

TEXAS TECH UNIVERSITY

*MASTER OF SCIENCE IN
BIOTECHNOLOGY*

*MASTER OF SCIENCE IN
BIOTECHNOLOGY with RESEARCH
CONCENTRATIONS*

*GRADUATE CERTIFICATES in
BIOTECHNOLOGY*

GRADUATE MINOR IN BIOTECHNOLOGY

*Student
Handbook*

2026/2027

Graduate Advisor's Message

Dear Students:

I, on behalf of Texas Tech, welcome you to this great program and university.

The master's program in the Center for Biotechnology and Genomics offers a great environment for learning. Over the next year(s), our goal is to provide you with the most up-to-date knowledge and training in this area. We are dedicated to making your experience here both enjoyable and productive.

The unique feature of our program is the availability of both research and non-research-based curriculum, wide array of electives, and most importantly to give you the freedom to select the elective courses and research options that meet your needs/interests. I am here to help you select your courses, research areas, and answer any questions you may have.

Our graduates are currently employed in well-known biotechnology industries and academic institutions or are furthering their studies in a doctoral program, medical or dental school. I am confident that you will find yourselves professionally qualified for whatever path you choose in the exciting field of biotechnology.

I present to you the 2026/27 Student's Handbook. It contains essential information and program policies that you must know and follow as a biotechnology graduate student.

Thank you for your decision to join the master's program in the Center for Biotechnology and Genomics. I wish each one of you a great start to the semester.

Good luck in your endeavors!

Jatindra Nath Tripathy, Ph. D; M.B.A.

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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 research is a major focus at Texas Tech University. The Center for Biotechnology and Genomics capitalizes 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, genomics, proteomics, and bioinformatics.

The Center for Biotechnology and Genomics is an integrated component of the international biotechnology and genome research community. We have forged strong cooperative ties with academic institutions, federal laboratories, and biotechnology industries.

The Center provides:

- Core Facilities that offer instrumentation, support and training in various aspects of modern biotechnology: genomics, proteomics, bioinformatics.
- Multidisciplinary graduate studies in Biotechnology with research concentrations in Life Sciences Research and Bioinformatics Research, leading to a Master of Science in Biotechnology, which is designed to prepare students for technical positions in the rapidly growing biotechnology industry.
- Multidisciplinary graduate studies in Biotechnology without research concentrations, leading to a Master of Science in Biotechnology, which is designed for students whose primary career interest is to pursue professional degree programs such as medical school, dental school, veterinary school, business school, law school and career outside of bench-research in the biotech sector.
- A joint MS/JD degree, a program in conjunction with the Texas Tech Law School
- Graduate Certificate in Biotechnology, which is designed primarily to meet the needs of participants who need short term, specialized training to join the biotech workforce or enhance their career prospects.
- Graduate Minor in Biotechnology, which is designed for students of other majors, who wish to advance their knowledge and expertise in specific areas in biotechnology.

CENTER FOR BIOTECHNOLOGY AND GENOMICS

Master of Science in Biotechnology

IMPORTANT PROGRAM POLICIES

- ✓ Each student will be assigned a faculty mentor from the CBG at the beginning of the semester.
- ✓ Mentors and mentees should meet regularly to discuss academic matters, including coursework, projects, written reports, and presentations throughout the duration of the program. The mentor should determine if the student is adequately prepared to take the final exam.
- ✓ If a student is experiencing significant academic challenges, mentors should inform the Graduate Advisor promptly.

Diagnostic Test

- ✓ Diagnostic tests will be administered 3 times in an academic year:
 1. Before the start or first week of the fall semester
 2. In the first week of spring semester
 3. After the final exam of spring semester
- ✓ A list of topics for diagnostic test preparation is available in the Biotechnology Handbook.
- ✓ Each test consists of 50 multiple-choice questions.
- ✓ To pass the diagnostic test, students must achieve a minimum score of 80%.
- ✓ After an unsuccessful attempt, the Graduate Advisor will meet with the student to discuss the reasons for the failure and identify areas for improvement.
- ✓ Students who fail the diagnostic test three times but maintain a minimum GPA of 3.0 (as required by the Graduate School) will be advised to enroll in an undergraduate or graduate-level course to strengthen their foundation.
- ✓ Students whose GPA falls below the minimum requirement of 3.0 will no longer be eligible to continue in the graduate program. These students may consider applying for a graduate certificate program instead.

Master's Internship

- ✓ We will help facilitate finding an internship in a biotech company, academic lab or federal organization. However, students must go through the selection process

required by the hiring organization. Internship stipends are determined by the employer.

- ✓ Students are also encouraged to pursue research or project work with faculty members. Any financial support for such engagements is subject to the availability of funds within the respective faculty's research program.

Master's Thesis

- ✓ Students may opt to begin their thesis project in the first semester (Fall). In such cases, the thesis advisor will determine the most appropriate course load for the student, which may include a modified schedule. Students starting a thesis early are typically not expected to enroll in all three core courses during their first semester.
- ✓ Students receiving graduate support are required to register at least three credit hours of research (BTEC 7000) every semester.

Elective Course Registration in the Program.

- ✓ Students with a minimum GPA requirement of 3.0 or higher, as required by the graduate school, are eligible to enroll in elective biotechnology courses. (Core courses: BTEC 5301: Introduction to Biotechnology, BTEC 5338: Methods in Biotechnology and BTEC 5322: Bioinformatics Application).
- ✓ The minimum passing grade for any graduate-level biotech course is "C". Students receiving a grade below "C" must retake the course.

