

TEXAS TECH UNIVERSITY

*MASTER'S OF SCIENCE DEGREE IN
BIOTECHNOLOGY*

APPLIED SCIENCES TRACK

*Biotechnology
Student
Handbook*

2013/2014

MESSAGE FROM THE DIRECTOR



The start of any new semester is always an exciting time, not only for students but also for faculty and staff. In your case, the occasion is no doubt even more exciting, as you are beginning a completely new program in what for many of you is a completely new university (and perhaps even a new country). We are very pleased indeed, given the many choices you may have had, that you have chosen to pursue your graduate education in biotechnology at Texas Tech University. We are delighted to have you here and are dedicated to making your experience here both enjoyable and productive. We hope that you will feel free to contact us for advice or any time you encounter problems of any sort.

One of the first choices you will encounter is the selection of the two elective courses called for in the first-semester curriculum. One of the features of our program of which we are very proud is the wide array of elective courses available, designed to make the program as flexible as possible and to give the students a chance to tailor the curriculum to meet their needs. Dr. Tripathy and I will be more than happy to assist you in the selection of these electives.

I also want to point out that a graduate degree program is very much a two-way street and thus, no matter how hard the faculty and staff work in preparing courses and presenting material, real success cannot be achieved unless the students work hard and are equally dedicated to achieving the goals of the program. The subjects that must be mastered in order for a student to succeed in this highly competitive area are demanding and will require hard work at the highest level. However, I am confident that you will find the effort worthwhile and satisfying and that your efforts will be rewarded at the end of the program when you find yourselves well qualified for employment in the exciting and growing field of biotechnology.

David B. Knaff, Ph.D.

Director
Center for Biotechnology and Genomics

Paul W. Horn Professor
Department of Chemistry and Biochemistry

MESSAGE FROM THE GRADUATE ADVISOR



Dear Students:

I welcome you to the Center for Biotechnology and Genomics. I am glad you decided to join the graduate program in Biotechnology at Texas Tech University. I am happy to help you as your graduate advisor for the next two years.

Our program draws in students from diverse backgrounds creating a unique and challenging experience. Over the next two years, our goal is to provide you with the most up to date knowledge and training in the field of Biotechnology. Many of our students after

graduation are working in renowned institutes and industries or furthering their studies in a doctoral program. I hope that you all will follow a similar path to success and I am here to provide guidance and support to see that your dreams do come true.

Thank you for making the Master's program in the Center of Biotechnology and Genomics your home. I wish each one of you good luck.

If you have any questions please do not hesitate to see or contact me.

Jatindra Nath Tripathy, Ph. D; M.BA.
Graduate Advisor

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We would like to acknowledge The Department of Biological Sciences at Texas Tech University for allowing portions of their graduate student handbook to be used as a model for some of the sections contained in the Biotechnology student handbook.

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MISSION STATEMENT

Biotechnology and genomic research is a major focus at Texas Tech University. The Center for Biotechnology and Genomics is designed to capitalize on this strength by facilitating research partnerships between highly productive research teams that extend across departmental boundaries. These partnerships are established to bring together complementary research efforts in biochemistry, molecular biology, and genetics. The Center for Biotechnology and Genomics is an integrated component of the international biotechnology and genome research community. Strong cooperative ties have been forged with academic institutions, federal laboratories, and companies in Texas and throughout the region.

The Center provides:

- ✿ Core Facilities that offer instrumentation, support and training in various aspects of modern biotechnology.
- ✿ Multidisciplinary graduate studies in Biotechnology and Genomics leading to a Master of Science degree in Biotechnology which is designed to prepare students for technical positions in the rapidly growing biotechnology industry.
- ✿ A joint MS/JD degree, a program in conjunction with the Texas Tech Law School
- ✿ Membership composed of a diverse group of faculty with multiple sources of funding from the academic campus and the HSC medical campus.

MASTER'S OF SCIENCE DEGREE IN BIOTECHNOLOGY

The master's program is a **two-year program**, jointly administered by the General Academic Campus and the Health Sciences Center of Texas Tech University. Students may pursue either the Applied Sciences track (TTU) or the Bio-Medical track (TTUHSC). The Applied Sciences track is a 21 month curriculum consisting of a **minimum of 22** credits in the first year, and **18-24** credit hours during the summer sessions and the second year. Students have the flexibility to do either a thesis or non-thesis degree plan (i.e., internship or non-thesis capstone experience); however, students must register for **9** credit hours for research or internship in **both** the fall and spring semesters regardless of any summer hours taken.

Applied Sciences Overview

The Applied Sciences track, administered by the TTU General Academic Campus, is designed to prepare students for a career in biotechnology. Students devote their first year to course work, which is comprised of a mixture of required core courses (lectures and laboratory) and selections from a broad spectrum of electives. These electives allow students to gain expertise in molecular biology, biochemistry, cell biology, animal science and plant science. There are **three options** for the second year of the program. For the first two options, the second year of the program involves intense (hands-on) practical training, with students choosing between an internship or thesis for the training experience. There are limited numbers of internships and research assistantships available and the number varies from year to year.

