



**THE MASTER OF SCIENCE IN COMPUTER GRAPHICS
TECHNOLOGY**

M.S. GRADUATE STUDENT HANDBOOK

Assembled by
the CGT Graduate Faculty
in the
Purdue Polytechnic Institute

PURDUE

U N I V E R S I T Y

West Lafayette, IN

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Computer Graphics Technology M.S. Graduate Student Handbook

NOTE: This document supersedes the Graduate School Policies & Procedures Guide and the College of Technology Graduate Handbook.

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FOREWORD: HOW TO USE THIS HANDBOOK?

This document is intended to clarify and emphasize the expectations that the CGT department has relative to the pursuit of graduate studies. You will find that content in this Handbook is similar to that of the college in most cases. Where there are differences, the Department of Computer Graphics Technology has typically established procedures and rules that fall within, or are more stringent than, those of the college. Especially with regard to credit hours, courses to be taken, and important milestones towards graduation, the policies and procedures in this document vary from that of the college. If you have questions about how to interpret what is in this Handbook, please consult with your major professor, the CGT Graduate Program Chair, or the Graduate Program Administrative Assistant.

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SECTION 1.0. INTRODUCTION

Section 1.0 of this document provides an overview to general information concerning graduate study in Computer Graphics Technology.

1.1. Background

Since the beginning of the information age and the evolution of the computer, computer graphics has emerged and has been recognized by the U.S. government's Directory of Occupational Titles as a professional occupational field. The wide range of applications for computer graphics is creating the need for individuals who are highly skilled in the technology of computer graphics and broadly educated in related interdisciplinary skills, such as instructional design, engineering, graphic design, cognitive psychology, human factors, visualization, and management to name a few. In an effort to promote intellectual inquiry and to stimulate a recognized body of applied research, graduate study in computer graphics in the Department of Computer Graphics Technology at Purdue is designed to focus on four (4) broadly based, interrelated branches including spatial cognition, imaging, geometry, and the technology related to computer graphics.

The subject matter of these four interrelated branches comprises an emerging field of study called Visual Science. All theses in computer graphics technology will likely relate to one or more of these recognized branches and areas. In addition, for those wanting to specialize in education and training, another fifth option would be to enroll in related coursework and engage in applied research related to learning through the College of Education.

1.2. Mission

The mission of the graduate program in Computer Graphics Technology is to prepare graduates for leadership positions in computer graphics professions and to advance the knowledge in the application and teaching of computer graphics through applied research, publishing, presentations, and teaching.

1.3. Degrees

Graduate study leading to the Master of Science in Computer Graphics Technology is offered through the Department of Computer Graphics Technology in the College of Technology at Purdue University. This degree program requires a thesis concentrating on applied research, development, and production of computer graphics.

A "3+2" combined program is also available for outstanding undergraduates in their third year of study in the CGT Bachelor of Science. The combined degree allows a student to obtain the B.S. and M.S. in CGT within five years. See Appendix A for the guidelines.

A Ph.D. degree program is offered through the College of Technology, which has a more general technological focus. This program option allows opportunities for curriculum development and professional development in educational applications of computer graphics. A separate handbook provides detailed information for the doctoral program. It can be found at the following web address:
<https://polytechnic.purdue.edu/degrees/phd-technology>.

Specific information about graduate study in Computer Graphics Technology may be obtained directly from the Department of Computer Graphics Technology, 401 North Grant Street, Knoy Hall 363, Purdue University, West Lafayette, IN 47907. The telephone number is 1 (765) 496-6368. You may also visit us on the web at
<https://polytechnic.purdue.edu/degrees/ms-computer-graphics-technology>.

SECTION 2.0. ADMISSION PROCESS

Section 2.0 of this document provides an overview of the requirements, types of admission, time limits and opportunities for financial assistance relative to graduate study in the Computer Graphics Technology.