Continuation of financial support (Assistantship, Fellowship, Scholarship)

- ✓ To maintain eligibility for financial support – including scholarship, fellowship, research assistantships (RA), teaching assistantship (TA) – students must have a minimum GPA of 3.0 throughout the support period.
- ✓ Failure to maintain GPA of 3.0 will result in the termination of financial support.

Comprehensive Final Exam

- ✓ Students are allowed a maximum of two attempts to pass the comprehensive final exam.
- ✓ The second attempt must occur in a different semester, not in the same semester.
- ✓ After two unsuccessful attempts, students may consider transitioning to the Biotechnology Certificate Program

DIAGNOSTIC TEST TOPICS

1. Biomolecule's structure and function
2. Chemical bonds: Covalent, non-covalent bonds
3. Properties of water, pH, and Buffer
4. Fundamental chemistry, mole, molar, molar solution, percentage solution, stock solution
5. Functional groups in organic molecules, Fischer, and stereo chemical rendering of organic molecules
6. Concept of evolution of gene, Gene definition and Genome concept
7. Gene cloning principle and techniques
8. Protein purification and characterization
9. Concept of Free Energy, Enzyme catalysis and specificity of biochemical reactions and biochemical pathways
10. Prokaryotic and Eukaryotic cell structure, organellar function, cell division
11. Replication, Transcription and Translation in virus, prokaryotes, and eukaryotes
12. RNA types, difference between eukaryotic and prokaryotic RNA
13. PCR, Sanger Sequencing, Agarose gel electrophoresis, and SDS-PAGE
14. Transgenic animals and plants, Techniques involved in genetic modification.
15. Animal models, including non-mammalian models (the fruit fly *Drosophila melanogaster*, the nematode *Caenorhabditis elegans*, the Zebrafish *Danio rerio*), rodent models, large animal models including non-human primates, etc.
16. Basic concepts of bioethics: ethics vs morals
17. Protein Data Bank – 3D visualization and analysis of protein structure
18. Simple sequence alignment questions—BLAST, gaps, alignment score
19. Data types, including text format, databases, spreadsheets, etc.
20. Basic Statistics, including mean, median, average, mode, standard deviations, errors, systematic errors, random errors, etc.

MASTER OF SCIENCE IN BIOTECHNOLOGY: Program Overview

Two Master of Science programs: **a one-year (without research concentration), and a two-year (with research concentration) program**, are administered by the Center for Biotechnology and Genomics as part of the Interdisciplinary Programs of the Graduate School of Texas Tech University. These programs are designed to prepare students for careers in biotechnology with advanced specializations in Life Sciences and Bioinformatics. Students may pursue 30-credit (non-research) capstone based degree that may be completed in one year, or a 38-credit research-based degree that may be completed in two years.

The 30 credit, non-research degree program provides opportunity for preparation for students who wish to go on to veterinary school, medical or dental schools, or other biosciences or STEM related professional schools, and wish to pursue a career in the biotech sector but outside of bench-research. It involves neither a research-based thesis nor a research internship, but instead involves additional, advanced course work, chosen in an academic area of concentration like communication studies, nutrition science, informatics/computer science, engineering, microbiology, biochemistry, medical science 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 courses for this option should be discussed with the Graduate Advisor as early as possible to ensure courses are available for registration.** Class grades, an in-depth written paper and presentation on an appropriate topic in a capstone course and an oral comprehensive final examination will determine success in this track. **Students must register for capstone credit (3 hours) in the capstone course BTEC 5335: Capstone in Biotechnology in their graduating semester.**

The 38 credit, research-based degree program is offered with two research concentrations: the concentrations in Life Sciences Research and the concentration in Bioinformatics Research. Both these research concentrations consist of a 21-month curriculum. Students take courses for **a minimum of 20** credits in the first year, and a total of **18-24** credit hours during the summer sessions and the second year. The program is designed to train students in the most important techniques currently used in the biotechnology sector. In addition, the program provides excellent preparation for students wishing to go on and pursue a Ph.D. degree or MD (Ph.D.) degree after graduation.

The first year of the program (fall and spring) involves only course work. This comprises a combination of required core courses (lectures and laboratory) in the fall semester and selections from a broad spectrum of electives in the spring semester. Students can choose elective courses offered at the center. Students might alternatively choose **advanced STEM-relevant courses** as elective in other departments at Texas Tech University or the Texas Tech University Health Sciences Center. Additionally, the center might also

afford the students the ability to take online or face-to-face courses outside the TTU educational system, under close supervision from a CBG faculty. Students must obtain the approval of the Graduate Advisor before registration of courses outside of the Center.

The second year of the program involves practical training in a research environment.

There are two options for students pursuing research concentrations in the second year of the program: thesis and internship. These are highly competitive options with many factors determining availability of and eligibility for these positions. Both these options involve intense (hands-on) practical training, with students choosing between an academic or industry internship or working toward an M.S. thesis.

Option 1 involves one-year thesis-based research experience in a laboratory at Texas Tech (or, in some cases, at the Texas Tech Health Sciences Center, TTUHSC), under the supervision of a faculty member with scientific expertise in a field of particular interest to the student. 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 three faculty members** and submission of a written thesis. Students must register research credits, BTEC 7000 (12 hours). In addition, students must register for Master's thesis (BTEC 6000 - 6 hours) in their graduating semesters.