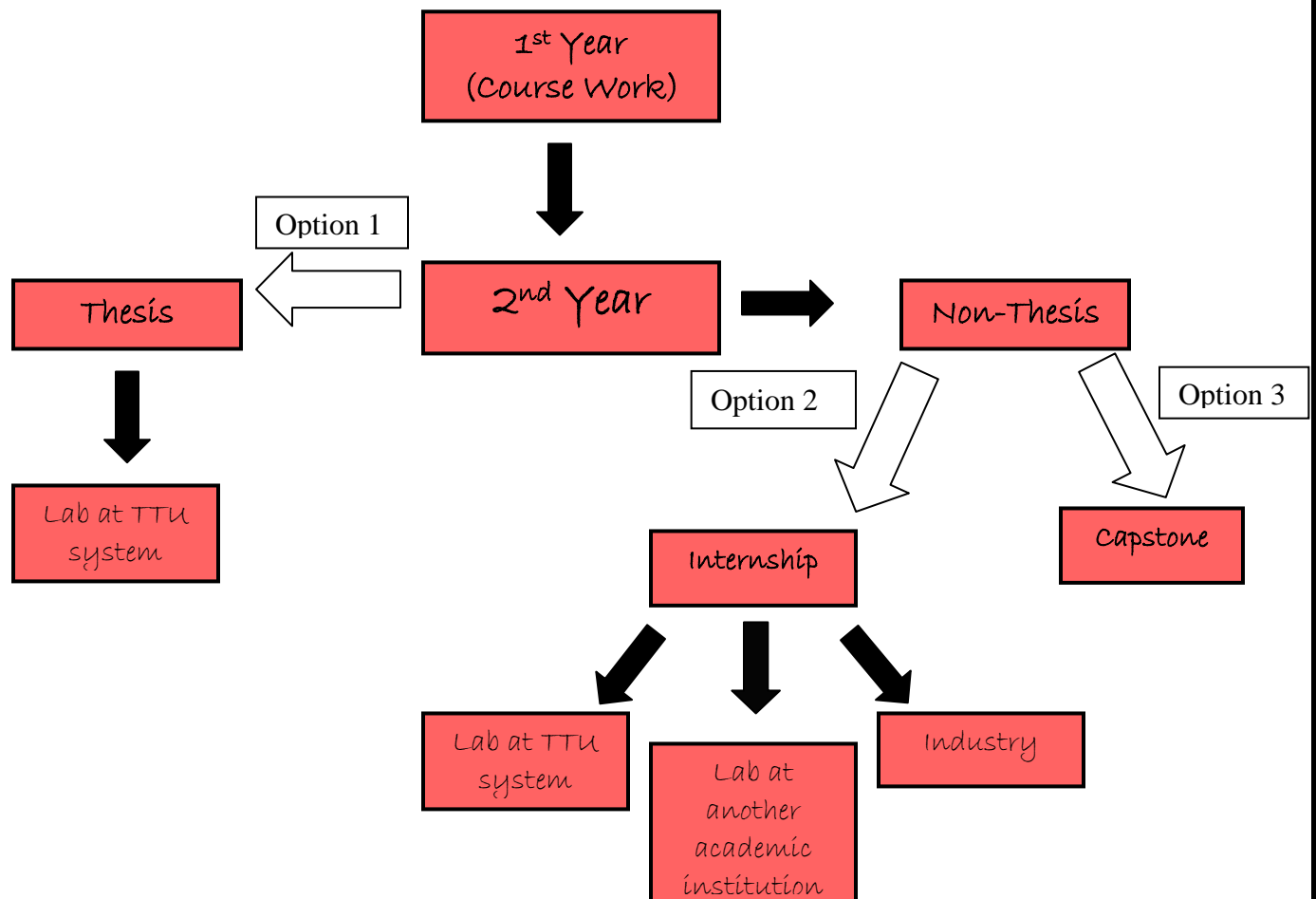
These are highly competitive options with many factors determining availability of and eligibility for these positions.

- ✿ **Option 1** involves a one-year thesis-based research experience in a laboratory at Texas Tech (or, in some cases, at the Texas Tech Health Sciences Center), where a Texas Tech faculty member with scientific expertise in a field of particular interest to the student supervises the research training. This option may take longer than one year to complete, as it depends on the completion of a research project, an oral defense of the research to a committee of 3 faculty members and submission of a written thesis.

- ✿ **Option 2**, which does not involve a written thesis, is a one-year internship. Internships are available in private-sector biotechnology companies, in non-profit research foundation laboratories, in state and federal government research labs, or in selected university labs (including some at Texas Tech). Our faculty assists students in finding internships that are interesting and challenging. Students can apply for, and choose any company in the U.S. current and former students have enjoyed internships in California, Missouri, Tennessee, and Texas. Students must register for internship credit and

successful completion is evaluated by a written description and a comprehensive oral examination (including all coursework and experience gained during the internship) by a committee of 3 faculty members.

- ❖ **Option 3** involves neither an internship nor a research-based thesis, but instead involves additional, advanced course work during the second year, chosen in an academic area of concentration like informatics/computer science, engineering, microbiology, biochemistry or business. For example, for students interested in eventually moving into management positions in the Biotechnology industry, a variety of business courses in management and related areas are available. Planning the class schedule for this option should be carefully discussed with the Graduate Advisor as early as possible to ensure as many classes will be available for registration as possible. Success in this track will be determined by class grades and an in-depth written paper on an appropriate topic in a capstone course. As is the case for all non-thesis M.S. degrees at Texas Tech, along with a comprehensive final oral presentation of this scholarly research, an examination is required.



GENERAL PROGRAM GUIDELINES

Biotechnology Graduate Student Orientation

The **week before classes begin** in the fall semester, the Director of the Center and other faculty will meet with the graduate students to communicate important news and information. Attendance at this orientation is **mandatory**.

Academic Standing in the Program

A student who is on schedule for completion of the degree program (see the accompanying checklist) and who maintains a **GPA of at least 3.0** is considered in good academic standing. **No course in which a grade of “D” or “F” is received can be used for credit towards the degree.**

At the end of the 1st semester (usually in December-January) and again after the 1st year (usually in May), **all graduate students are required to meet with the Graduate advisor** to discuss various aspects of their progress toward the completion of their degrees. The advisor will use these meetings to assess the progress and academic standing of each graduate student. Students who are not making adequate progress or who fall from good academic standing will be referred to the Director of the Center for review and possible loss of teaching and research assistantship opportunities or dismissal from the graduate program.

Deadlines and Time Limit

Although every effort will be made by both the Graduate Advisor and the Major Advisor to make the student aware of various University and Department regulations and deadlines, **it is ultimately the student’s responsibility to see that these regulations are adhered to and that the deadlines are met (see the checklists on pg.15-16).** All work applied towards a Master’s degree must be completed in a timely manner.

Degree Plan

All Master’s students must submit a “Program for the Master’s Degree and Admission to Candidacy” form to the Graduate School. This form, which must be signed by the Graduate Advisor, lists all required courses. It should be submitted as soon as possible but **no later than the second semester** of enrollment in the Master’s Degree program. The Graduate Catalog should be consulted for any additional requirements that must be met. Subsequent changes in the degree plan must also be approved by the Graduate Advisor and filed with the Graduate School.

Graduation: Additional Requirements

During the semester of intended graduation, a “Statement of Intention to Graduate” must be filed at the Graduate School, and payment of all required fees must be posted to the student’s University bill. Since exact dates for these requirements vary with the semester, the current “Graduation Deadlines” posted on the Graduate School website should be consulted.

Maximum Allowable Graduate Hours

Graduate students who are not making timely progress toward completion of their degree are subject to termination by the Dean of the Graduate School. Students beyond the maximum allowable graduate hours may be required to pay out-of-state tuition, regardless of residence status. The maximum time allowed for completing a Master's degree is six years.

Enrollment

All graduate students are required to register for appropriate courses in **every** semester or summer session in which they expect to receive assistance, use the facilities of the University and faculty time, take comprehensive examinations, **and in the semester they plan to graduate**. If enrollment is interrupted during the summer, the student may be required to pay additional fees upon re-enrollment in the following fall semester.

Competitive Scholarship:

In order to be eligible for a competitive scholarship, graduate students must maintain an overall GPA of 3.0 each semester and a final grade of B or higher in the two required courses of the first year of the program: BTEC 5338 (Methods in Biotechnology) and GSBS 5373 (Genes).