2.1. Requirements

The Department of Computer Graphics Technology graduate committee reviews several important criteria in a holistic fashion when evaluating an application for graduate study in the CGT department. The following criteria are considered when reviewing an applicant's request for admission:

- *GRE Scores:* The committee looks at GRE scores in the context of the larger application. While there is no cutoff, we aim for scores in the 50th percentile or above.
- *Statement of Purpose:* This document should include the applicant's professional goals and objectives as they relate to applied research and advanced coursework in computer graphics. It should not appear that an applicant wants to simply take content similar to the CGT undergraduate curriculum and receive graduate credit for such work.
- *Previous GPA:* There is no minimum GPA required for admission outside those set by the Graduate School at Purdue University and the College of Technology, which is 3.0 on a 4.0 scale. The CGT graduate committee uses a GPA of 3.2 as a goal for admission. A lower GPA will not disqualify a candidate but may lead to a more in-depth examination of the applicant in regards to the other admissions materials or it may lead to conditional admission.
- *Letters of Recommendation:* Letters of recommendation should come from at least three (3) people that can attest to the applicant's professional abilities, goals, and background as it relates to computer graphics. These letters should also speak to the applicant's professional maturity and academic ability. For applicants that have been in the workforce for several years, positive letters of recommendation attesting to the candidate's knowledge gained while on the job are also helpful.
- *Professional Experience:* Consideration will be given for any internship, co-ops, or professional work experience and its relationship to the applicant's undergraduate degree program and the candidate's Statement of Purpose for admission to graduate school. Work experience that addresses any potential deficiencies in their academic background will be noted.
- *Nature of Academic Coursework:* Consideration will be given to the applicant's academic major and its inherent rigor. An applicant's profile should contain examples of proficiency within the CGT department's areas of core competency: creativity, technology, visualization, and communication. The CGT Graduate Review Committee may use this record as a guide for determining any potential conditions for admission related to coursework.
- *Graduate Core Competencies:* The applicant should appear to possess the ability

to become proficient within the CGT department's graduate core competencies during their course of study. These include:

- Research (investigate / explore via qualitative, quantitative or mixed modes of inquiry)
 - Methodology (procedures / logic / structure)
 - Application (of knowledge and skills)
 - Leadership potential
- *Portfolio Samples:* The applicant should provide at least four (4) examples of their CG-related work, and the work should be presented in a professional manner and of the highest quality. The samples presented should emphasize the applicant's area(s) of interest.
 - *Writing Sample:* The writing sample should exhibit the applicant's ability to develop a coherent and concise thought process, and it should clearly emphasize the applicant's area(s) of interest. The writing sample should be written at a level beyond the Statement of Purpose, such as a term paper, a conference article, or a journal article.
 - International applicants must also submit TOEFL scores. While there are no minimum GRE requirements, the University's Graduate School's web site lists the specific TOEFL score requirements for language proficiency.

The graduate review committee reviews only complete application packages. If an application is missing materials, it will not be reviewed.

Admission recommendations from the CGT Graduate Review Committee may be one of the following:

- Admit without conditions,
- Admit with conditions (and these conditions must be specified), or
- Deny.

2.3. Conditional Admission

Occasionally, a student who does not meet the standard for unconditional admission may be recommended for conditional admission, provided evidence is presented (e.g., a high performance on the Graduate Record Examination or a strong professional portfolio) which indicates that the student's potential for success is not adequately reflected in their academic record.

An applicant having interest in the computer graphics discipline may not have the technical, artistic, or mathematical foundations necessary to go directly into the graduate program. A prospective applicant for study in CGT that does not have formal education, training, or relevant experience in computer graphics may be required to complete prescribed **undergraduate** courses in CGT as part of his or her graduate study requirements as directed by the CGT Graduate Review Committee. Such courses **will not** be available for use on the master's degree plan of study and must be taken **before** enrolling in graduate-level computer graphics courses.

Conditional admission requires that certain minimum performance standards be established, such as “must achieve at least a 3.00/4.00 graduate index at the completion of the first twelve (12) credits following admission to the master’s degree program.” Any conditions placed on the applicant’s acceptance into the program will be monitored by the student’s major professor and the CGT departmental Graduate Administrative Assistant to meet conditions of acceptance will result in actions taken by the CGT Graduate Committee to place the student in probationary academic status. Such status will also be communicated to the Graduate School such that each semester the Graduate School will remove the eligibility to register for future sessions for all students who failed to satisfy their conditions of admission in the previous session. (Thus, there is a grace period of one semester). **Failure to improve academic performance once placed on probation will result in the dismissal of the student from the CGT graduate program (see section 3.0 for information regarding probation and dismissal).**

The CGT department will justify and indicate any conditions under which a student should have his or her eligibility to register restored allowing continuation of degree study. The justification is requested by a memo from the chair of the CGT Graduate Program and routed through the Graduate Administrative Assistant, detailing reasons why the student should be permitted to continue. Upon Graduate School approval, the eligibility to register will be restored.

2.4. Deadlines

The deadlines for completed applications are shown in table 2.1.

Table 2.1.
Deadlines for Graduate Program Application.