Students may choose to start the thesis project from first semester (fall semester). In that case, the faculty member (the thesis advisor of student) should decide what courses the student needs to take (students may not take all three core courses in the first semester).

Students must register for three credit hours of research credit (BTEC 7000) in first semester.

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. Our faculty assist students in finding internships that are interesting and challenging. Students can apply for, and choose any biotechnology company in the U.S. The number of hours students need to register internship credits depends on the nature and location of internship. Students must register 18 hours of internship credit in case of off-campus internship. All on-campus internship requires minimum of six internship credits (BTEC 6001 - 6 hours) and 12 hours of research credits (BTEC 7000). **Students must register 6 hours of internship credits in their graduating semesters.** Successful completion of internship is evaluated by a written descriptive report and a comprehensive oral examination (including all coursework and experience gained during the internship) by a committee of at least three faculty members.

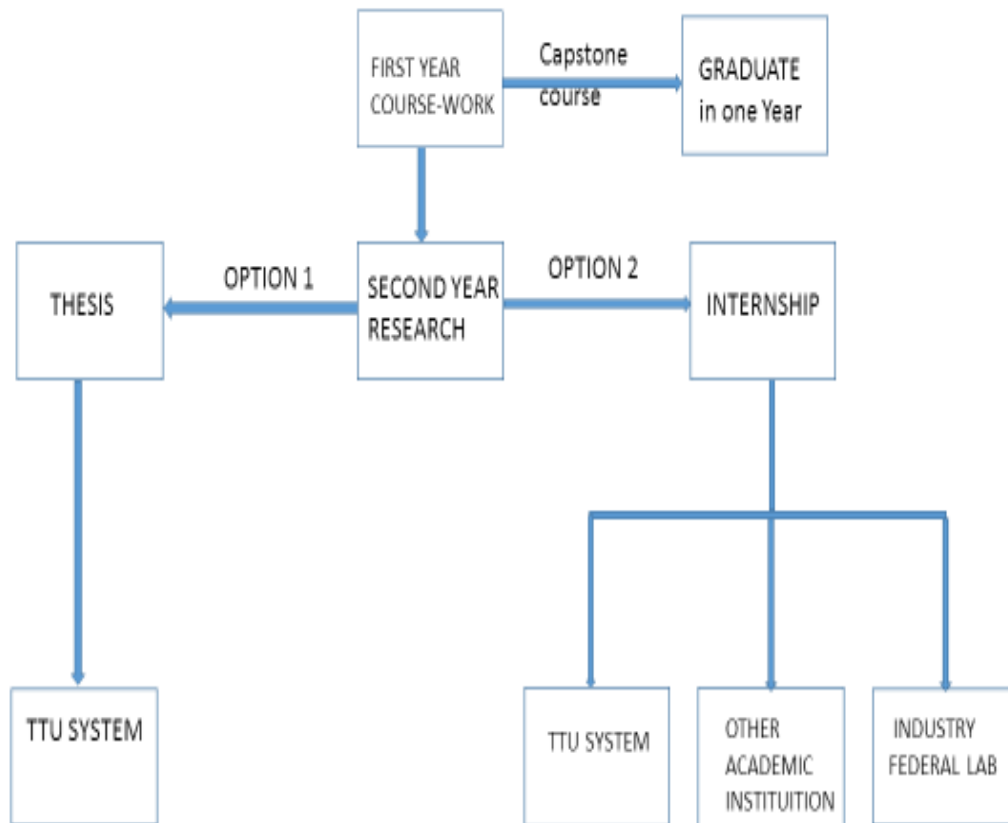
Additionally, a Certificate in Biotechnology is available to cater for the needs of people who want basic training and short-term education to pursue a career in biotechnology. A certificate in biotechnology can be obtained by completing 12 BTEC credits (three core courses, BTEC 5301: Introduction to Biotechnology – 3 credits, BTEC 5338: Methods in

Biotechnology – 3 credits and BTEC 5322: Bioinformatics Application – 3 credits and any other BTEC course of choice as an elective (3 credits).

In addition, a graduate minor in biotechnology (9 credits required) is available for students of other majors. Students can obtain a minor by taking any three BTEC courses offered from the Center.

Master of Science in Biotechnology Curriculum Sketch:

Master of Science in Biotechnology Curriculum Sketch:



Curriculum: Master of Science in Biotechnology with Research Concentrations – 38 credit hours

- I. Concentration in Life Sciences Research (LSRS)
- II. Concentration in Bioinformatics Research (BIRS)

FIRST-YEAR COURSE-WORK – 20 Credit Hours

First semester (fall) Core Courses – 11 credits

BTEC 5301: Introduction to Biotechnology – 3 credits

BTEC 5338: Methods in Biotechnology – 3 credits

BTEC 5322: Bioinformatics Application – 3 credits

BTEC 5100: Scientific Communication – 1 credit

BTEC 5101: Bioethics and Research Integration -1 credit

Second semester (spring) Electives - 9 credits

A. Concentration in Life Sciences Research

Students may select **any courses from the elective list below** or choose electives offered by other departments **with approval from the Graduate Advisor.**

BTEC 5333: Advanced Bioinformatics – 3 hours

BTEC 5311: Protein Engineering – 3 hours

BTEC 5312: Gene Expression Analysis – 3 hours

BTEC 5313: Experimental Mass Spectrometry in Biotechnology – 3 hours

BTEC 5316: Mammalian Cell Culture - 3 hours

BTEC 5317: Animal Genomics – 3 hours

Second semester (spring) Electives - 9 credits

B. Concentration in Bioinformatics Research

Students must register for the following courses.

