

PROPOSAL FOR A JOINT

Entomology BS / Entomology MS Five-Year Combined-Degree Program

November 2017

Proposed by the Faculty of
the Entomology Department
College of Natural and Agricultural Sciences
University of California, Riverside
Riverside, CA 92521

1 Introduction

The Department of Entomology is proposing a new degree program that allows students to obtain a joint BS/MS degree through an integrated 5-year plan of study. The proposed program is within the framework established by UCR's Committee on Educational Policy and the UCR Graduate Council in 2007. This program prepares students for careers that require knowledge of entomology and for pursuing subsequent medical or doctoral degrees. The Joint BS/MS Program is open to UCR Entomology undergraduates only.

Participation in the joint degree program is initiated through an application for admission prior to the students' senior year. Students interested in this program should begin identifying potential research labs by the end of their junior year. This would allow students to begin thesis research early in their senior year by applying for entomology research credit (ENTM 197/199). The Graduate Division and the Department of Entomology do not provide financial support for students enrolled in this program.

Motivation: Quoting from the document "Establishment of Combined Programs at UCR"¹ "Combined programs can better attract top high school graduates, transfer students, and returning students, especially those interested in advanced degrees. Thus, UCR departments can expect a higher proportion of good undergraduates. Combined program students will be more inclined to stay at UCR for their Masters studies instead of applying to other institutions. Thus, UCR departments can better retain these students." UC has placed an increased emphasis on attracting transfer students from community colleges and the joint BS+MS program provides a unique opportunity for these students.

In sum, the program should attract top students into both the BS and MS programs.

¹Online at http://senate.ucr.edu/about/policies/establishment_of_combined_programs_at_ucr.pdf.

Method: To make it possible to complete both degrees in five years, the combined programs can allow double-counting of up to twelve credits of coursework done for the undergraduate degree towards the MS degree. The justification is that many UCR MS programs require up to twelve units of preparatory undergraduate coursework that may be necessary for undergraduates from other institutions but redundant for undergraduates coming from an appropriate UCR program. In the case of Entomology, all graduate students are required to take a 15 unit graduate core in lieu of taking the preparatory undergraduate courses. Students in the combined program will receive the requisite background in their undergraduate curriculum.

Relation to existing programs. The program consists of the regular Entomology BS program, with MS research initiated during the fourth year and completed in year five. Up to twelve units of undergraduate technical-elective coursework can be counted towards the MS elective requirements, so that the (Plan I) MS requirements can be met in a single additional year.

As the primary motivation for the program is simply recruitment of top students, the program involves no new courses or requirements.

Interrelation with other UC institutions. The proposed program would be unique among Entomology programs nationally. Consequently, beyond making the respective BS and MS programs more attractive, the program does not directly compete or inter-relate with other UCR or UC programs or institutions. It may indirectly recruit top students into the UCR (or other UC) life science PhD programs via the MS program.

Department that will administer the program. The BS and MS portions of the program will be administered by the Department of Entomology in the College of Natural and Agricultural Sciences.

Timetable for development. Based on current levels of participation in the Entomology BS program over the 2012-2017 period, we expect from 3-6 students to participate at the MS level per year.

Historical development of the field. There is a consistent strong demand for individuals with BS and MS degrees in Entomology in private industry, government and institutional service, and in research. Individuals with research experience are highly suited for these positions and are highly sought after for their ability to adapt to rapidly changing work environments. However, many of these positions do not require the extensive training provided by the Ph.D. In a recent survey of entomological non-academic jobs, we found that 65% explicitly required or preferred a Master's degree and 20% did not specify and only 15% required a PhD. Furthermore, a recent USDA report estimates are that the only 61% of the expected openings in agriculture, food, renewable natural resources, or the environment will be filled due to a paucity of

students graduating with degrees in these areas (Goecker et al 2015)¹. Students with BS and MS in Entomology would be excellent candidates to fill these positions. Thus, demand for, and awareness of, graduate-level training is increasing, making it a good time to leverage interest in the MS program and to facilitate entry into it.