Domestic Applicants	International (outside the U.S.)	International (within the U.S.)
Fall - April 1	Fall - April 1	Fall - April 1
Spring - October 1	Spring - September 1	Spring - October 1
Summer - April 1	Summer - February 1	Summer - April 1

2.5. Time Limitation

A candidate for the master’s degree is expected to complete all requirements for the degree **within five years** from the completion of the oldest course on the plan of study.

2.6. Financial Assistance

The following two sections describe the availability of financial assistance and information about assistantship appointments.

2.6.1. Availability

A limited number of graduate teaching and research assistantships within CGT are available. All assistantship applications are to be directed to the CGT Department Head. Additional appointments are available from other departments of the University,

such as the Information Technology at Purdue (ITaP), the library system and student housing. Details on graduate fellowships might be found on the Purdue University Graduate School website <https://www.purdue.edu/gradschool/funding/>.

2.6.2. Assistantship Appointments

In order to provide opportunity for the student to progress satisfactorily toward the degree objective, graduate appointments will ordinarily be for no more than one-half time and for a maximum of two (2) academic years for M.S. students and three (3) academic years for Ph.D. students. Renewal of graduate appointments for additional time will be based on satisfactory performance in the position and academic performance toward plan of study requirements, as well as availability of positions.

Teaching assistantships (TA) and research assistantships (RA) include a tuition waiver during the semester the student has the assistantship. Normally teaching assistantships are not available in the summer. However, if a student has a teaching assistantship in the spring and the following fall semester, a tuition waiver for the summer is still available to the student.

***NOTE:** Assistantships DO NOT cover the cost of student fees assessed each semester.*

In order to receive an assistantship, please complete the following steps:

1. Fill out application (<https://tech.purdue.edu/degrees/ms-computer-graphics-technology/funding> in upper right hand corner)
2. Submit on or by: June 1st for Fall semesters and November 1st for Spring semester. Continuing GTA's are not required to submit another application.
3. Please submit to Graduate Program Secretary on or before dates above.
4. All International students applying for a teaching assistantship are required by the University to take the Oral English Proficiency Test (OEPT) before an assistantship can be granted. Please contact the Graduate Program Assistant with any questions.

New and continuing Graduate Teaching Assistants are required to be on campus one week prior to classes starting as you will be in pay status. You will be required to attend the Departmental, College and University meetings.

Know that assistantships are not guaranteed as it is dependent on the course needs of the department.

Please note that if a TA's class schedule conflicts with the TA's teaching assignment the TA might need to rearrange his/her class schedule in order to maintain the teaching assistantship.

Contact the graduate program assistant of this degree for more information about available assistantships.

2.6.3. Terms and Conditions of Assistantships

1. Graduate Student must remain in good academic standing.

2. Student must receive positive performance evaluation.
3. If you are an International Student you must pass the OEPT (Oral English Proficiency Test) before you will be considered for a position.
4. A student will not receive an assistantship if they are on probation.
5. Students receiving assistantships are required to be on campus the Monday prior to classes starting and are to stay on campus until the Tuesday after finals weeks. – Every Semester.

SECTION 3.0. POLICY ON MONITORING, PROBATION, AND DISMISSAL

Section 3.0 provides an overview to the monitoring, probation, dismissal and appeal policies in the department of Computer Graphics Technology.

3.1. Minimum Cumulative GPA Requirements (in graduate courses)

The department of Computer Graphics Technology has a specific GPA requirement for graduation as shown in Table 3.1, which is the same as the university requirement. Also shown are the GPA requirements for probation and dismissal relative to the department's programs. Sections 3.2 thru 3.5 outline the policies and procedures relative to probation and dismissal.

Table 3.1. *Graduation, Probation and Dismissal GPA Thresholds*

Graduation	3.00/4.00
Probation	2.75/4.00
Dismissal	2.50/4.00

NOTE: University requirements state that no grade of "D" or "F" is allowed in a course on the plan of study. Any plan of study course in which a grade of "D" or "F" is received must be repeated and completed successfully; it cannot be dropped from the plan of study.

3.2. Monitoring

Each semester graduate student performance is evaluated to ensure that the student is performing well and will graduate with a 3.00/4.00. Procedurally, this is done in the following way:

- Graduate student grades and academic progress will be monitored at the CGT's Office of Graduate Studies.
- Monitoring will begin after six (6) credit hours have been attempted and every semester thereafter in which the student is enrolled.
- Students are expected to maintain a cumulative grade point average of at least 3.00 /4.00 with no grade less than "B" and earn grades of "Satisfactory" in thesis research credit hours.