Research Symposium

Students should present their research outcome in the third week of December.

Graduate School Poster Competition

All graduate students are required to participate in the Graduate School Annual Poster Competition. This is one of the requirements for graduation.

FIRST YEAR OF PROGRAM

Fall (1st semester):

- ✿ **BTEC 5338 (Methods in Biotechnology) and GSBS 5373 (Genes)** are required courses for the first fall semester of enrollment in the graduate program. Failure to take a course at the appropriate time might result in dismissal of the student from the program or the loss of opportunities for internships or teaching assistantships. **In addition** to these courses, students need to choose 2 electives from the Approved Fall Elective list. Permission from the Graduate Advisor is needed to take an elective not found on the list. Students must register for a minimum of **12 credit hours** in the Fall semester.
- ✿ **Leveling courses.** Incoming graduate students with educational gaps in their background may be required to take certain courses in order to fill these gaps. However, these courses cannot be used to satisfy degree requirements.
- ✿ **Languages and research tools.** The Master's in Biotechnology **does not** have a general requirement for either a foreign language or a research tool subject (for example, computer programming) for the graduate degree.

Spring (2nd semester):

- ✿ **GBTC 5101 (Ethical Conduct), GBTC 6202 (Biomedical Informatics) and BTEC 5100 (Advanced Topics: Scientific Communication)** are required courses for the second semester of enrollment in the graduate program (spring). BTEC 5001 is a "Special Topics" course which focuses on improving written and oral communication skills from a scientific point of view. Failure to take a course at the appropriate time may result in dismissal of the student from the program or the loss of opportunities for internships or teaching assistantships. **In addition** to these courses, students need to choose 2 electives from the Approved Spring Elective list. Permission from the Graduate Advisor is needed to take an elective not found on the list. Students must register for a minimum of **10 credit hours** in the Spring semester.

At the end of the first year (Fall and Spring semesters), students must have completed a minimum of 22 credit hours of academic course work and must have a cumulative GPA of 3.0 or greater in order to be considered for a laboratory research experience in the second year of the program. Any exceptions, if the circumstances warrant, are at the discretion of the Graduate and Major Advisors and requires specific approval.

Adequate academic preparation is absolutely required for an intensive second year research experience and all internships (internal or industrial) and thesis projects must be approved by the Director and Graduate Advisor.

SECOND YEAR OF PROGRAM

For the 2nd year of the Biotechnology Master's program, students have a choice between doing a **non-thesis internship** or **capstone course experience**, or a **thesis research project**. During the month of December, students must participate in short oral presentations summarizing their research. Students must be registered in the semester in which they graduate (even in the summer), with credit requirements depending on the semester and program option (i.e., internship or thesis). See the graduate advisor regarding registration requirements.

NON-THESIS MASTER'S PROGRAM

The non-thesis Master's degree program in Biotechnology (i.e. an Internship or advanced coursework, culminating in a Capstone course) is designed to make a substantial contribution to the intellectual development of the student. The internship option is designed for students whose career plans are best served by direct industrial experience and which do not require a written thesis as part of the training experience. To earn the non-thesis Master's degree, the student must complete **at least 40 hours** of course credit beyond the Bachelor's degree. **An internship may be pursued for 9-12 months after successfully completing 22 credit hours in the first year and at least 18 additional credits must be applied toward an internship in Biotechnology or in coursework offering an emphasis in an area linked to Biotechnology.** Students doing an internship in a lab at Texas Tech System should register for 6 hrs. of internship in their graduating semester and the rest in BTEC 7000. Students doing internships outside should register in BTEC 6101 (Internship).

Advisory Committee

Typically for non-thesis students, the advisory committee consists of three members, usually a combination of Dr. Knaff, Dr. Tripathy, Dr. San Francisco and the faculty mentor from the lab where the internship is being done.

Summary of Internship Experience

In consultation with his or her Major Advisor and Advisory Committee members, the student will write a summary of the internship experience. Generally, a document of 10 pages in length is sufficient. Details and information on the format may be obtained from the Graduate Advisor. The student will then make an oral presentation of the experience, which is open to the public, describing their experience and presenting his or her work to the Advisory Committee and all in attendance. This is typically followed immediately by the Final Oral Examination (see below).

Summary of Capstone Course

Students pursuing a M.S. degree based entirely on advanced coursework during the second year are required to meet with the Graduate Advisor to select the additional elective courses to be taken during the second year. The Capstone course, which the student must take during the Spring Semester of the second year, is designed to integrate the knowledge gained by the student from earlier courses by applying this knowledge to a

non-laboratory research project that focuses on an important contemporary issue in modern biotechnology.

Final Oral Examination

Each non-thesis Master's student must pass a final oral comprehensive examination before earning a Master's degree. This exam has both written and oral components and is based both on the student's course work and either the Internship or Capstone project. Students should be aware that the results of the examination must be reported to the Graduate School approximately four weeks prior to graduation (consult the "Graduation Deadlines" posted on the Graduate School website for the exact date, which varies somewhat from one year to another). The date for the examination will be set after discussion between the student and all members of the Advisory Committee, keeping in mind the Graduate School deadline. **Students must submit the written portion of this exam to all members of the Advisory Committee at least two weeks before the scheduled date for the oral portion.** A spiral-bound copy of the report is due after any correction suggested by the committee. Students should also understand that faculty members might not be available for an examination during the summer.

The final oral examination is administered by the student's Advisory Committee. The Committee members will use the question-and-answer format to assess the extent of the student's knowledge and understanding of the basic scientific principles he or she has been exposed to through course work, readings and internship experiences. The student is expected to deliver responses that are concise and well-reasoned. As soon as possible after the examination, the head of the Committee will report the results to the Dean of the Graduate School. Satisfactory performance by the student is indicated by a majority affirmative vote of the Committee members. A student who fails the examination may repeat it once, but only after an interval of four months or more. In the event of failure, the Committee will provide the student with a written summary of the perceived deficiencies and corrective actions that need to be taken before making the second attempt.

THESIS MASTER'S PROGRAM

The thesis Master's degree program in Biotechnology is recommended for most students interested in a career in science that involves independent research. Participation in thesis research provides sophistication and insight into the workings of science beyond that available in formal course work, facilitates the eventual pursuit of doctoral studies, and may also enhance employability through development of research skills. The student must complete at least **40 hours** of course credit beyond the Bachelor's degree, **6 hours** of which must be thesis research. At least **22 hours** are required in academic course work.