Plan for evaluation of the program. The effectiveness of the program will be evaluated by monitoring the extent to which it increases the quality of students in the BS and MS programs. The metrics of evaluation will include GPA, graduation rates, job placement, and acceptance to advanced degree programs.

2. Program

Admission Criteria. The proposed 5-year joint BS/MS degree in Entomology will have two timeframes for admission, one of which is for conditional admission: 1) preliminary conditional admission as an incoming lower division student, and 2) admission as a junior meeting admission criteria. The Department of Entomology proposes to offer outstanding freshman the opportunity to apply for preliminary (conditional) admission into the joint BS/MS program in Entomology based on their undergraduate admission qualifications. This can serve as a recruiting tool as well as increase participation in the program. Official admittance would still require meeting the course and GPA criteria and satisfactory progress in the undergraduate major.

Preliminary Conditional Admission Criteria

- Intent to enroll in the UCR Entomology Program
- High School GPA > 3.6
- SAT I combined score > 1950

Official Admission Criteria

- Enrolled in the UCR Entomology Program
- 3.3 GPA in major (upper division classes only)
- 3.0 GPA overall
- The GRE requirement would be waived for admission to the BS/MS

Prospective BS/MS students are responsible for selecting an eligible faculty member to serve as their thesis advisor. The thesis research should entail at least 24 units of research over 6 consecutive quarters with one advisor. Alternatively, students may petition to work for no more than 2 quarters in another lab to either develop essential methodological skills or work on a related mini-project, followed by the remaining 4-5 consecutive quarters spent in the laboratory of their major advisor. At the time of application, students must provide written confirmation that the selected thesis advisor will not be on sabbatical leave during any quarter of the scheduled BS/MS project.

¹ Goecker, AD, E. Smith, JM Fernandez, R Ali, and R Goetz. 2015. Employment Opportunities for College Graduates in Food, Agriculture, Renewable Natural Resources, and the Environment United States, 2015-2020. <https://www.purdue.edu/usda/employment/> (Accessed 3 Nov 2017)

Eligible faculty mentors include any faculty within the Department of Entomology (Professor Emeritus, Distinguished Professor, Professor, Associate Professor, Assistant Professor, Cooperative Extension Specialist) or faculty with cooperating faculty status in the Entomology Department. If the proposed research member does not fall into one of these categories, the student will need to have a PI from Entomology serve as co-chair. The co-chair's responsibility is to assess the proposed and ongoing research and ensure that the research is relevant to the field of Entomology.

Joint BS / MS Degree Requirements. The BS program course requirements remain as currently outlined in the general catalog. Additional research unit requirements are outlined below and a sample program is provided.

The joint BS/MS requires a total of 36 units. A minimum of 24 research units (a combination of ENTM 197/199/199H and ENTM 297/299) over 6 consecutive quarters is required. Students receive credit towards this requirement by completing ENTM 199/199H as an undergraduate senior and ENTM 297/299 as a graduate student. A maximum of 3 quarters of ENTM 199/199H and a minimum of 3 quarters of ENTM 297/299 can be applied towards the BS/MS program. As is the case for all Entomology graduate programs, the departmental seminar, ENTM 250, is required during all quarters of the MS portion of the program, however it does not count toward the 36-unit requirement. Remaining course requirements can be fulfilled by taking a minimum of 6 units of graduate courses and graded 2-unit graduate seminars in ENTM or relevant departments (e.g. EEOB, STAT). Up to 6 units of upper division 100 level ENTM courses may be taken during the MS portion of the program. No more than 12 units earned prior to matriculation to graduate status (including ENTM 199/199H) can be applied toward the MS degree requirements.

During the MS portion of this program, students must maintain a grade-point average (both overall and in the major) of at least 3.0 for all course work, both cumulatively and for each quarter of enrollment. If the student's GPA falls below 3.0 (for either the overall or major), he/she may be dropped from the program.

Additional requirements include participation in Graduate Student Seminar Day and the completion of a thesis, with an oral presentation to, and approval of, a 3-member MS Thesis Committee. Students must meet with their committee prior to and throughout the master's year to discuss the project and its progress. The written thesis must be submitted to the MS Thesis Committee by Week 7 of the student's sixth quarter in the joint BS/MS program. Any deviation from this plan, such as a disruption in enrollment for 1 or more quarters, may cause the student to be dropped from the program.