NS 5342: Biostatistics in Nutrition – 3 hours

BTEC 5333: Advanced Bioinformatics – 3 hours

Students may select **additional electives** from the list below or from other departments **with approval from the Graduate Advisor.**

BTEC 5312: Gene Expression Analysis – 3 credits

BTEC 5313: Experimental Mass Spectrometry in Biotechnology – 3 credits

BTEC 5311: Protein Engineering – 3 credits

BTEC 5316: Mammalian Cell Culture – 3 credits

BTEC 5317: Animal Genomics – 3 credits

SECOND-YEAR RESEARCH – 18 Credit Hours

Summer semester – 9 hours (Summer is optional)

BTEC 7000: Research in Biotechnology – 9 Credits

Third semester (Fall) – 9 Credits

If enroll full-time in summer and intend to graduate in Fall

BTEC 7000: Research in Biotechnology – 3 Credits

BTEC 6001: Biotechnology Internship – 6 credits

OR

BTEC 6000 Master's Thesis – 6 hours

If NOT enrolled full-time in summer:

BTEC 7000: Research in Biotechnology – 9 Credits

Fourth semester (Spring) – 9 Credits

BTEC 7000: Research in Biotechnology – 3 Credits

BTEC 6001: Biotechnology Internship – 6 Credits

OR

BTEC 6000 Master's Thesis – 6 hours

Other Courses: Elective Courses

Fall elective course:

BTEC 5414: Advanced Plant Biotechnology

Summer elective course: The following elective courses are available for students who wish to take additional coursework during the summer. Summer enrollment is optional.

BTEC 5314: Single-Cell Genomics

BTEC 5315: Transcriptomics

BTEC 5318: eDNA

Curriculum: Master of Science in Biotechnology (Non-Research, Capstone option) – 30 credit hours

First semester (fall) Core Courses – 15 credits

BTEC 5301: Introduction to Biotechnology – 3 credits

BTEC 5338: Methods in Biotechnology – 3 credits

BTEC 5322: Bioinformatics Application – 3 credits

BTEC 5100: Scientific Communication – 1 credit

BTEC 6101: Biotechnology Seminar – 1 credit

BTEC 5101: Bioethics and Research Integration -1 credit

Elective Options:

BTEC 5001-D02: Topics in Biotechnology: RNA-driven innovations in biotechnology - 3 credits

BTEC 5414: Advanced Plant Biotechnology

Second semester (spring) – 15 credits (3 credits Capstone plus 12 credits electives)

BTEC 5335: Capstone in Biotechnology – 3 credits (Students must register for the capstone in the graduating semester)

Elective Options:

Students may select **any courses from the list below** or choose electives offered by other departments **with approval from the Graduate Advisor.**

BTEC 5333: Advanced Bioinformatics – 3 hours

BTEC 5311: Protein Engineering – 3 hours

BTEC 5312: Gene Expression Analysis – 3 hours

BTEC 5313: Experimental Mass Spectrometry in Biotechnology – 3 hours

BTEC 5316: Mammalian Cell Culture - 3 hours

BTEC 5317: Animal Genomics – 3 hours

Minimum Requirement: Students must complete **at least 18 credit hours** in the biotechnology major (BTEC courses) to meet degree requirements.

Note: Credit Hour Structure

The M.S. in Biotechnology requires **30 total credit hours** for degree completion. The standard enrollment pattern is **15 credit hours per semester** across two semesters. Students who prefer a lighter course load during the fall and spring terms may distribute credits into the **summer session**, allowing them to complete all degree requirements and graduate in the summer.

Summer Elective Courses:

BTEC 5314: Single-Cell Genomics

BTEC 5315: Transcriptomics

BTEC 5318: eDNA

Texas Tech University

Curriculum: Graduate Certificate in Biotechnology – 12 Credit Hours

Required Courses – 9 Credits.

BTEC 5301: Introduction to Biotechnology – 3 credits

BTEC 5338: Methods in Biotechnology – 3 credits

BTEC 5322: Bioinformatics Application – 3 credits

Elective Requirement – 3 Credits

Students must complete one elective (3 credits) selected from approved BTEC courses or other relevant graduate-level courses with approval from the Graduate Advisor.

Curriculum: Graduate Minor in Biotechnology – 9 Credit Hours

Students must complete 9 credit hours of coursework selected from any BTEC courses.

IMPORTANT PROGRAM ACTIVITIES

I. First-Year Activities

A. Biotechnology Graduate Student Orientation

The orientation is arranged before start of the class in every fall semester to orient new students with the graduate school and program policies. It is a required one-day event for both degree seeking and certificate students. The Director of the Center, the Graduate Advisor, faculty, staff, and current graduate students assemble to welcome the incoming graduate students. Speakers from the Career Center, Environmental Health & Safety, Office of Research and Innovation, Biotechnology Student Organization address new students. The Graduate Advisor discusses the program policy and curriculum in detail.

Attendance is mandatory.

