. ISBN : 0-19-925468-0, pp346. 6. Dictionary: Bains W. 2004. Biotechnology from A to Z. 3rd Edition. Oxford University Press, Oxford, UK. ISBN 0-19-852498-6. Pp413. 7. Journals and Newspapers. 8. Public Websites.																																																																							
評量方式* (Grading Criteria) 務必填寫!	<table border="1"> <tr> <td></td> <td></td> <td></td> <td colspan="6">此評量方式可評量前面所勾選之基本素養與核心能力，是者請打勾</td> </tr> <tr> <td>序號</td> <td>評量方式</td> <td>分配% 總計 100%</td> <td>培養具人文與科學思考邏輯之熱帶植物與微生物科學與技術人才</td> <td>掌握國際植物與微生物科學與技術研究方向與發展</td> <td>積極主動關懷農業與糧食之相關社會議題</td> <td>具備轉譯基因體學的創新應用能力</td> <td>具備植物與微生物科學專業知識及實務技能</td> <td>擁有獨立思考與判斷的能力</td> </tr> <tr> <td>1</td> <td>Participation</td> <td>10%</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>2</td> <td>Presentation</td> <td>30%</td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>3</td> <td>Assignment</td> <td>30%</td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>4</td> <td>Exam</td> <td>30%</td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>5</td> <td></td> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>												此評量方式可評量前面所勾選之基本素養與核心能力，是者請打勾						序號	評量方式	分配% 總計 100%	培養具人文與科學思考邏輯之熱帶植物與微生物科學與技術人才	掌握國際植物與微生物科學與技術研究方向與發展	積極主動關懷農業與糧食之相關社會議題	具備轉譯基因體學的創新應用能力	具備植物與微生物科學專業知識及實務技能	擁有獨立思考與判斷的能力	1	Participation	10%	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2	Presentation	30%	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3	Assignment	30%	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4	Exam	30%	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	5			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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tutor			
備註 (Note)			
課程學習融入下列議題或具有下列內涵的程度 * (Immersing the Following Issues or Contents) (單選) 務必填寫!	議題或內容 Issues or Contents	關聯性 Correlation	
	消除貧窮 (No poverty)	<input checked="" type="checkbox"/> 直接相關 Direct Correlation <input type="checkbox"/> 間接相關 Indirect Correlation <input type="checkbox"/> 無相關 No Correlation	
	消除飢餓 (Zero hunger)	<input checked="" type="checkbox"/> 直接相關 Direct Correlation <input type="checkbox"/> 間接相關 Indirect Correlation <input type="checkbox"/> 無相關 No Correlation	
	健康與福祉 (Good health and Well Being)	<input checked="" type="checkbox"/> 直接相關 Direct Correlation <input type="checkbox"/> 間接相關 Indirect Correlation <input type="checkbox"/> 無相關 No Correlation	
	教育品質 (Quality Education)	<input type="checkbox"/> 直接相關 Direct Correlation <input type="checkbox"/> 間接相關 Indirect Correlation <input checked="" type="checkbox"/> 無相關 No Correlation	
	性別平等 (Gender Equality)	<input type="checkbox"/> 直接相關 Direct Correlation <input type="checkbox"/> 間接相關 Indirect Correlation <input checked="" type="checkbox"/> 無相關 No Correlation	
	淨水與衛生 (Clean water and sanitation)	<input type="checkbox"/> 直接相關 Direct Correlation <input type="checkbox"/> 間接相關 Indirect Correlation <input checked="" type="checkbox"/> 無相關 No Correlation	
	可負擔能源 (Affordable and clean energy)	<input type="checkbox"/> 直接相關 Direct Correlation <input checked="" type="checkbox"/> 間接相關 Indirect Correlation <input type="checkbox"/> 無相關 No Correlation	
	就業與經濟成長 (Decent work and Economic growth)	<input checked="" type="checkbox"/> 直接相關 Direct Correlation <input type="checkbox"/> 間接相關 Indirect Correlation <input type="checkbox"/> 無相關 No Correlation	
	工業、創新與基礎建設 (Industry Innovation and infrastructure)	<input type="checkbox"/> 直接相關 Direct Correlation <input type="checkbox"/> 間接相關 Indirect Correlation <input checked="" type="checkbox"/> 無相關 No Correlation	
	減少不平衡 (Reduced Inequalities)	<input type="checkbox"/> 直接相關 Direct Correlation <input type="checkbox"/> 間接相關 Indirect Correlation <input checked="" type="checkbox"/> 無相關 No Correlation	
	永續城市與社區 (sustainable cities and communities)	<input type="checkbox"/> 直接相關 Direct Correlation <input checked="" type="checkbox"/> 間接相關 Indirect Correlation <input type="checkbox"/> 無相關 No Correlation	
	責任消費與生產 (Responsible consumption and production)	<input checked="" type="checkbox"/> 直接相關 Direct Correlation <input type="checkbox"/> 間接相關 Indirect Correlation <input type="checkbox"/> 無相關 No Correlation	
	氣候行動 (climate action)	<input type="checkbox"/> 直接相關 Direct Correlation <input checked="" type="checkbox"/> 間接相關 Indirect Correlation <input type="checkbox"/> 無相關 No Correlation	
海洋生態 (Life below water)	<input type="checkbox"/> 直接相關 Direct Correlation <input type="checkbox"/> 間接相關 Indirect Correlation		

		<input checked="" type="checkbox"/> 無相關 No Corelation	
	陸地生態 (Life on land)	<input checked="" type="checkbox"/> 直接相關 Direct Corelation <input type="checkbox"/> 間接相關 Indirect Corelation <input type="checkbox"/> 無相關 No Corelation	
	和平與正義制度 (Peace justice and strong institutions)	<input type="checkbox"/> 直接相關 Direct Corelation <input type="checkbox"/> 間接相關 Indirect Corelation <input checked="" type="checkbox"/> 無相關 No Corelation	
	全球夥伴 (partnerships for goals)	<input type="checkbox"/> 直接相關 Direct Corelation <input type="checkbox"/> 間接相關 Indirect Corelation <input checked="" type="checkbox"/> 無相關 No Corelation	

有關課程其他調查 Other surveys of courses

1.本課程是否規劃業界教師參與教學或演講 ☐是 Yes ☒否 No ，約 about____次 times

Will this course plan on inviting industry specialists for teaching or speech?

2.本課程是否規劃內含校外實習（並非參訪） ☐是 Yes ☒否 No ，約 about____天 days

Will this course plan industry practice for student? (not visiting)

備註:教師可於成大網頁：教職員工之課程大綱上傳登錄或修改課程綱要

網址：<http://140.116.165.74/syllabus/>