Advisory Committee

Typically during the student's first summer session after the completion of all required coursework, but no **later than the first semester of the second year** of enrollment in the Master's degree program, the student will form an Advisory Committee in consultation with his or her Major Advisor. This Committee is composed of **three** (occasionally more)

Graduate Faculty members, one of them being the Major Advisor who will serve as the Chairperson of the Committee. The Advisory Committee will advise the student and assess his or her progress towards the Master's degree. The Committee approves the thesis research proposal and conducts the final oral examination and defense of thesis.

Occasionally, it may become necessary for a student to change the composition of his or her Advisory Committee:

- 1) In the case of a proposed change other than the Major Advisor, the process is initiated by the Major Advisor. The Graduate Advisor must be informed of the change. The student must also show courtesy to the Committee member being replaced by letting him or her know about the plans for change and reasons for the decision. It may be that a misunderstanding has occurred that can be resolved, so that a change will not be necessary.
- 2) A student proposing to change his or her Major Advisor should inform the current Major Advisor directly or through the Director of the Center. In either case, the Major Advisor will be given an opportunity to express his or her opinion and make an attempt to work out problems that may have precipitated the need for such a change. Some discussion with the Director of the Center may be required before a final decision is reached.
- 3) In extreme cases of disagreement, the Major Advisor or Committee member has the right to file an official grievance, which will be conducted according to normal grievance policies of the University.
- 4) If a degree plan has been filed prior to a change in the composition of the Advisory Committee, a "Title or Committee Change Form" must be completed, signed by the Graduate Advisor, and submitted to the Graduate School.

Master's Thesis

The Master's thesis represents original research conducted by the student under the direction of his or her Major Advisor and Advisory Committee. It is to be written clearly and concisely in correct English. The required format for the thesis is described in the "Thesis/Dissertation Formatting Guidelines," which is available as a PDF file on the Graduate School website.

After being approved by the Major Advisor, a completed version of the thesis (not necessarily the final one) will be given to all other members of the Advisory Committee at least **four weeks** prior to the anticipated date of the final oral examination and defense of thesis. Within **one week**, the Committee members will determine whether the thesis is defensible. "Defensible" means that it is structurally sound, based on the criteria for articles in a quality journal in the field of study, and that the Committee is able to assess the validity of the presented research. "Defensible" does not mean that the Committee members approve of the scientific content of the thesis or will pass the student in the thesis defense. If the thesis is judged defensible, then the defense can go forward as scheduled. If one or more Committee members do not find the thesis to be defensible, or if they perceive any major flaws in the methodology, analysis or interpretation of data, these problems should be communicated to the Major Advisor and graduate student within the one-week period. Any disputes that cannot be resolved will be taken for

arbitration first to the Graduate Advisor and then, if necessary, to the Director of the Center.

Final Oral Examination and Defense of Thesis

Before earning the M.S. degree, each thesis Master's student must pass a final oral examination and defense of thesis. After the Advisory Committee has judged that the thesis is in a defensible form, the graduate student may then set a date for the examination and defense with the approval of all Committee members, which must be scheduled at least **three weeks** in advance. Thus, the student should plan to deliver the Major Advisor-approved version of the thesis to the other Committee members at least four weeks before he or she intends to defend. In scheduling the examination and defense, students should be aware that the final, Committee-approved copy of the thesis, signed Thesis-Dissertation Approval Form, and Electronic Thesis-Dissertation (ETD) Signature Form must be turned in to the Graduate School within **two weeks** of the defense or **no later than the date** in the "Graduation Deadlines" posted on the Graduate School website. A hard-bound copy should also be submitted to the Center. Sufficient time should be allowed before this deadline to make all necessary revisions to the thesis. Students should also understand that faculty members may not be available for a thesis defense during the summer. A hard-bound copy of the thesis is to be submitted to the center after the thesis is officially accepted by the university.

The examination and defense is administered by the student's Advisory Committee. The student is expected to deliver a concise and well-organized presentation covering the salient points of the thesis, stressing its contribution(s) to scientific knowledge. This presentation and following question-and-answer session is open to all faculty, graduate students and others who care to attend. Afterwards, the student will meet privately with the Advisory Committee for a more in-depth discussion of the merits and weaknesses of the thesis and further oral examination. As soon as possible after the examination and defense, the Major Advisor will report the results to the Dean of the Graduate School. Satisfactory performance by the student is indicated by a majority affirmative vote of the Committee members. A student who fails the examination and defense may repeat it once, but only after an interval of four months or more. In the event of failure, the Major Advisor will provide the student with a written summary of the perceived deficiencies and corrective actions that need to be taken before making the second attempt.

Research Symposium Meeting

All students are recommended to attend this meeting scheduled during the last week of the Fall Semester.

Graduate School Poster Competition

Entry in this competition is mandatory for all students.

NON-THESIS M.S. CHECKLIST

***Students are responsible for seeing that all deadlines are met. For the purposes of this program, your initial Major Advisor is the Graduate Advisor, Dr. Tripathy.**

Item	Date or Deadline
Biotechnology graduate student orientation	During the week classes begin in the fall semester
Plan courses for first semester: BTEC 5338 and GSBS 5373 are required during first fall enrollment	Week before classes begin
Meet with Graduate Advisor for student evaluation, to discuss degree plan and to plan courses for second semester: BTEC 5001, GBTC 5101 and GBTC 6202 are required in spring. Hand in form describing research interests for the second year.	After the first semester, usually in December or January
File Degree Plan ("Program for the Master's Degree and Admission to Candidacy" form) at the Graduate School: at least 40 hours of graduate course work is required (must also file any subsequent course changes)	As soon as possible but no later than the second semester of enrollment
Meet with Graduate Advisor for student evaluation and to discuss degree progress	After the first year of enrollment, usually in May
Research Symposium	Last week of the Fall Semester, second year.
Graduate School Poster Competition	April
File " Statement of Intention to Graduate " at the Graduate School and make sure all fees are paid	During the semester of graduation (exact deadline varies)
Obtain approval of all Advisory Committee members to schedule the final oral presentation and examination	During the semester of graduation (exact deadline varies) at least three weeks in advance
Take Final Comprehensive Examination (Major Advisor reports the result to the Graduate School) and hand in written requirements	During the semester of graduation (exact deadline varies), but results should be reported four weeks prior to graduation
Graduation	Target: 2 Years

THESIS M.S. CHECKLIST

***Students are responsible for seeing that all deadlines are met. For the purposes of this program, your initial Major Advisor is the Graduate Advisor, Dr. Tripathy.**