B. Diagnostic Tests

All degree-seeking students, both one-year and two-year program, are required to take the diagnostic test before the first day of the class. After that, two diagnostic tests will be administered, at the end of the first semester (fall) and during second semester (spring). The date and time will be communicated to the students in advance. Students should score minimum 80% to pass the diagnostic test in any of their attempts. Maximum of **three attempts** to pass the diagnostic tests are allowed. **If students are unsuccessful after the third attempt but have a minimum GPA of 3.0 would be advised for further remedial courses. They should score a minimum “B” in the remedial courses to continue the program. Students whose GPA is below 3.0 will not be eligible to continue in the program. In that point, students may consider the option of getting a Certificate in Biotechnology.**

C. Responsible Academic Conduct Training

All degree-seeking students, both one-year and two-year programs are required to complete this online training within their first semester of enrollment. The training is accessible at <https://go.grad.ttu.edu/rcr>

D. Capstone Project, Presentation, Report and Final Comprehensive Examination (non-research, one-year degree program)

Students in one-year program will give the final oral presentation of their **capstone project** to an open audience of peers and committee members. They will also take an oral comprehensive examination and produce a written report of the project. A committee will evaluate students' performance in all three aspects: Oral presentation, written report, and comprehensive oral examination. Students must score 80% or above in each above category to pass the examination.

II. Second-Year Activities (Research concentrations only)

A. Research Symposium

Students pursuing research concentrations are required to present their progress of work done in their internship or thesis projects at the research appraisal seminar at the end of the third semester (around mid-December). They are also required to submit a written report of their project(s) in the following format: literature, goals, objectives, hypothesis, results, and future work to the graduate advisor at least three weeks before presentation. All CBG faculty will evaluate both report and presentation according to a rubric. A score of 80% or above is considered a good performance by the student. Feedback will be provided to both the students and mentors about the students' performance.

B. Graduate School Poster Competition

All graduate students are encouraged to participate in the Graduate School Annual Poster Competition in April. The Graduate School and the Graduate Advisor will provide the information about the competition well in advance to students.

C. Final oral Comprehensive Examination, Presentation, written Report and Thesis

Students will give the final oral presentation of their **research project leading to thesis or internship** to an open audience of peers and committee members. They will also take an oral comprehensive examination (internship option only) and produce a written report (a thesis in the case of a thesis option). Students doing a thesis need to write a thesis according to the graduate school guidelines. Students will be assessed for the quality of their presentation of experimental or informatics-related results, written reports and demonstration of successful integration of transferrable skills and knowledge. Students must score 80% or above to pass the comprehensive examination.

IMPORTANT PROGRAM INFORMATION

I. 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.**

A student who fails to maintain a cumulative graduate GPA of 3.0 will be placed on academic probation for failing to meet the satisfactory progress requirements for graduate education at Texas Tech University. **The student is required to raise the GPA to at least 3.0 in the next regular semester** (both summer sessions count as one regular semester). **Failure to do so will result in academic suspension.** According to the TTU policy, students placed on suspension are required to remain out of the Graduate School for at least one semester and students must reapply to the graduate program. The admission to the program is not automatic. The admission committee will review students' application and take decision for readmission. The policy of the Graduate School states that if a student is suspended twice, the student will not be allowed to return to the Graduate School.

Students should discuss with the Graduate Advisor about course(s) that is suitable for them to register. **Only stem-relevant courses are allowed to take to raise the GPA.** Most importantly, students are not allowed to take advanced elective courses until the GPA is raised to 3.0.

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 loss of scholarship, teaching and research assistantship opportunities or dismissal from the graduate program.

II. Deadlines and Time Limit

Although the Graduate Advisor will make every effort to make the student aware of various University and Department regulations and deadlines, **it is the student's responsibility to see that these regulations are adhered to and that the deadlines are met (see the checklists on pg.22-25).** All work applied towards a master's degree must be completed in a timely manner.

III. Degree Works (<https://degreeworks.texastech.edu/dashboard>)

Degree Works is an online repository of degree related course works. Students should use this site as a tool to monitor the progress of their degree program from the beginning until graduation.

IV. 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.

V. Maximum Allowable Graduate Hours

Graduate students who are not making timely progress toward completion of their degree and whose cumulative GPA is below 3.0 are subject to probation for the following semester and suspension afterwards 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.

VI. Enrollment

Timely graduation requires students to register for appropriate courses and correct credit hours **every** semester. Full-time graduate students must enroll minimum 9 credits in the fall and spring and 3 credits in each summer session to be eligible for fellowships, assistantships (TA, RA, GPTI) and scholarships. Students receiving financial assistance must register for the number of hours required by Financial Aid.

VII. Competitive Scholarship

To maintain the eligibility of competitive scholarship or any TTU assistantships, graduate students must pass the diagnostic test, maintain an overall GPA of 3.0 and a final grade point average of B or higher in all required and elective courses during the first year of the program. Scholarships from external sources have their own policy requirements. It is the responsibility of the student to be aware of, and comply with, these policies. Any deviation from these rules is at the discretion of the Graduate Advisor.

PROGRAMS in DETAIL

I. Master of Science in Biotechnology without Research Concentration

A. Fall (1st semester)

To graduate in a year, students should register for the following courses (15 credit hours) in the first semester. Failure to take courses might result the delay in graduation as some of these courses are only offered in the fall semester. **BTEC 5301: Introduction to Biotechnology, BTEC 5338: Methods in Biotechnology, BTEC 5322: Bioinformatics Application, BTEC 5100: Scientific Communication, BTEC 6101 Biotechnology Seminar, BTEC 5101: Bioethics and Research Integrity and a 3-hours elective course** are required courses for the first fall semester of enrollment in the non-research based graduate program.