NOTE: Purdue policy permits the optional use of whole letter grades or + or -. Please be aware of the negative affect on grade such as a B-. The grade "B-" (B minus) is below the expected grade graduate student should earn in his or her courses

- If a student has a **semester** GPA less than 2.75/4.00 or a **cumulative** GPA less than 3.00/4.00, a letter will be drafted by the Chair of the CGT Graduate Program to the student, with a copy to the major professor, to the CGT Department Head, to the Graduate School, and to the student's file, indicating the last semester was determined unsatisfactory and that they are being placed on probation.

***NOTE:** Graduate students that receive an incomplete in a course will have one semester and 12 weeks into the following semester to complete the course. If that is not done, the Registrar automatically makes the grade a failure.*

3.3. Probation

Probation occurs when a student performs below the CGT standards in an individual semester. Procedurally probation means:

- If a student's **semester** GPA falls below 2.75 or if a student's **cumulative** GPA falls below 3.00/4.00, the student will be placed on academic probation.
- The CGT Graduate Studies Office will generate a letter informing the student, major professor, and department head of the probationary status. A copy will also be forwarded to the Graduate School and placed in the student's permanent record.
- **The student will have one semester to raise their cumulative GPA to the required level and return to good standing.** If they do not, they will not be able to register for classes the subsequent semester and will be dismissed from the program.
- While on probation, students are ineligible for a CGT assistantship.

3.4. Dismissal

- If a student's **semester** GPA is below a 2.50 or if a student's **cumulative** GPA falls below 2.75, the student will be immediately dismissed from the program.
- A student will be dismissed from the program if they remain on probation for one consecutive semester without improvement. This policy is independent of any assistantship the student may hold.

3.5. Appeal

- A student may appeal their probationary or dismissal status by contacting the CGT Graduate Studies Office in writing within thirty (30) days of the date of the requisite notification letter. The appeal should include the student's specific reasons for exception to the aforementioned policies.
- The appeal will be reviewed by a subcommittee of at least three (3) members of the CGT Graduate Education Committee, chaired by the CGT Graduate Program Head.
- If the review committee recommends reinstating the student, the student's graduate advisor/chair must approve. If the graduate advisor does not approve, the CGT Department Head will render a final decision.
- In cases where a student is reinstated without approval of the graduate advisor, a new advisor may need to be assigned.
- The decision of the appeal subcommittee and/or CGT Department Head will be considered final and will be delivered within thirty (30) days of the student's request for exception to probation.

SECTION 4.0. MASTER'S DEGREE PROGRAM STRUCTURE

Typically, the Master of Science in CGT degree requires that each student complete the requisite number of courses and successfully execute a thesis. Typically, proposal of the thesis occurs in the next to last semester of study (but this can vary). As a process, the Master of Science experience includes:

1. Coursework (27 credit hours)
 - a. Appointment of major professor
 - b. Selection of a committee (two people in addition to a chair)
 - c. Filing of the Electronic Plan of Study (EPOS)
 - i. Draft of the Plan of Study must be submitted by the end of the first semester of study.
 - ii. A final Plan of Study must be submitted by the end of the second semester of study.
 - d. Successful completion of all courses
2. Thesis
 - a. Thesis proposal and proposal defense meeting
 - b. Obtain appropriate certifications for research (CITI, HIPAA, FERPA, etc.).
 - c. Execution of thesis
 - d. Final oral defense of thesis

4.1. Program Credit Hour Requirements

The master's degree program administered through the department of Computer Graphics Technology requires a minimum of 27 credit hours of course work and six (6) hours of thesis research (CGT 698). The thesis must be defended through a public oral defense and examination meeting with the faculty advisory committee and any other interested parties.

4.2. Residency Requirements

The total number of hours of academic credit used to satisfy residency requirements consists of all course credit hours that appear on the plan of study, other graduate course credit hours with grades of "C" or better that appear on the Purdue transcript, and research credit hours with grades of "S" that appear on the Purdue transcript. In fulfilling these requirements, a maximum of 18 credit hours will be allowed from any one semester (maximum hours are proportional to length of summer session equals nine (9) credit hours).

