

## 《生物防治》课程教学大纲

课程基本信息 (Course Information)					
课程代码 (Course Code)	AB304	*学时 (Credit Hours)	32	*学分 (Credits)	2
*课程名称 (Course Name)	(中文) 生物防治				
	(英文) Biological control				
课程性质 (Course Type)	专业选修课 (Major Elective Course)				
授课对象 (Target Audience)	本科生三年级 (Junior Undergraduates)				
授课语言 (Language of Instruction)	双语教学 (Chinese and English)				
*开课院系 (School)	农业与生物学院(School of Agriculture and Biology)				
先修课程 (Prerequisite)	植物保护学 (Plant Protection), 微生物学 (Microbiology), 动物学 (Zoology)				
授课教师 (Instructor)	陈捷	课程网址 (Course Webpage)			
*课程简介 (Description)	<p>(中文 300-500 字, 含课程性质、主要教学内容、课程教学目标等)</p> <p>生物防治学是研究利用有益生物防控植物有害生物的理论与实践科学, 其核心是如何利用生防微生物和天敌昆虫防治农林作物有害生物的发生与危害, 属于一种环境友好型绿色防控技术。本门课程是资源环境科学专业本科生在完成《植物保护学》课程学习的基础上, 进一步学习和掌握植物病虫草鼠害绿色防控的理论和技术的选修课。主要讲授生物防治学发展历史、发展动态及在现代农业有害生物治理中的地位, 有害生物生物防治的基本概念与原理, 生防微生物、天敌昆虫的种类及与植物和有害生物间的相互关系, 有害生物生物防治的作用机理和应用途径, 其中植物土传病害和害虫的生物防治机制和应用技术是本门课程的学习重点。通过本门课程学习使学生掌握农业有害生物生物防控的基本理论和应有途径, 为今后从事植物有害生物的绿色防控工作奠定理论和技能基础。</p>				
*课程简介 (Description)	<p>Biological control or biocontrol is a science on how to use beneficial microbes or natural enemy insect to control pest insect and diseases. The core parts of the course are composed of theory and practice with biocontrol microbes and natural enemy to prevent plant disease, pest insect as well as rat in which the crucial technique is a kind of environmental-friendly plant pest control measure. The course is selective course offered to undergraduate student majoring in resources and environment science. The course mainly introduces the history of biocontrol science, development and its role in the IPM of modern agriculture, and also further details concepts and principle of biocontrol of plant pest, the interaction between biocontrol microbes, natural enemy insect and plants, as well as the biocontrol mechanism and application against plant pests. To well learn the course, the basic knowledge on plant protection</p>				

	science should be taken ahead. The key points to learn the course are for understanding biocontrol mechanism of soilborne diseases and pest insect and its application approaches, so as to offer students with major biocontrol theories and techniques, and to lay a foundation for to practice the green control of plant pests in future.
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课程教学大纲 (Course Syllabus)

*学习目标(Learning Objectives)	<p>1. 掌握生物防治的基本概念、原理和应用技术, 使学生进一步拓展《植物保护学》的课程内容 (A5. 1. 2)。 Acquire basic concepts, theories and application techniques of biocontrol and make them further understand what they have learnt in Plant Protection course.</p> <p>2. 了解目前主要生物防治微生物和天敌昆虫的种类和应用水平, 使学生了解每类生物防治因子作用有害生物对象 (B2, B9)。 Know major species of biocontrol microbes and enemy insects and their application and make students know harmful objects of every biocontrol agent.</p> <p>3. 掌握生物防治病虫害鼠害的生态学和分子机理, 了解生物防治的理论研究和应用技术发展新动态 (B3, B10)。 Acquire ecological and molecular mechanisms of biocontrol on diseases and pests. Know latest development trends in biocontrol theories and application techniques.</p> <p>4. 提高学生综合分析和解决实际问题的能力 (C4、C7)。 Improve students' abilities in comprehensive analysis and problem solving.</p>
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	教学内容 (Content)	学时 (Credit hours)	教学方式 (Teaching method)	作业及要求 (Assignment)	基本要求 (Requirements)	考查方式 (Examination mode)
*教学内容 进度安排及要求 (Class Schedule & Requirements)	第一章 绪论 第一节 植物有害生物与防治 第二节 生物防治的概念 第三节 生物防治历史 第四节 生物防治相关学科 <b>Chapter 1</b> <b>Introduction</b> <b>Section 1</b> Plant pests and its control <b>Section 2</b> Concepts of biocontrol <b>Section 3</b> History of	4	多媒体授课 Multi-media teaching		掌握生物防治技术的基本概念; . 掌握生物防治发展动态和应用途径 Acquire basic concepts of biocontrol and its application and latest development	提问与作业 Questioning and Assignment