B. Spring (2nd semester)

Students need to enroll 15 hours (12 hours electives), including 3-hours capstone course, **BTEC 5335: Capstone in Biotechnology**. Students must register in the Capstone course in the graduating semester. Students can choose from following list of courses offered in the Center. **BTEC 5312: Gene Expression Analysis, BTEC 5313: Experimental Mass Spectrometry in Biotechnology, BTEC 5311: Protein Engineering, BTEC 5316: Mammalian Cell Culture Techniques, BTEC 5317: Animal Genomics, and BTEC 5333: Advanced Bioinformatics**. Additionally, Students can also choose courses offered in other colleges at TTU and TTUHSC with the permission from the Graduate Advisor, such as courses from media and communication, nutrition sciences, animal sciences, computer sciences, biology, chemistry, plant and soil sciences, courses offered at medical school and business school as electives.

- **Capstone Course:** Students pursuing M.S. degree without research concentration MUST register in **BTEC 5335: Capstone in Biotechnology** in their graduating semester. The course serves as the degree capstone course and is mandatory for the graduate students pursuing one-year M.S. program in Biotechnology. The course prepares students to integrate the skills and knowledge learned from their coursework to help synthesize new concepts and innovate innovative ideas, products and processes to meet the demand of global challenges.

At the end of the first year (Fall and Spring semesters), students must complete 30 credit hours of academic course work, **out of which 18 credits must be BTEC courses**, with a cumulative **GPA of 3.0 or greater**, and **pass the diagnostic test** to graduate in one year. In addition, students must give a final comprehensive oral examination, submit a written report, and must give an oral presentation of his/her capstone project.

The format of the final presentation and oral examination is like the students pursuing internship options (Page 20).

II. Master of Science in Biotechnology with Research Concentrations

A. First Year - Fall (1st semester)

BTEC 5338: Methods in Biotechnology, BTEC 5301: Introduction to Biotechnology, BTEC 5322: Bioinformatics Application, BTEC 5100: Scientific Communication and BTEC 5101: Bioethics and Research Integrity 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 delays in graduation, the loss of opportunities for internships and assistantships, and dismissal of the student from the program. Exceptions to this schedule must be discussed and approved by the Graduate Advisor in advance. **In addition** to these courses, students may take one elective with prior permission from the Graduate Advisor. Students must register for a minimum of **11 credit hours** of required courses in the fall semester.

Leveling courses. Incoming graduate students with educational gaps in their background may be required to take certain courses to fill these gaps. However, these courses cannot be used to satisfy degree requirements.

B. First Year - Spring (2nd semester)

Full-time graduate students must register for a minimum of **9 credit hours** in the spring semester. (Taking an elective in the fall semester over the required 11 hours course load is optional, but the total formal course workload must total a minimum of 20 credits.) Exceptions to this schedule must be discussed and approved by the Graduate Advisor in advance.

Students can choose 3 electives (9 hours) from following list of courses offered in the Center. **BTEC 5312: Gene Expression Analysis, BTEC 5313: Experimental Mass Spectrometry in Biotechnology, BTEC 5311: Protein Engineering, BTEC 5316: Mammalian Cell Culture Techniques, BTEC 5317: Animal Genomics, and BTEC 5333: Advanced Bioinformatics.** Students can also choose courses offered in other colleges at TTU and TTUHSC with the permission from the Graduate Advisor.

Students pursuing the bioinformatics track must enroll in **BTEC 5333: Advanced Bioinformatics and NS 5342: Biostatistics in Nutrition.** In addition to that, students may choose one of the following courses to meet the requirements of third electives: **BTEC 5312: Gene Expression Analysis, BTEC 5313: Experimental Mass Spectrometry in Biotechnology, and BTEC 5311: Protein Engineering, BTEC 5316: Mammalian Cell Culture Techniques, and BTEC 5317: Animal Genomics.** Students can also choose courses offered in other colleges at TTU and TTUHSC with the permission from the Graduate Advisor.

At the end of the first year (Fall and Spring semesters), students must complete a **minimum of 20 credit hours of academic course work** and **must have a cumulative GPA of 3.0 or greater** and **must pass the diagnostic tests** to be considered for the second-year research/internship program. Any exceptions, if the circumstances warrant, are at the discretion of the Graduate Advisor and require 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 Graduate Advisor.

Summer I and Summer II are an optional period for students to do any course work or start second year research early. Registration in summer is only required in certain circumstances. Consult with the Graduate Advisor if you want to know any information about summer registration.

C. Second Year - Third (Fall) and Fourth (Spring) Semesters

The program offers students the opportunity to carry out two semesters of research activity in the second year. Students have a choice between doing a **non-thesis internship** project or a **thesis-based research project**.