Sample BS/MS Degree Program. The following table outlines a sample program for a student in the proposed joint BS/MS in Entomology. Students would average 15.3 units per quarter in the BS portion of this proposed joint degree program.

PROPOSED JOINT BS/MS

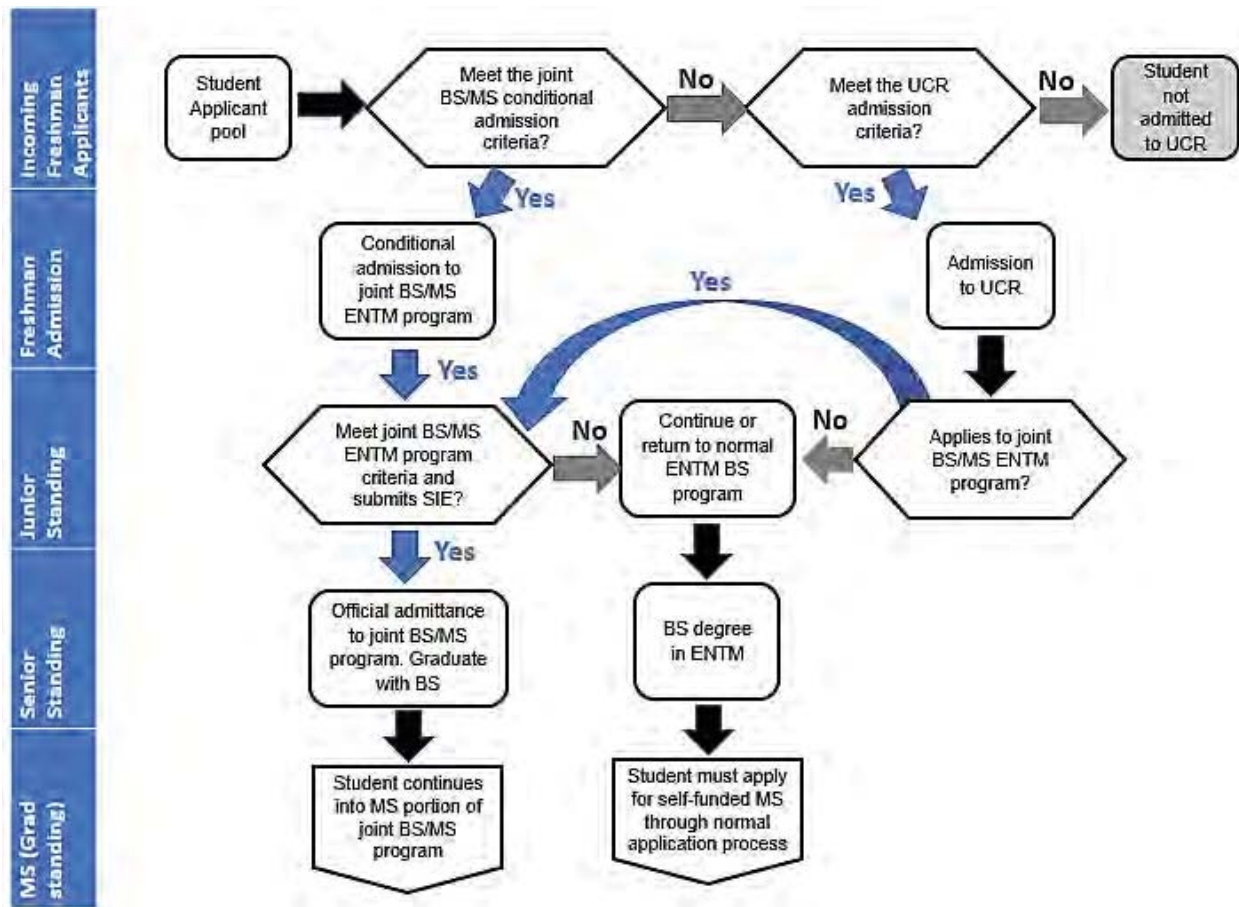
Freshman	Courses	Fall	Winter	Spring
	BIOL 005A, BIOL 05LA or BIOL 020; BIOL 005B		4	4
	CHEM 001A, CHEM 001B, CHEM 001C, CHEM 01LA, CHEM 01LB, CHEM 01LC	4,1	4,1	4,1
	ENGL 001A, ENGL 001B	4	4	
	MATH 007A or MATH 009A, MATH 007B or MATH 009B	4	4	
	Humanities/Social Sciences	4		4
	Freshman Total Units	17	17	13
Sophomore	Courses	Fall	Winter	Spring
	BIOL 005C	4		
	Biology/Entomology Electives		4	
	CHEM 008A and 008LA, CHEM 008B and 008LB, CHEM 008C and 008LC	4	4	4
	PHYS 02A, PHYS 02LA, PHYS 02B, PHYS 02LB, PHYS 02C, PHYS 02LC	4,1	4,1	4,1
	Humanities/Social Sciences, STAT 100A	4	4	5
	Sophomore Total Units	17	17	14
Junior	Courses	Fall	Winter	Spring
	BIOL 102	4		
	BIOL 107A, ENTM 173/BIOL 173	4		4
	ENTM 100/BIOL 100	4		
	ENTM 107		4	
	Biology/Entomology Electives [§]		7	8
	BCH 100, ENTM 19X	4	2	
	Humanities/Social Sciences		4	4
	Junior Total Units	16	17	16
Senior	Courses	Fall	Winter	Spring
	ENTM 180			2
	ENTM 199/199H* [§]	2	2	2
	Biology/Entomology Electives [§]	8	8	8
	Humanities/Social Sciences, ENGL 001C	4	4	
	Senior Total Units	14	14	12
5th Yr/MS	Courses	Fall	Winter	Spring
	ENTM 29X*	5	5	11
	Entomology Electives (200 level, includes ENTM 2-unit seminars)		6	
	Entomology Electives (100 or 200 level)	6		
	ENTM 250	1	1	1
	5th Yr Total Units	12	12	12