	<p>biocontrol</p> <p><b>Section 4</b></p> <p>Relevant disciplines of biocontrol</p>					
	<p>第二章 生物防治的基本原理</p> <p>第一节 植物体生态系与微生物环境</p> <p>第二节 微生物的相互作用</p> <p>第三节 生物防治机理</p> <p><b>Chapter 2</b></p> <p>Basic theories of biocontrol</p> <p><b>Section 1</b></p> <p>Plant ecosystem and microbial environment</p> <p><b>Section 2</b></p> <p>Interaction of microbes</p> <p><b>Section 3</b></p> <p>Biocontrol mechanism</p>	2	多媒体授课 Multi-media teaching	课外作业 Homework	<p>掌握生物防治病害机理；了解生物防治微生物-植物互作的特异性；了解昆虫病原真菌的致病机理；</p> <p>4.掌握生物防治微生物诱导抗性的原理</p> <p>Acquire biocontrol mechanisms;</p> <p>Know biocontrol specificity on microbe-plant interaction;</p> <p>Know pathogenic mechanisms of fungus pathogens;</p> <p>Acquire inducible resistance mechanism of biocontrol microbes.</p>	提问与作业 Questioning and Assignment
	<p>第三章 土传病害生物防治</p> <p>第一节 真菌病害生物防治</p> <p>第二节 细菌病害生物防治</p> <p>第三节 线虫病害生物防治</p> <p>第四节 抑病土壤的概念与原理</p> <p>第五节 存在的问</p>	8	多媒体授课 Multi-media teaching	课外作业 Homework	<p>掌握植物真菌病害生物防治技术与细菌病害生物防治技术；认识.利用非致病微生物防治病害的优缺点；掌握拮抗木霉菌生物防治的主要分子机理</p> <p>Acquire biocontrol</p>	提问与作业 Questioning and Assignment

	<p>题与改进措施</p> <p><b>Chapter 3</b> Biocontrol of soil-borne diseases</p> <p><b>Section 1</b> Biocontrol of fungal disease</p> <p><b>Section 2</b> Biocontrol of bacterial disease</p> <p><b>Section 3</b> Biocontrol of nematode disease</p> <p><b>Section 4</b> Concepts and principles of disease-inhibiting soil</p> <p><b>Section 5</b> Problems and mentve solution</p>				<p>techniques of plant fungal and bacterial diseases; Know advantages and disadvantages of biocontrol using non-pathogenic microbes; Acquire primary molecular mechanim of antagonisticTric hoderma biocontrol</p>	
	<p>第四章 叶部病害与产后病害生物防治</p> <p>第一节 叶部病害生物防治</p> <p>第二节 产后病害生物防治</p> <p>第三节 存在的问题与解决途径</p> <p><b>Chapter 4</b> Foliar disease and post-harvest disease biocontrol</p> <p><b>Section 1</b> Foliar disease biocontrol</p> <p><b>Section 2</b></p>	4	多媒体授课 Multi-media teaching	课外作业 Homework	<p>掌握.叶部病害生物防治技术；掌握.产后病害生物防治的技术</p> <p>Acquire foliar disease biocontrol techniques; Acquire post-harvest disease biocontrol techniques.</p>	<p>提高与作业</p> <p>Questioning and Assignment</p>