- **Non-Thesis Master's Program (Internship Option):** The non-thesis master's degree program in Biotechnology is designed to make a substantial contribution to the intellectual and technical development of the student. The internship option is designed for students whose career plans are best served by research experience in either industry or academic lab 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 38** hours of course credit beyond the bachelor's degree. An internship may be pursued after successfully completing **20 credit hours** of course work in the first year followed by **18 hours** of combined research and internship credits. **Students doing an internship in a lab at Texas Tech System should register 9 hours in BTEC 7000: Research in Biotechnology in the fall, 3 hours in BTEC 7000: Research in Biotechnology and 6 hours in BTEC 6001: Biotechnology Internship in the spring semester. Students doing internships outside the academic campus should register for 9 hours in BTEC 6001: Biotechnology Internship in both the fall and spring semester. Any deviation from the above needs prior approval from the Graduate Advisor.**
- **Evaluation of Internship Project:** Students' project will be evaluated by the committee of three members, typically a combination of the Graduate Advisor (chair of the committee), and two faculty members from the CBG or the mentor from the lab where the internship is being done. A student's internship experience will be evaluated by a written report, oral presentation and a comprehensive final exam.
 - **Written Report:** In consultation with his or her mentor, student will write a summary of the internship experience. Generally, a document of 20 pages in length is sufficient. Details and information on the format may be obtained from the Graduate Advisor. Students must submit the written portion of the exam (internship report) to all members of the Examination Committee at **least two weeks before** the scheduled date for the oral

presentation. The report should be approved by his/her mentor before it is submitted to the Graduate Advisor. A bound copy of the report is due after any corrections suggested by the committee.

- **Oral Presentation:** Student will then make an oral presentation of research project, which is open to the public, describing his/her experience and presenting his/her work to the Advisory Committee and all in attendance. The final oral comprehensive examination (see below) typically follows immediately after presentation.
- **Final Comprehensive Oral Examination:** Each non-thesis master's student must pass a final oral comprehensive examination before earning a master's degree. This exam is based both on the student's course work and on research project leading to internship. 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 students and all members of the Examination Committee, keeping in mind the Graduate School deadline. The student's Examination Committee administers the final oral examination. 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, reading 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 retake the exam in another semester. Students cannot take more than one oral examination in same semester.** In the event of failure, the Committee will provide the student with a summary of the perceived deficiencies and corrective actions that need to be taken before making the second attempt. Students should also understand that faculty members might not be available for an examination during the summer.

- **Master's Program (Thesis Option):** The thesis master's degree option 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 enhance employability through development of research skills. The student must complete at least **38 hours** of course credit beyond the bachelor's degree, 18 hours in the second year, **6** hours of which must be thesis research. At least **20 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 defense of the 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 Graduate Advisor of the Center. In either case, the Major Advisor will be given an opportunity to express his or her opinion and try 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 Texas Tech University.
- **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 complete 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 thesis defense. 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 can 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.

- **Defense of Thesis:** Before earning the M.S. degree, each thesis master’s student must complete the defense of thesis. After the Advisory Committee has judged that the thesis is in a defensible form, the graduate student may then formalize and announce the date for the 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 have completed and be ready to turn into Graduate School 1). the final, Committee-approved copy of the thesis; 2). signed Thesis-Dissertation Approval Form; 3). and the Electronic Thesis-Dissertation (ETD) Signature Form within **two weeks** of the defense or **no later than the date** in the “Graduation Deadlines” posted on the [Graduate School website](#). 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. Students should submit a hardbound copy of the thesis to the center after the thesis is officially accepted by the university.

The 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 the following question-and-answer session is open to all faculty, graduate students and others who wish 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. As soon as possible after the 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 defense may repeat it**

once, but only after an interval determined by the committee. In the event of failure, the Major Advisor will provide the student with a summary of the perceived deficiencies and corrective actions that need to be taken before making the second attempt.

M.S. CHECKLIST- CAPSTONE PROJECT

Students are responsible for ensuring that all deadlines are met.

For the purposes of this program, your Major Advisor is the Graduate Advisor, Dr. J.N. Tripathy.

Activity	Typical Date or Deadline
New Students Orientation	Week before class begins in the fall
First Diagnostic Test	Before class begins or first week in the fall
First Semester Coursework: 15 hours BTEC 5301, BTEC 5338, BTEC 5322, BTEC 5100, BTEC 6101, BTEC 5101, and one elective (3 hours)	Week before classes begin in the fall
Second Diagnostic Test	After first semester (Dec or Jan)
Second Semester: 15 hours Meet with Graduate Advisor to discuss degree plans and to plan courses for second semester.	After the first semester, usually in December or January
Third Diagnostic Test	During/after second Semester (May)
Meet with Graduate Advisor to discuss Capstone Project.	After the first semester, usually in December or January
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)
Capstone project report, final oral presentation and comprehensive oral examination	During the semester of graduation (exact deadline varies) at least three weeks in advance
Graduation	Target: one year

M.S. CHECKLIST- INTERNSHIP

Students are responsible for ensuring that all deadlines are met.

For the purposes of this program, your Major Advisor is the Graduate Advisor, Dr. J. N. Tripathy.

Activity	Typical Date or Deadline
New Students Orientation	Week before classes begin in the fall
First Diagnostic Test	Before class begins or first week in the fall
First Semester Required Courses: 11 hours BTEC 5301, BTEC 5338, BTEC 5322, BTEC 5100, BTEC 5101	Week before class begins in the fall
Second Diagnostic Test	After first semester – first week Spring
Second Semester Elective Courses: 9 hours	After first semester, usually in December or January
Third Diagnostic Test	During/After Second Semester (May)
Second Year Program: 18 hours Internship (9 hours in fall and 9 hours in spring)	After successful completion of first year program, usually in May
Internship Placement	Summer/fall
Research Symposium (Second Year)	Last week of the fall semester, Dec
Graduate School Poster Competition	April, second year
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)
Internship project report, final oral presentation and comprehensive oral examination	During the semester of graduation (exact deadline varies) at least three weeks in advance.
Graduation	Target: Two years

M.S. CHECKLIST- THESIS

Students are responsible for meeting all deadlines and submitting required documents to graduate school.