* Only 24 total research credits (199/199H + 29X) will count toward the MS degree

§ Up to 12 units of 100 level ENTM electives and 199/199H research credits will double count towards the BS and the MS degree requirements. This 12 credit limit is similar to BCOE BS/MS program.

Application Details. Interested students must submit a Statement of Interest and Eligibility (SIE) before the start of their final undergraduate year but are encouraged to apply as early as possible. This SIE would provide documentation of meeting the eligibility criteria, identify the thesis advisor and include a very brief description of the proposed research topic.

Projected Flowchart of Student Applicants. The following flowchart illustrates how ENTM students may move into and out of the joint BS/MS program in ENTM. Students must maintain academic standards (i.e. GPA > 3.3 in major and 3.0 overall) or they will not be permitted to remain in the program.



Catalog entry

Joint Entomology BS + Entomology MS Program. The College of Natural and Agricultural Science offers a combined five-year BS / MS program in Entomology, designed to allow successful UCR Entomology BS graduates to complete the Master of Science degree in Entomology in one year. Applicants to the Entomology Joint BS/ MS program should apply by the end of their junior year, provided that the student was a UCR Entomology BS student with cumulative GPA at least 3.0 overall and 3.3 in the

Entomology major. The application to the Joint BS/MS program must include at least two recommendation letters from UCR Academic Senate faculty members, one of which should include the prospective thesis advisor and at least one of which must be Entomology faculty. Matriculation into the graduate portion of the joint degree program occurs in the Fall term following senior year, provided: (a) the MS application is accepted, (b) throughout senior year, the student is an Entomology BS major with cumulative GPA 3.0 or higher, (c) by the end of senior year, the student completes the Entomology BS degree requirements.