4.3. Appointment of a Major Professor/Advisor

Each graduate degree plan of study is unique to the individual student and his/her background, experience, and degree objectives. To guide in the development of a degree plan, a major professor (advisor) will be appointed to chair the student's advisory committee and will assist the student through the program. A student may request a major professor in their application materials; but this request may not always be possible. It is based on advisement load, research commitments, and other factors. The major professor

will become the most important contact person, and the major professor/student relationship must be a mutually acceptable one. The major professor serves concurrently as advocate, mentor, and supervisor of the graduate student.

***NOTE:** A student may change major professor if their research topic changes significantly as a result of their course of study.*

4.4. Graduate Advisory Committee

Each student, with assistance and approval from the major professor, is responsible for establishing an advisory committee for his or her program. The duties of that committee are to advise the student in the preparation of the plan of study and to offer advice and assistance during the period of graduate work.

The committee consists of the major professor, one other member of the CGT graduate faculty (refer to section 4.3 and 4.4 of this handbook), and an advisor for the related area (who must also be a member of the Purdue University graduate faculty). Members of the committee need not be faculty with whom the student has taken course work. However, in practice this is usually the case. The request for appointment of the advisory committee is made on the same form (GS Form 8), and at the same time, as the request for approval of the student's plan of study (refer to section 5.0). In addition, each graduate student is encouraged to explore other areas outside the Purdue Polytechnic Institute as it relates to their professional goals and development.

The advisory committee is selected and established **once the student has a firm idea of their potential research direction**. This typically occurs in the first semester. The committee will then be in place to help the student develop the plan of study and review and approve the student's thesis proposal, which must be approved before actual work on the project or research may begin.

***NOTE:** The thesis proposal must be approved prior to the semester the student intends to graduate.*

The student should discuss the plan of study with the selected advisory committee members and must get their permission to list them on the plan of study before the plan is submitted to the CGT Graduate Studies Office. Should the need arise; changes in the advisory committee after the plan of study has been submitted will be handled on an individual basis through the Electronic Plan of Study form (EPOS) (refer to section 5.0).

4.5. Course Load Recommendations and Requirements

The maximum course load for graduate students is 18 credits (and occasionally 19 credit hours with special permission). Typically 18 credit hours translate into six (6) courses. Eight (8) credit hours is considered the full-time certification standard for graduate students by the Graduate School.

***NOTE:** To maintain full time status, international graduate students must take eight (8) credit hours per semester.*

Most students inquire as to how many classes they should take when they have an assistantship. Table 4.2 provides some recommendations as to how many credit hours are typical when also working as a teaching or research assistant.

Table 4.2. *Recommended Course Loading for Assistants*

Assistantship Load	Recommended Course Load
1/4-time assistant	12 to 15 cr. hrs.
1/2-time assistant*	9 to 12 cr. hrs.
3/4-time assistant	6 to 9 cr. hrs.

*Assumes 1/2-time is equivalent 20 working hours.

NOTE: A candidate for the master's degree is expected to complete all requirements for the degree within five years from the completion of the oldest course on the plan of study.

4.5.1. Reduced Course Loads for International Students

To maintain visa status, international students must maintain a fulltime load. Purdue's Office of International Students and Scholars (ISS) provides information about this requirement and offers a means for international students to request permission to take a reduced course load. Appendix B provides a visual example of the form. Graduate students desiring a reduced course load should work with ISS to request this before their course load is reduced below that required by U.S. Immigration rules. See the ISS web site for more information: <http://www.iss.purdue.edu/>.

4.6. Registering for Courses as a Graduate Student

Purdue University provides online scheduling of courses for all of its students via the *myPurdue* system. The software used for this system is called *Banner*. Typically the student works with his or her advisor to determine the appropriate courses to take for a given semester. Then the student works with the Graduate Administrative Assistant in CGT to sign up for courses. Typically students can self-register. A registration PIN number is required to perform self- registration. You will be informed of your PIN number at the time of admission from the CGT Graduate Office. However, at times students may need an 'override' to be able to register for certain courses. More information about registering for classes can be found at the Registrar's web site: <http://www.purdue.edu/registrar/> (see *Registration Procedures*).

It is the graduate student's responsibility to keep track of specific dates relative to course scheduling. These include deadlines for registration, deadlines for dropping courses and the like. The Graduate School announces these dates on its web site and typically the deadlines are emailed to students each semester at appropriate times.

4.7. Dropping and Adding Courses

To drop or add a course, the student uses the *myPurdue* system. Changes in variable credit courses will require the CGT Graduate Office to enter the changes. The Graduate Office must also set the desired credit hours (when a student enrolls, the default is one (1)

credit hour). Subsequently, be sure to confirm that a dropped or added course has been officially recorded by checking *myPurdue*.