For the purposes of this program, your initial Major Advisor is the Graduate Advisor, Dr. J. N. Tripathy.

Activity	Typical Date or Deadline
New Students Orientation	Week before classes begin in the fall
First Diagnostic Test	Before class begins or first week in the fall semester
First Semester Required Courses: 11 hours BTEC 5301, BTEC 5338, BTEC 5322, BTEC 5100, BTEC 5101	Week before class begins in the fall
Second Diagnostic Test	After first semester (Spring first week)
Second Semester Elective Courses: 9 hours	After the first semester, usually in December or January
Third Diagnostic Test	During/after second semester (May)
Second Year Program: 18 hours Fall Research 9 hours; Spring Research 3 hours, Thesis 6 hours	After successful completion of first year program, usually in May
Meet with Graduate Advisor to discuss the thesis requirements	After the successful completion of first year, usually in May
Set up and meet with Thesis Committee	During the fall semester, second year
Research Symposium (second year)	Last week of fall semester, Dec
Graduate School Poster Competition	April, second year
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)
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: Two years

UNIVERSITY POLICY

With permission from the Provost's Office, the policies listed below are reproduced directly from the Texas Tech University Operating Policy.

Important Documents

- [Student Handbook & Student Code of Conduct](#)
- [Operating Policies & Procedures](#)

[OP 34.22: Establishing Reasonable Accommodation for Students with Disabilities](#)

[OP 64.03: Graduate Students Employed as Teaching Assistants and Graduate Part-Time Instructors](#)

[OP 62.40: Graduate Employee Benefits](#)

[OP 70.27: Employment of Student Employees](#)

Instructions for Teaching Assistant

The purpose of your teaching assistantship is twofold: to help support you financially during your study for an advanced degree and, of equal importance, to provide an essential service for the Department and for 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 are 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)

If 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, accumulated the evidence and asked 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 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 members 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.

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.

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.

Key University Resources

- Center for Biotechnology and Genomics
 - Experimental Sciences: Room 101
 - (806) 742-6927
 - <http://www.depts.ttu.edu/biotechnologyandgenomics/>
- TTU Graduate School
 - Administration Building: Room 328
 - (806) 742-2787
 - <http://www.depts.ttu.edu/gradschool/>
- TTU Graduate School Writing Center
 - Administration Building Room 43 (Inside Graduate Center)
 - <http://www.depts.ttu.edu/gradschool/gswc.php>
- Student Business Services
 - West Hall: Room 301
 - (806)742-3272
 - <http://www.depts.ttu.edu/studentbusinessservices/>
- Office of International Affairs
 - 601 Indiana Avenue
 - (806) 742-3667
 - <https://www.depts.ttu.edu/international/>
- University Career Center
 - Wiggins Complex
 - (806) 742-2210
 - <http://www.depts.ttu.edu/careercenter/>
- MyTech (Online Class Registration) through Raiderlink
 - <http://www.ttu.edu>
- Graduate Catalog
 - <http://www.depts.ttu.edu/officialpublications/catalog/index.php>
- Environmental Health and Safety
 - <https://www.depts.ttu.edu/ehs/>
- TTU Library
 - <https://www.depts.ttu.edu/library/>

Advising Worksheet

Name: _____ R# _____

Degree: Master's in biotechnology (30 hours) _

FIRST YEAR

<u>FALL</u>	<u>SPRING</u>
Core Requirements- 15 hrs. BTEC 5338: Methods in Biotechnology -3 hrs. BTEC 5301: Intro to Biotechnology – 3 hrs. BTEC 5322: Bioinformatics Method – 3 hrs. BTEC 5100: Scientific Communication – 1 hr. BTEC 6101: Biotechnology Seminar – 1 hr. BTEC 5101-001: Bioethics - 1hr. Elective: – 3 hrs.	Capstone and Electives – 15 hrs. BTEC 5335: Capstone in Biotech – 3 hrs. Elective – 12 hrs.

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

***BTEC 5335: Capstone in Biotechnology – Must Register in Graduating Semester**

Must enroll 18 hours in BTEC courses

Advising Worksheet

Name: _____ R# _____
 Degree: Master's in biotechnology (38 hours) Concentration: _____

FIRST YEAR (20 credit hours Course-works)

<u>FALL</u>	<u>SPRING</u>
Core Requirements- 11 hrs. BTEC 5338: Methods in Biotechnology -3 hrs. BTEC 5301: Intro to Biotechnology – 3 hrs. BTEC 5322: Bioinformatics Method – 3 hrs. BTEC 5100: Scientific Communication – 1 hr. BTEC 5101: Responsible Conduct Res.- 1hr.	Electives - 9 hrs. _____ _____ _____ _____

SECOND YEAR (18 hrs. Research)

<u>FALL</u>	<u>SPRING</u>
BTEC 7000: Research in Biotech – 9 hrs.	BTEC 7000: Research in Biotech – 3 hrs. BTEC 6001: Biotech Internship – 6hrs. OR BTEC 6000: Master's Thesis – 6 hrs.

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

***At least 20 hours of course work from the first year are required to be eligible for research concentrations.**