Incoming freshman students who are applying to the Entomology BS program may simultaneously apply for preliminary admission into the joint degree program provided their high-school GPA is at least 3.6, their SAT-I combined score is at least 1950, they satisfy the Entry-Level Writing requirement prior to matriculation, and they have sufficient math preparation to enroll in MATH 7A (Calculus for the Life Sciences) or 9A (First-Year Calculus Part 1) upon arrival. Preliminary conditional admission status is maintained as long as the student is an Entomology BS student in good standing with a cumulative GPA of at least 3.0. Preliminarily admitted students would still need to apply for full admission by the end of their junior year as described above.

Up to 12 units of 100 level coursework taken as a UCR undergraduate to be counted towards the 36-unit requirements of the MS Courses that may be double-counted are only those that are eligible to be counted as ENTM 199/199H research credits or 100 level electives in the BS requirements (e.g. ENTM 106, course between ENTM 109 up to ENTM 162).

3. Projected need, resource requirements, student support

As noted in the introduction, in keeping with the framework established by CEP and Graduate Council, this combined program is primarily a recruitment tool, intended to leverage the increasing interest in graduate education to attract top freshmen into the BS program, and to attract top UC Riverside BS students into the MS program.

In the BS program, the prospect of entering the program at year three and completing both the BS and MS in a total of five years should attract students that are highly motivated and more likely than average to make it through the program. While we do have a number of students who choose to study Entomology as entering freshmen, a larger proportion of our undergraduates discover the field after their first year at UC Riverside. The combined BS/MS program will increase the visibility of the undergraduate major to entering students. It will also raise the visibility of the major to life science students who are already enrolled but might have been unaware of the prospects offered by the discipline. We expect that the opportunity of earning a joint BS/MS in three years will be highly attractive to community college transfer students as well. Enrollment of community college students has recently become an urgent priority for the University of California. Combined with ongoing increases in admissions standards, this should increase both retention and the overall quality of the students.

In the MS program, we anticipate growth in combined-program enrollment initially of only a few students per year. However, a similar program in life sciences at UC San Diego has more than 100 students enrolled. Rapid growth in the proposed program would be welcome and would significantly increase overall enrollment in the Entomology MS program. Although we consistently receive a small number of applicants for our Plan 1 MS program, potential major professors accept a very small number of students because of the lack of support available to them. There would be no expectation of support for the participants in the combined BS/MS program. Major professors could provide support funding in the fifth year if they chose to do so. In addition, if at some point in the future, funding opportunities emerge from campus, college, or Graduate Division sources for MS students, then fifth-year BS/MS students would be eligible. If a student decided to continue on for a Ph.D., then full support packages would be provided. Each student accepted into the combined program is likely to be near the top of the applicant pool and would be welcomed into the laboratories, particularly if there was a likely prospect of timely completion of the degree and continuation through the Ph.D.

In short, the main effect of the program should be to increase the quality of students in the BS and MS programs, and achieve a modest increase in enrollment levels. Similarly, it should increase the employability of students produced by the BS and MS programs, and help meet the increasing demand for Entomology students with graduate degrees.

Resources. Note that each student in the combined program is essentially just a regular student (in the BS program, or, in fifth year, in the MS program), and requires the same resources as a regular student at the same level. Also, because of the highly selective nature of the admissions requirements, BS and MS enrollments will be modestly affected, at least initially. Currently, all of the undergraduate entomology majors are required to complete at least four and up to six units of undergraduate research in Entomology. This requires them to become associated with faculty and their laboratories. Thus, the program requires no change in faculty, courses, or resources such as library, computing, equipment, space, etc. Likewise, the program requires no change in levels or mechanisms for student funding.

The program does require minor administrative support. During the BS portion of this program, students will be advised by the CNAS Undergraduate Academic Advising Center as normal for pursuance of a BS in Entomology. The administration of the program at the undergraduate level requires processing applications for preliminary acceptance, tracking preliminarily enrolled students, and identifying and informing students who will be eligible to apply at the end of their junior year. The administrative functions for admission to the Entomology Graduate program are already performed by the department Instruction and Student Affairs Committee; this committee will also be responsible for administering the BS/MS program with continued support from the CNAS Graduate Student Affairs Center, which will have to track which MS students are in the combined program and account for the double-counting allowance.