Courses dropped during the first two weeks of classes will not appear on your permanent record. Courses dropped during weeks three and four will be recorded as a “W” grade on your permanent record (withdraw). Courses dropped during weeks five through nine require the signature of both the instructor and the CGT Graduate Chair. In such a case, the instructor must assign a grade of “W,” “WF,” or “WN.” Week nine (9) is the final deadline for withdrawing from a class.

***NOTE:** A “W” simply records the fact that the student withdrew after the second week of the semester. A “WF” records that the student was failing a dropped course. “WF” grades are not included in computing the GPA. A “WN” records failing status in a course being taken Pass/No Pass. “W,” “WF,” and “WN” grades are recorded on your permanent record.*

Courses added during weeks two through four require the approval and signature of the instructor and the CGT Graduate Program Chair. Courses may be added during weeks five through nine, but only under extraordinary circumstances. Courses added after the fourth week require the approval and signature of the instructor, the CGT Graduate Program Chair, and the head of the department where the course is offered (for non-CoT courses).

***NOTE:** Graduate students that receive an incomplete in a course will have one semester and 12 weeks into the following semester to complete the course. If that is not done, the Registrar automatically makes the grade a failure.*

SECTION 5.0. ELECTRONIC PLAN OF STUDY REQUIREMENTS

The philosophy of the Graduate School of Purdue University is that advanced study should be tailored to the individual and his/her professional and intellectual objectives. Thus, the plan of study is unique to each student's needs and desires. To facilitate such an individually tailored program, each master's degree plan of study consists of a primary area and one or more related areas. Both the primary area and the related area(s) are based on the relationship of the course content and not on the departmental course prefix.

The development of the plan of study begins as part of the initial course registration. The major professor will discuss the student's background, interests, and degree objectives as part of the preparation for the first enrollment. The major professor will also recommend possible related areas and advisors.

In addition to course work requirements, each student must complete and successfully defend a research project known as Thesis (CGT 698 Research MS Thesis). The plan of study should be developed to support this research requirement.

The plan of study must list all courses the student will take to meet the degree requirements. These include the names for the primary and related areas of study; the course number, course title, and credits for each course; the date when the course was or will be completed; and the research area. Research credits are listed in the notes field of the EPOS. The plan of study is electronically approved by each member of the advisory committee and the student. After review, the plan is electronically approved by the CGT Graduate Studies office. The plan is then submitted to the Graduate School for formal approval. After an approved Plan of Study is on file, committee and course changes can be made at any time up until graduation. This can be accomplished by clicking on the Create Change Request link available next to an Approved plan of study. The Change Request link will initiate a Change Request form. These procedures all occur electronically via the EPOS system.

Also, be sure to review the CGT Plan of Study Checklist to verify completeness of your EPOS before submitting it in final form:

Upon approval by the Graduate School, the plan of study becomes a contract among the student, the CGT department, and the Graduate School. When all requirements of the plan of study are completed satisfactorily, the student is awarded the Master of Science (M.S.) degree. Refer to the sample plan of study form in Appendix C. Appendix C shows a flowchart of the EPOS creation and approval process.

NOTE: *If a course in the plan of study is not available when the student needs it, or if the direction of the student's research topic changes, students can submit an EPOS change of plan of study. Once filed, the change request requires prior signatories to approve the requested change.*

5.1. Primary Area

All plans of study will have a primary area focused in Computer Graphics Technology. The primary area will have an applied research, management, or teaching emphasis. The plans of study require 33 semester hours (including the six (6) semester hours in CGT 698 Research MS Thesis), with a minimum of 12 semester hours in courses from CGT. The primary area for the Master of Science in Computer Graphics Technology must include the following core courses (or acceptable equivalents):

Number	Credits	Title
CGT 501	0	Seminar in CGT
CGT 511	3	The Development of Graphics in Technology
STAT 501	3	Experimental Statistics I (or IT 507, STAT 511, or PSY 600)
TECH 646	3	Analysis of Research in Industry and Technology
**CGT 611	3	Pipeline Development Course

Courses included in the primary area (other than the four required core courses above) should be selected to enhance the career goals of the student. Undergraduate courses (300- or 400-level) may not be included in the primary area of the plan of study without special permission from the CGT Graduate Education Committee.

** CGT 611 is not a requirement for graduate students who started the program in Fall 2014 and after.

5.2. Plan of Study Guidelines

Table 5.1 provides guidelines for the CGT M.S. Plan of Study.