Item	Date or Deadline
Biotechnology graduate student orientation	During the week classes begin in the fall semester
Plan courses for first semester: BTEC 5338 and GSBS 5373 are required during first fall enrollment	Week before classes begin
Meet with Graduate Advisor for student evaluation, to discuss degree plan and to plan courses for second semester: BTEC 5001, GBTC 6202 and BIOL 6101 are required in spring. Hand in form describing research interests for the second year.	After the first semester, usually in December or January
File Degree Plan (“Program for the Master’s Degree and Admission to Candidacy” form) at the Graduate School: at least 40 hours of graduate coursework is required	As soon as possible but no later than the second semester of enrollment
Meet with Graduate Advisor for student evaluation and to discuss degree progress	After the first year of enrollment, usually in May
Set up and meet with Advisory Committee	Before second year of enrollment
Research Symposium	Last week of Fall Semester, 2nd Yr.
Graduate School Poster Competition	April
File “ Statement of Intention to Graduate ” at the Graduate School	During the semester of graduation (exact deadline varies)
Pay Electronic Thesis Dissertation (ETD) processing fee	During the semester of graduation (exact deadline varies)
Submit a completed version of the thesis to all Advisory Committee members for review	At least four weeks before the anticipated thesis defense
Obtain approval of all Advisory Committee members to schedule the thesis defense	During the semester of graduation (exact deadline varies)
Take Final Examination and Defense of Thesis (Major Advisor reports the result to the Graduate School)	During the semester of graduation (exact deadline varies) and scheduled at least three weeks in advance
Submit thesis for formatting review; turn in signed Thesis-Dissertation Approval Form and ETD Signature Form to the Graduate School	During the semester of graduation (exact deadline varies) within two weeks of the defense
Upload corrected, final version of thesis to the ETD Submission website	During the semester of graduation (exact deadline varies)
Graduation	Target: 2 years

<*INSERT CALENDAR*>

APPROVED ELECTIVES: FALL 2013

COURSE		TITLE	
BIOL		Advanced Cell Biology	
BIOL		Advanced Molecular Biology	
BTEC		Advanced Plant Biotechnology	
BTEC		Nanobiotechnology	
BTEC		Topics in Biotechnology	
CHEM		Lipids	
CHEM		Proteins	
GSBS (HSC)		Cells	
GSBS (HSC)		Molecules	
MBIO		General Virology	
MBIO		Immunobiology	
MBIO		Microbial Genetics	
TOXICOLOGY (Reese)		Analytical Toxicology	

NOTE:

***CHEM 5330, CHEM 5331, CHEM 5332 and CHEM 5334 will NOT be accepted for elective credit**

TENTATIVE ELECTIVES FOR SPRING 2014

COURSE	TITLE	CREDIT HOURS
BIOL 5301	Advanced Genetics	3
BIOL 5302	Advanced Cell Biology	3
BIOL 5306	Advanced Cancer Biology	3
BIOL 5320	Advanced Molecular Biology	3
BIOL 6301-007	Molecular Microbiology of Pathogenic Eukaryotes	3
BIOL 6301-009	The Microbiology of Biofilms	3
BIOL 6301-054	Flow Cytometry & Cellular Immunology	3
BIOL 6301-072	Plant Stress	3
BIOL 6315	Regulation of Gene Expression	3
BIOL 6408	Research Techniques in Electron Microscopy	4
BOT 6304	Advanced Plant Molecular Biology	3
BOT 6409	Advanced Plant Development	4
CHEM 5304	Molecular Cloning	3
CHEM 5333	Proteins	3
CHEM 5335	Physical Biochemistry	3
MBIO 5301	Advanced General Microbiology	3
MBIO 5403	Immunobiology	4
MBIO 5404	Pathogenic Microbiology	4
MBIO 6302	Advanced Bacterial Physiology	3
PSS 5421	Genetically Modified Crops	4

NOTE:

***These electives were offered in Spring 2013 but may change for Spring 2014**

***CHEM 5330, CHEM 5331, CHEM 5332 and CHEM 5334 will NOT be accepted for elective credit**

UNIVERSITY POLICY

With permission of the Provost's Office, the statements below were taken directly from the Texas Tech University Faculty Handbook which can be found online at <http://www.depts.ttu.edu/officialpublications/pdfs/2010-11%20Faculty%20Handbook.pdf>

Important Documents

- Student affairs handbook
<http://www.depts.ttu.edu/dos/handbook/>
- Undergraduate and Graduate Catalog (University catalog)
<http://www.depts.ttu.edu/officialpublications/>
- TTU Operating procedures.
<http://www.depts.ttu.edu/opmanual/>

Academic Freedom

“Institutions of higher education exist for the common good. The common good depends upon a free search for truth and its free expression. Hence, the faculty member must be free to pursue scholarly inquiry without undue restriction and to voice and publish conclusions concerning the significance of evidence considered relevant. The faculty member must be free from the corrosive fear that others, inside or outside the university community, because of their differing view, may threaten the faculty member's professional career or the material benefits accruing from it.

Each faculty member is entitled to full freedom in the classroom in discussing the subject taught. Each faculty member is also a citizen of the nation, state, and community, and when speaking, writing, or acting as an individual citizen, must be free from institutional censorship or discipline”.

Academic Integrity

The University is strongly committed to upholding standards of academic integrity. Any student found to have committed academic misconduct is subject to the disciplinary sanctions, conditions, and/or restrictions outlined in Part IX, Code of Student Conduct, Section B of the *Student Affairs Handbook*. This includes (but is not limited to): cheating, plagiarism, academic dishonesty, intoxication, drug possession, theft, possession of weapons, physical harm or threat, disruptive behavior, gambling, hazing, harassment, false alarms, terrorism, financial irresponsibility misuse of computer facilities, providing false information or abuse of the discipline system. Complete definitions and examples of academic misconduct are available in the Texas Tech University Faculty Handbook.

Academic Regulations

Regulations concerning admission, registration, grading practices, class attendance, the University calendar, and other similar matters are stated in the current Undergraduate and Graduate Catalogs. Faculty members are advised to consult the catalogs in order to become familiar with those regulations. Information concerning admission of graduate

students is contained in the current Graduate Catalog. Additional information may be distributed as needed by memoranda or letters.

Americans With Disabilities Act (ADA)

“Section 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) require that universities, and all faculty and staff therein, make reasonable accommodation for all students with disabilities in all programs and activities, both academic and nonacademic. *If such reasonable accommodation is denied to any disabled student, the institution may be held in violation of the law.* It is advisable that you ask in each first class session that students with disabilities or health problems identify themselves to you (privately after class or during your office hours) and indicate to you any special accommodations you will need to make for them during the semester (for example, extended time examinations). While disabled students are always told to notify their professors, some may be reluctant to do so.

Faculty are not obligated to provide accommodation for a student's disability needs unless the student provides proof of a disability for which the accommodation requested is appropriate. While such proof should ideally be provided at the beginning of the semester, accommodation requests can be submitted at any time during a semester. The accommodations begin on the date the letter is signed by both the instructor and the student and are NOT retroactive. The university-approved mechanism for doing so is written notification from AccessTECH—a Letter of Accommodation (LOA). The LOA on official university letterhead indicates to professors that the student has given proof of his or her disability and that the accommodation noted is considered appropriate and reasonable. No further proof of disability should be required of the student. Students presenting verification other than the LOA should be referred to AccessTECH in the office of the Dean of Students for the appropriate identification. No requirement exists that accommodation be made prior to completion of the approved university process.