Finally, only to the extent that existing resources allow, BS students with “preliminary conditional admission” status will be given additional advising appropriate for MS-bound students. The department faculty advisors for undergraduate students and for graduate students are also members of the Instruction and Student Affairs Committee, which will serve to coordinate advising needs.

4. Changes in Senate regulations

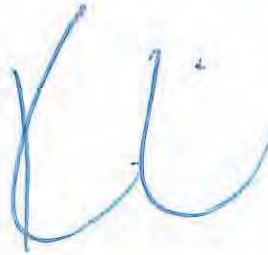
No changes in Senate regulations are required.

To: CNAS Executive Committee

From: Kathryn Uhrich
Dean, CNAS

Date: October 2, 2017

RE: Five-year BS/MS degree program in Entomology



The Department of Entomology has proposed a valuable degree program that allows students to obtain a joint BS/MS degree through an integrated 5-year plan of study. The joint degree program will provide an efficient and cost-effective academic path offering a high level of technical proficiency for students interested in careers within a variety of areas involving insects and insect pest control. This program is expected to serve as a potential model for other programs within the college to efficiently provide academic training and preparation for non-academic careers in technical fields. Moreover, the program offers unique opportunities for qualified students from community colleges to transfer into the program, complete the BS/MS degree and efficiently move into their professional careers.

I fully support this proposed BS/MS degree program.

Interoffice Memorandum

DATE: 25 September 2017

TO: Dr. Kathryn Uhrich, Dean
College of Natural and Agricultural Sciences

FROM: Dr. Richard A. Redak, Chair
Department of Entomology



SUBJECT: Proposed new BS/MS program in Entomology

The faculty of the Department of Entomology have developed a proposal to offer a joint BS/MS degree program in Entomology. The details are provided in the accompanying attachment. The proposed program would enable students to earn a BS and a research MS (Plan 1) degree in five years. Highly qualified undergraduates would be conditionally admitted as incoming students and formally admitted at their junior year based on formal graduate admissions criteria. In addition, the program would be available to community college transfer students who apply and meet the admissions criteria. We believe, based on surveys of our current undergraduate majors, that the joint degree program will be highly attractive to life science undergraduate students and could be a very important to attracting high quality and motivated community college transfer students.

Although there are only two joint degree programs (both in the Bourns College of Engineering), the appropriate Academic Senate Committees have criteria and processes in place for approval of new proposals. The process for approval of new graduate programs requires a letter of support from the College Dean before the proposal goes to the College Executive Committee and then on to the appropriate Academic Senate Committees. Consequently, we ask that you evaluate the potential benefits of the proposed joint degree and provide a letter of support for our efforts. That letter and the attached document would then be forwarded by your office to the CNAS Executive Committee.

Thank you very much for your support.

Rachel Alvarez

From: Richard Redak <redak@ucr.edu>
Sent: Wednesday, October 4, 2017 3:38 PM
To: Rachel Alvarez
Subject: Re: Proposed new BS/MS program in Entomology

Unanimously in favor (20 yes, 0 no, 0 abstain, 9 unavailable [1 Div Dean, 1 Sabbatical, 5 travel, 2 MIA]). Meeting was held June 23, 2017.

Rick Redak
Professor & Chair
Department of Entomology
University of California
Riverside, CA 92521
951-827-7250

On Tue, Oct 3, 2017 at 4:25 PM, Rachel Alvarez <rachel.alvarez@ucr.edu> wrote:

Rick,

Kathryn has completed the letter of support. I've been advised that we need something to indicate the department has voted on and recommends this program ("x were present, x voted, x approved"). Once we receive that info, I can forward to CNAS Executive Committee.

Rachel

From: Richard Redak [mailto:redak@ucr.edu]
Sent: Monday, September 25, 2017 2:04 PM
To: CNASDEAN <cnasdean@ucr.edu>; Rachel Alvarez <rachel.alvarez@ucr.edu>; Agdean <agdean@ucr.edu>
Subject: Proposed new BS/MS program in Entomology

All please see attached documents.

Rick Redak

Professor & Chair

Department of Entomology

University of California

Riverside, CA 92521

[951-827-7250](tel:951-827-7250)