Sample Plan of Study

1 st Semester	2 nd Semester
(1cr) CGT 501* take in 1 st Semester	(3cr) CGT Course
(3cr) STAT 501, 502, 511, or IT 507	(3cr) CGT course
(3cr) CGT 511	(3 cr) Related course
(3cr) CGT course	
3 rd Semester	4 th Semester
(3cr) TECH 646	(5cr) CGT 698
(3cr) Related area	*Registered as a Candidate
(3cr) Related area	Defend Thesis
(1cr) CGT 698 – defend proposal	

Table 5.1

Plan of Study Guidelines

CGT Primary Area Core:	<i>10 credit hours</i>
CGT 501 (0)	Seminar in CGT
CGT 511 (3)	The Development of Graphics in Technology
IT 507 (or equivalent) (3)	Measurement and Evaluation in Industry and Technology

TECH 646 (3)	Analysis of Research in Industry and Technology
CGT Primary Area Selectives: (9)	<i>9 credit hours in any CGT courses or TECH courses offered by CGT faculty.</i>
CGT Related Area: (9)	<i>9 credit hours (minimum) in any area(s) other than CGT</i>
Thesis Research (6)	<i>6 credit hours</i>

5.3. Related Area

Each plan of study must include a related area of at least nine (9) semester hours from an area other than Computer Graphics Technology. In some cases, there may be two related areas, if such a plan will enhance the student's professional goals. Examples of related areas on plans of study include: Management, Instructional Design, Art & Design, Curriculum and Instruction, Landscape Architecture, Civil Engineering, Industrial Engineering, Human Factors, Kinesiology, Theatre, and Perceptual Psychology, or one of the disciplines within the Purdue Polytechnic Institute (e.g., MET, CIT, BCM, etc.).

5.3.1. Undergraduate Credit in a Related Area

A related area may include undergraduate courses (300- or 400-level) **only when followed by appropriate 500- and 600-level courses**, and are subject to the approval of the student's advisory committee and the CGT Chair for Graduate Studies. Undergraduate courses listed in the related area must be in excess of the baccalaureate degree requirements. Graduate School policy stipulates that 100- and 200-level courses may not appear on a plan of study and that no more than six (6) semester hours of 300- and 400-level courses may be applied to graduate work and a grade of "B" or better is required.

5.3.2. Sources for Related Area Courses

Courses for the related area may be drawn from other colleges, schools and departments throughout Purdue University, or from other departments within the Purdue Polytechnic Institute.

5.4. Credit Limitations

The combination of undergraduate excess credit, transfer credit, post-baccalaureate registrant credit, and independent study credit included in a master's Degree plan of study must not exceed 15 semester hours. These credit categories are defined as follows.

***NOTE:** For students obtaining two M.S. degrees, a maximum of nine (9) Purdue credit hours (at the 50000- and 60000-level) are allowed to overlap between coursework required in the two degrees.*

5.4.1. Undergraduate Excess Credit

Undergraduate students attending Purdue University who have time available to take courses in excess of their undergraduate degree course requirements may earn a maximum of 12 semester hours of credit in 500- and 600-level courses which were taken and declared as graduate work on Registrar's Form 350 at the time that grades were filed for that semester. Undergraduate excess credit will be certified by the Registrar only if

the student:

1. Took the course during the senior year;
2. Received a grade of at least "B" in the course;
3. The course was designated as a graduate course; and
4. The student's work in the course was performed at the level required for graduate students in the course.

5.4.2. Transfer Credit

A maximum of half the required course credit hours completed at another institution may be included in the master's Degree plan of study. Graduate School policy states that transfer credit will be allowed only for courses in which a grade of "B" or better was obtained. A catalog description of the course and an official transcript showing completion of the course and the grade received must be submitted with the plan of study.

5.4.3. Post-baccalaureate Registrant Credit

The Graduate School has created an enrollment category known as "post-baccalaureate registrant" to enable those who have a Bachelor's degree to enroll in courses that are considered appropriate to the registrant's personal objectives. A limited amount of credit earned in this category is available for inclusion on a plan of study at the discretion of the advisory committee, the recommendation of the Associate Dean for Graduate Studies and the approval of the Graduate School.

A maximum of twelve (12) semester hours of graduate credit earned as a post-baccalaureate registrant may be included in a plan of study; no post-baccalaureate course in which a grade of less than "B" was earned will be permitted on the plan of study.