Faculty should be aware of the related student grievance process as detailed in the *Student Affairs Handbook*. It is our hope that this system will enable faculty and staff to easily and quickly access those resources necessary to respond effectively to these students' needs, particularly those students whose disabilities are not visible or as familiar as others. AccessTECH is available to advise and assist faculty members in the accommodation process. They can be reached at 742-2405.

Keep in mind that the purpose of classroom accommodation is to eliminate the competitive disadvantage caused by the disability itself. *Students with disabilities should be expected to do the same quality of work and the same quantity of work as every other student. It is the method by which this is accomplished that is sometimes different.*

Class Excuses from Student Health Services

Student Health Services is a primary care clinic staffed with licensed physicians and other health care professionals who provide care for minor illnesses, injuries, and mental health issues. Students generally pay a medical services fee which entitles them to access clinical and pharmacy services at Student Health Services. A valid Texas Tech ID is required to access the clinic services. Student Health Services is located in the Student Wellness Center at the corner of Main and Flint on the west side of the campus. Services are available by appointment by calling (806) 743-2848. Appointment hours are 8:30

a.m.to 6 p.m. weekdays. Students are not given excuses for missed classes or exams due to a clinic visit. Students experiencing a lengthy illness that may affect their academic performance may consult their Student Health Services physician about obtaining a letter explaining the situation. In accordance with state and federal law, a student's medical information is confidential and cannot be released to anyone, including parents/guardians, without the student's written permission, unless otherwise authorized by law. Contact Student Health Services at (806) 743-2860 or visit their website at <http://www.ttuhsc.edu/studenthealth>.

Faculty–Student Conflict of Interest

The university is responsible for ensuring the integrity of the roles of faculty and students during the period of graduate or undergraduate enrollment and protecting them from conflict of interest. Faculty must avoid academic supervisory, teaching, or evaluative relationships with students that pose significant conflicts of interest from the standpoint of personal or professional connections. Such connections might include husband-wife or other affectional liaisons, supervisor-employee relationships, or parent-child relationships. The appearance of conflict of interest should be avoided. OP 32.33 sets forth details of procedures that are to be followed in this regard.

Sexual Harassment - Faculty

"It is the policy of the university to maintain a work place and a learning environment free of sexual harassment and intimidation. Harassment of students on the basis of sex is a violation of Section 106.31 of Title IX of the Education Amendments of 1972.

Harassment of Texas Tech University employees on the basis of sex is a violation of Section 703 of Title VII of the Civil Rights Act of 1964 and the Texas Commission on Human Rights Act. Sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature constitute sexual harassment when:

- Submission to such conduct is made either explicitly or implicitly a term or condition of an individual's employment, participation in a university-sponsored educational program or activity, or in return for a grade or other consideration;
- Submission to or rejection of such conduct by an individual is used as the basis for an academic or employment decision affecting such individual; or
- Such conduct has the purpose or effect of unreasonably interfering with an individual's academic or work performance or of creating an intimidating, hostile, or offensive working or educational environment.

Any faculty member, staff member, or student may pursue a grievance within the procedures outlined in OP 10.09 without fear of reprisal, stigma, or threats if a complaint is filed in good faith."

Complaint Procedures - Students

Sexual harassment complaints must be filed within 180 days after the incident occurs. (Title VII of *Civil Rights Act* of 1964 and Title IX of the *Educational Amendments* of 1972).

Students believing they are the targets of sexual harassment in the academic environment

by faculty, staff, or other students should report their complaint to the *Dean of Students Office (DOS)*.

Students complaining of sexual harassment in their employment capacity should proceed directly to the *Affirmative Action Office* as provided in the Faculty and Staff section of this policy.

When a signed complaint is filed, an investigation will be conducted by either the *Dean of Students Office* or the *Affirmative Action Office*. Investigation of a complaint of sexual harassment will include, but not be limited to, conferring with the complainant, the accused and the supervisor of the accused and may also involve examination of relevant documentation and interviews with other pertinent individuals. The appropriate Vice President or Provost will be notified of the complaint.

The investigation will be conducted as quickly as possible and the results reported to the complainant, accused, and the appropriate vice president and Provost.

In the event the complaint is valid, the accused will be subject to disciplinary action, as determined by the appropriate Vice President or Provost.

Appeals by either party may be directed to the appropriate Vice President or Provost.

Conduct of Graduate Students Serving as Faculty (Teaching Assistants)

Graduate students appointed as Teaching Assistants or Research Assistants serve in a limited role as faculty of Texas Tech University. As faculty employees, OP 33.04, "*Conduct of University Faculty*," and OP 32.33 "*Faculty and Student Conflict of Interest*" apply fully. This policy prohibits actions by a faculty employee which are a breach of the public trust. Penalties for such actions range from an oral reprimand to separation from the University. The classes of actions prohibited are as follows.

1. Academic dishonesty of any form, including but not limited to academic plagiarism or giving improper aid to a student on an examination or grade. Acceptance of money, gifts, or favors from students, or solicitation thereof, which would compromise integrity, are similarly prohibited.
2. Forgery, alteration, or unauthorized use of University documents or records.
3. Knowingly furnishing false information to the University.
4. Use of force or violence or other methods of obstructing the teaching, research, administration, or public service functions of the University.
5. Physical abuse, threats, or conduct dangerous to the health and safety of any person on University property or University-sponsored or supervised functions.
6. Sexual harassment connected in any way to the performance of University duties.
7. Theft or damage to the property of the University or to the property of a member of or visitor to the University.
8. Unauthorized entry to or use of University facilities.
9. Use, possession, or distribution of narcotics or other substances controlled by Federal and State law, except in strict compliance with such regulations.

10. Lewd, indecent, or obscene conduct on University-owned or controlled property or at a University-sponsored or supervised function.
11. Failure to comply with the lawful directions of University officials acting in the performance of their duties.
12. Violation of other promulgated University policies or rules. This prohibition includes failure to meet regularly scheduled classes or to administer scheduled examinations.

The foregoing are to be understood as illustrative, but not exhaustive, of the possible infractions of academic ethics.