	<p>Post-harvest disease biocontrol</p> <p><b>Section 3</b></p> <p>Existing problems and solutions</p>					
	<p>第五章 植物害虫的天敌</p> <p>第一节 寄生性天敌</p> <p>第二节 捕食性天敌</p> <p>第三节 存在的问题与解决途径</p> <p><b>Chapter 5</b></p> <p>Natural enemy of plant insect pests</p> <p><b>Section 1</b></p> <p>Parasitic enemy</p> <p><b>Section 2</b></p> <p>Predatory enemy</p> <p><b>Section 3</b></p> <p>Problems and solutions</p>	4	<p>多媒体授课</p> <p>Multi-media teaching</p>	<p>课外作业</p> <p>Homework</p>	<p>掌握.寄生性天敌防虫机理；掌握.天敌人工繁殖和释放技样。</p> <p>Acquire insect protection mechanism of parasitic enemy; Acquire artificial propagation and releasing enemy techniques</p>	<p>提问与作业</p> <p>Questioning and Assignment</p>
	<p>第六章 昆虫病原生物</p> <p>第一节 害虫疾病流行的概念</p> <p>第二节 害虫流行病的影响因子</p> <p>第三节 昆虫病原细菌</p> <p>第四节 昆虫病原真菌</p> <p>第五节 昆虫病毒</p> <p>第六节 昆虫病原线虫</p> <p><b>Chapter 6</b></p> <p>Entomopathogens</p> <p><b>Section 1</b></p>	6	<p>多媒体授课</p> <p>Multi-media teaching</p>	<p>课外作业</p> <p>Homework</p>	<p>掌握昆流行病发生条件和机理；掌握.昆虫病原细菌、真菌、病毒杀虫机理因子；掌握昆虫病原线虫防虫机理。</p> <p>Acquire pest epidemic outbreak conditions and mechanism; Acquire insecticidal mechanism of entomopathogenic bacteria,</p>	<p>提问与作业</p> <p>Questioning and Assignment</p>

	<p>Concept of pest epidemics</p> <p><b>Section 2</b></p> <p>Impact factor of pest epidemics</p> <p><b>Section 3</b></p> <p>Entomopathogenic bacteria</p> <p><b>Section 4</b></p> <p>Entomopathogenic fungus</p> <p><b>Section 5</b></p> <p>Entomopathogenic virus</p> <p><b>Section 6</b></p> <p>Entomopathogenic nematodes</p>				<p>fungus, virus.</p> <p>Acquire insect protection mechanism of entomopathogenic nematodes.</p>	
	<p>第七章 杂草和鼠害生物防治</p> <p>第一节 杂草生物防治的天敌和病原微生物种类</p> <p>第二节 生物除草利用途径</p> <p>第三节 鼠害天敌和病原微生物的种类</p> <p>第四节 鼠害生物防治途径</p> <p><b>Chapter 7</b></p> <p>Weed and rodent pest biocontrol</p> <p><b>Section 1</b></p> <p>Enemy of weed biocontrol and pathogen species</p> <p><b>Section 2</b></p> <p>Weed biocontrol methods</p> <p><b>Section 3</b></p> <p>Enemy of</p>	4	<p>综述报告 (PPT汇报) PPT presentation</p>		<p>掌握.杂草生物防治的原理与难点; 了解病原微生物防治鼠害的途径。</p> <p>Acquire principles and difficulties of weed biocontrol; Know biocontrol methods of rodent pest by pathogenic microbes.</p>	<p>复习 Review</p>

	rodent pests and pathogenic microbes species <b>Section 4</b> Rodent pest biocontrol methods					
*考核方式(Grading)	<p>最终成绩由平时作业和期末考试成绩组合而成。各部分所占比例如下： 平时成绩包括课外作业、出勤率等，占 20%。主要考核学生平时对知识点的掌握程度、分析解决问题。 期末考试占 80%。主要考核对生物防治基本原理和关键技术的掌握程度。 Final course scores are co-calculated according to average scores of homework and final term written examination. The percentages of the two part in final scores are as follows: Homework scores account for 20%, Final term written exam scores account for 80%.</p>					
*教材或参考资料 (Textbooks & Other Materials)	<p>教材： 《植物病虫害生物防治学》，吴云锋主编，第一主编不是交大教师，中国农业出版社，2016 年 7 月，第二版，ISBN:978-7-109-21815-4, 该教材使用 1 届，中文教材，全国高等农林院校“十二五”规划教材。</p> <p>参考资料： 1. 《微生物生态学》，杨家新主编，化学工业出版社，2004 年 8 月 2. P.Narayanasamy. Biological Management of Disease of Crops. Vol 1. Characteristics of Biological Control Agent. Springer, 2013 3. M. J. Bailey, A.K. Lilley et al. Microbial Ecology of Aerial Plant Surfaces, Atheneum Press, 2006</p>					
其它 (More)						
备注 (Notes)						

备注说明：

1. 带\*内容为必填项。
2. 课程简介字数为 300-500 字；课程大纲以表述清楚教学安排为宜，字数不限。