Definition of Student Employment

A student employee performs part-time work incidental to academic training in an occupational category that requires all incumbents to be students as a condition of employment. These include:

- A. Graduate Assistant—A graduate student in an institution of higher education employed to perform work which utilizes knowledge beyond undergraduate academic studies. The position of Graduate Assistant is intended for graduate students employed in capacities other than teaching or research.
- B. Research Assistant—A graduate student in an institution of higher education employed in support of the research mission of the unit, its director or faculty, in laboratory, library, field, or computer, or such other activities as may assist the unit's research effort. The position of Research Assistant is intended for graduate students employed in research activities on research accounts.
- C. Teaching Assistant—A graduate student in an institution of higher education employed in support of the teaching mission of the unit who is responsible for, or in charge of a class or class section, or a quiz drill or laboratory section. The position of Teaching Assistant is intended for graduate students employed in teaching activities. The source of funds is ordinarily an academic account.

Disposition by the Dean of Students or Designee

A written report of any disciplinary action taken by the *Dean of Students* or designee will be sent to the appropriate academic dean and to the student. The final results of a grade appeal shall be reported to the instructor by the appropriate academic dean in the manner required by the grade appeals procedure (*Part V of the Student Affairs Handbook*).

Grade Appeal Procedure

The *Grade Appeal Procedure* (Part V of the *Student Affairs Handbook*) may be used to appeal a failing course grade, but not a failing grade given for a class assignment. The disciplinary penalty of a grade of *F* shall not be implemented until the disciplinary procedures or grade appeal process has been exhausted. A student may continue the academic class and course work until a final decision is made.

Instructor Responsibilities

The instructor in a course is responsible for initiating action in cases where there is an

admitted act or convincing evidence of academic misconduct. Before taking such action, the instructor should attempt to discuss the matter with the student. If the alleged misconduct involves a final exam, the instructor may withhold the grade until a reasonable attempt can be made to contact the student after the end of the semester.

Instructor Sanctions

If academic misconduct is determined by the instructor, a failing grade shall be assigned to either the assignment in question or to the course grade. When a student is given a failing grade in a course as a result of academic misconduct, the instructor shall report in writing to the instructor's department chair the facts of the case and the action to be taken against the student. The chair shall provide a copy to the student, to his or her academic dean (and the Graduate Dean in the case of graduate students) and to the Dean of Students.

Plagiarism

This violation includes, but is not limited to, the use, by paraphrase or direct quotation, of the published or unpublished work of another person without full and clear acknowledgment. It also includes the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials.

Posting Grades

Student grades are not to be posted in any public location. However, with exceptionally large classes, the University recommends that grades be posted as random numbers. These numbers must be the sole property and knowledge of the individual student for that particular exam posting. This is the University Administration's policy based on legal action taken against instructors, teaching assistants and administrators. If your grades are posted in a manner that places you and the Department in jeopardy, they will be removed.

When possible, return the student's quizzes during the laboratory period. DO NOT place the quizzes outside the lab on the floor or on the wall. DO NOT give a student's scores over the telephone unless you are sure that you are talking to the student; the student's parents or legal guardians are NOT exceptions.

Referrals to the Dean of Students

A student referred to the *Dean of Students* for alleged violation of academic misconduct is entitled to all substantive and procedural guarantees provided in the *Code of Student Conduct*.

Repeated Academic Dishonesty

In cases of repeated violations, either the instructor (through his or her department chair and/or academic dean) or the academic dean may refer the case to the *Dean of Students* for further disciplinary proceeding.

Sexual Harassment

The objective of the University is to provide an environment in which faculty, staff, and

students may pursue their careers and studies with a maximum of productivity and enjoyment. Behavior or conduct which interferes with this goal will not be tolerated.

It is the policy of the University to maintain a work place and a learning environment free of sexual harassment and intimidation.

Harassment of students on the basis of sex is a violation of Section 106.31 of Title IX of the *Education Amendments* of 1972.

Harassment of TTU employees on the basis of sex is a violation of Section 703 of Title VII of the *Civil Rights Act* of 1964, § 39.03 Texas Penal Code, as stipulated in House Bill 370 passed in the 71st Legislative Session, and the Texas Commission on Human Rights Act of 1933.

Sexual harassment is defined as: Sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature constitute sexual harassment when:

- a. Submission to such conduct is made either explicitly or implicitly a term or condition of an individual's employment, participation in a University sponsored educational program or activity, or in return for a grade or other consideration;
- b. Submission to or rejection of such conduct by an individual is used as the basis for an academic or employment decision affecting such individual, or
- c. Such conduct has the purpose or effect of unreasonably interfering with an individual's academic or work performance or of creating an intimidating, hostile, or offensive working or educational environment.

Any faculty member, staff member, or student may pursue a grievance as set forth in the procedures outlined below without fear of reprisal.

Confidentiality of both complainant and accused will be honored to such extent as it does not compromise the University's commitment to investigate allegations of sexual harassment.

Smoking

OP78.16 prohibits smoking in all campus facilities.

Teaching Assistants (Considerations and Advice)

GENERAL INSTRUCTIONS FOR TEACHING ASSISTANTS

The purpose of your teaching assistantship is twofold: to help support you financially during your study for an advance degree and, of equal importance, to provide an essential service to the Department and to the University. You have been appointed to a responsible job which will have an impact upon the learning experience of many college students. There is so little time for orientation prior to the beginning of the semester, the following points are provided as a guide to help you get started.

1. A good instructor always meets his/her laboratories on time, stays in lab for the entire period, and is well prepared in advance to cover the material for that laboratory.
2. You are encouraged to be innovative and to use your own experiences whenever possible. Remember, a positive approach is most effective, and the course in which you teach is a team effort with the other TA's and the lecturer(s) in the course. It is counterproductive to your effectiveness as a teacher to make derogatory remarks to the students about any aspects of the course.
3. If it is unavoidable that you be absent from a lab period, be sure to check in with your coordinator (or leave a message), and make sure someone covers your lab duties. It is University policy that leaves from "campus" must have proper approval in advance. If you know you are going to be absent for any other reason, apply for official leave.
4. Please use good judgment in your personal habits, hygiene, and dress. If your personal habits are such that they affect the students, someone will discuss the matter with you. What you wear is certainly up to you, but what you wear to a teaching laboratory is the Department's concern, so dress appropriately.
5. Treat all students with courtesy and fairness. To avoid even the appearance of favoritism, do not fraternize unduly with students assigned to your laboratories. It is unethical for you to date a student assigned to your laboratory. Such action would constitute basis for termination of further financial support from the Department.
6. Make every effort to be available to your students. However, do not give out personal cell phone numbers. Students can leave a general message in the main office, ESB Rm. 101.
7. Your duties may include the proctoring of lectures and final exams. Contact the lecture instructor early in the semester to find out what needs to be done and help get the materials to the examination room.
8. Please do your part to protect supplies and equipment from theft and to prevent damage to the building. It is difficult, and sometimes impossible, to replace items that "disappear".
9. Sometimes you may be asked to help clean, organize, or conduct inventories. Consider it part of your job.
10. You are responsible directly to your course coordinator. Any problems should be taken up directly with that person. In addition, you may speak with the Center Director about any aspects of your duties.

REMEMBER THAT YOU HAVE ONE OF THE MOST IMPORTANT JOBS IN OUR CENTER, THE CENTER DEPENDS ON YOU.

***PROCEDURES TO BE FOLLOWED AFTER OBSERVING CHEATING
(IMPEACHING)***

In the event that you observe someone cheating, immediately tell the student(s) what you observed. If the infraction is visual, you may seek confirmation by another TA; however, such confirmation is sometimes not possible and is not necessary. You might

take the student's answer sheet and ask him or her to leave the room. Tell the student to see you immediately after the quiz. You may allow the student to continue the quiz after your warning, depending on your assessment of the magnitude of the infraction. If the student refuses to give you the answer sheet when asked to do so, or refuses to leave the laboratory, call Campus Security.

Remember- TAs are not Instructors of Record. Only the Lecture Instructor can take official action against the student. IF you tell a student that you are going to give him or her a "zero" for the quiz, you have exceeded your authority. Immediately after talking to the student (you may tell him or her what your recommendation will be), counsel with the student's Lecture Instructor. If action is to be taken, the Instructor must do so in writing to the student's dean. Copies should be sent to the Center Director, the student, and the Dean of Students. The letter should detail the infraction and state what action the Instructor has taken. If the student finished the quiz but failed, the Instructor might choose to write a letter detailing the infraction but let the grade stand. If action is taken against the student, the student must have access to appeal.

If the student becomes vocally or physically abusive the behavior should be noted in the Instructor's letter.

If you have evidence that one or more students have plagiarized work, accumulate the evidence and ask the laboratory coordinator to review the material. Show the material to the students' Instructor(s). After a decision has been reached by the TA and the Instructor, notify the student(s) immediately and tell them to contact the Instructor(s). The Instructor should file a letter with the student's dean, as above.

MAINTAINING YOUR TEACHING APPOINTMENT

TA appointments are made for an academic year starting with the Fall term. However, your performance as a TA and as a graduate student will be reviewed each semester and a poor performance could lead to the loss of the TA appointment or failure to receive a TA re-appointment for the next semester. Students who do not have English as a first language need to pass the ESL test, and all students who serve as TA's need to take the TTU TA workshop.

Teaching performance will be evaluated from information provided by the faculty member serving as laboratory coordinator for the course in which you are teaching and from student evaluations. You must also remain in "good academic standing" by maintaining a GPA of 3.0 or higher each semester. Failure to meet this GPA requirement will result in being placed on academic probation by the Graduate School and could cause you to lose a TA appointment. The evaluation for TA re-appointments will include an assessment of your progress toward completion of your degree.

You are also reminded that you must conduct your class and interact with students or other TAs in a professional manner. Texas Tech University takes offenses, such as sexual harassment very seriously and you must be cognizant of how your actions or words might be interpreted by others.

If there is a course in which you would like to teach, contact the faculty member coordinating the labs. The course coordinator will request specific TAs for his/her course.

RESIGNING A TEACHING ASSISTANTSHIP

As soon as the student holding a teaching assistantship knows that he/she will resign, he/she should notify the Graduate Coordinator or the Departmental Chairperson in writing. This will allow the Department's interest to be best served by seeking a replacement as quickly as possible.

If the student wishes to resign a TA to accept a research assistantship several factors will be considered.

1) Before 1 June the student can resign the TA without concern 2) After 1 June he/she will not be released from the TA contract unless a suitable student can be found to accept the teaching responsibilities.

3) The same applies to a student wishing to resign a TA in the Fall to accept a RA in the Spring. He/she will be allowed to resign the TA without concern prior to 15 October.

TUTORING WHILE HOLDING A TEACHING ASSISTANTSHIP

Although you are encouraged to assist your students in every possible way to help them learn the course material, you are NOT allowed to tutor students for monetary gain.

RESOURCES

- ☼ Center for Biotechnology and Genomics
Experimental Sciences: Room 101
(806) 742-3722 Ext.226
<http://www.depts.ttu.edu/biotechnologyandgenomics/>
- ☼ Graduate School
Administration Building: Room 327
(806) 742-2781
<http://www.depts.ttu.edu/gradschool/>
- ☼ Student Business Services
West Hall: Room 301
(806)742-3272
<http://www.depts.ttu.edu/studentbusinessservices/>
- ☼ Office of International Affairs
601 Indiana Avenue
(806) 742-2974
<http://www.iaff.ttu.edu/main/index.asp>
- ☼ University Career Services
Wiggins Complex
(806) 742-2210
<http://www.depts.ttu.edu/careercenter/>
- ☼ MyTech (Online Class Registration) through Raiderlink
<http://www.raiderlink.ttu.edu>
- ☼ Academic Calendars
<http://www.depts.ttu.edu/officialpublications/calendar/>
- ☼ Graduate Catalog
<http://www.depts.ttu.edu/officialpublications/catalog/GradSchool.php>
- ☼ Environmental Health and Safety
<http://www.depts.ttu.edu/ehs/Web/>

Advising Worksheet

Name: _____ ID# _____
 Degree: Master's in Biotechnology (40 hours minimum) Program: _____

FIRST YEAR (22 hrs. minimum)

<u>FALL</u>	<u>SPRING</u>
Core Requirements (6 hrs): BTEC 5338 ____ <u>3</u> ____ GSBS 5373 ____ <u>3</u> ____ Electives (6 hrs): _____ _____ _____	Core Requirements (4 hrs): GBTC 5101 ____ <u>1</u> ____ GBTC 6202 ____ <u>2</u> ____ BIOL 5001 ____ <u>1</u> ____ Electives (6 hrs): _____ _____ _____
TOTAL: 12 hrs minimum	TOTAL: 10 hrs minimum

SECOND YEAR (18 hrs. minimum)

OR

OR

<u>Thesis</u>	<u>Internship</u>	<u>Capstone</u>
Summer I ____ hrs	Summer I ____ hrs	Summer I ____ hrs
Summer II ____ hrs	Summer II ____ hrs	Summer II ____ hrs
Spring ____ <u>*9</u> ____ hrs	Spring ____ <u>*9</u> ____ hrs	Spring ____ <u>*9</u> ____ hrs
Fall ____ <u>*9</u> ____ hrs	Fall ____ <u>*9</u> ____ hrs	Fall ____ <u>*9</u> ____ hrs
*Research Credit	*Research or Internship credit	*9 hours of class credit

***All coursework must be approved by the Director or Graduate Advisor.**

***At least 22 hours of course work from the 1st year are required to be eligible for an internship.**

NOTES