***NOTE:** The sum of credits earned as undergraduate excess credit and in post-baccalaureate registrant status that may be used on a plan of study is limited to 12 semester hours.*

5.4.4. Independent Study Credit

A maximum of six (6) semester hours of independent study credit (e.g., CGT 590, CGT 519, or EDCI 590) may be included in a plan of study. Registration for independent study courses will be permitted **only after the plan of study is initiated** (see section 6.0).

5.5. EPOS Acknowledgement of Thesis Requirement

When completing the EPOS, CGT 698 is not shown in the list of courses. Instead, this course (and associated credits) is acknowledged in the notes field. For example, the notes field may include the following:

“The student will complete six (6) credit hours of CGT 698 to satisfy the thesis requirement.”

5.6. Examination Requirement

Each thesis candidate must pass a final oral examination in order to graduate. The

final oral examination is considered public and is taken during the session in which candidacy is declared. The candidate's examining committee will conduct the examination and evaluate mastery of content related to the plan of study. A second purpose of this oral examination is for the student to defend the thesis. The final oral examination must be scheduled through the CGT Office of Graduate Studies no less than three weeks prior to the date of the examination. If the student's performance is not acceptable in one or more areas, the examining committee will specify what the student must do in order to eliminate any deficiencies.

5.7. Examining Committee

An examining committee will normally include the members of the student's advisory committee. Additional members may be appointed by the CGT Graduate Program Chair. The advisory committee chairperson (the major professor) may recommend additional members for appointment also (refer to the section 10.0).

5.8. Publication Requirement

Scholarship plays a very important role in the preparation of M.S. and Ph.D. students in the College of Technology. Graduate students need to understand the role of scholarship in higher education as well as its importance in disseminating new knowledge. CGT values the role and contribution of its faculty and students in its efforts to engage in discovery with impact. It is important that graduate students learn how to create and present scholarship as part of their academic training. For these reasons, CGT requires all Ph.D. students and M.S. thesis students to engage in scholarship.

- Refereed or reviewed journal article
- Refereed or reviewed trade journal article
- Refereed or reviewed conference presentation
- Reviewed conference poster

Exceptions to the above requirements have to be approved by the student's committee chair and the CGT Graduate Program Chair. Some other form of scholarship should be substituted for the above if the student requests an exception.

5.9. Recommended International Experience

Sources cite many benefits of study abroad programs for both graduate and undergraduate students, as well as faculty, within the university environment. In addition to learning about globalization and related issues, the experience of short term study outside the US, conducting international presentations, and leadership or involvement in international projects or project teams can have a positive professional affect on students. Purdue is a global institution and in the Strategic Plan one of the three major goals is "Meeting global challenges by enhancing Purdue's presence and impact in addressing grand challenges of humanity". For these reasons, an international experience is recommended for all graduate students in the Purdue Polytechnic Institute..

It is recommended that M.S. and Ph.D. students in the Purdue Polytechnic Institute participate in one of the following:

- Enrolling in one graduate level course dealing with globalization, internationalization, or culture (examples: ECON 534, EDCI 685, EDST 504, FR 581, GER 581, HK 581, JPNS 543, MET 527, MGMT 601 or 649, OBHR 650, OLS 578, POL 530, RUS 581, SPAN 682).
- Participate in a short-term study abroad course
- Participate in the Atlantis concurrent degree program
- Present a paper at an international conference outside the U.S.
- Participate in an international industrial project that requires travel abroad or interaction with international participants

SECTION 6.0. REGISTRATION FOR AN INDEPENDENT STUDY COURSE (CGT 590 or CGT 690)

Independent study courses are only allowed if they (1) supplement existing courses in the curriculum with deeper study in a subject area, (2) delve into topics not currently covered in the CGT curriculum, or (3) work on specific developmental projects that are designed to extend the student's knowledge in a particular area. In all cases the course requirements must equate to the required effort that justifies the level and credit provided by the course. An independent study cannot substitute for an existing, permanent CGT course. A maximum of six (6) credit hours of independent study are permitted on any program plan of study. Additionally, independent study courses should not repeat, nor be used for remediation of, content already covered in other existing courses. Independent studies must be reviewed and approved by the student, course instructor, student's academic advisor/chair, the graduate committee (for graduate students) before the start of the semester in which the independent study is to begin. Lastly, graduate students must have an approved plan of study on file to be eligible to enroll in an independent study course.

Registration in CGT 590 or CGT 690 may not be initiated until all of the following procedures have been satisfied. (Note CGT refers to departmental prefix code.)

NOTE: CGT 690 is limited to doctoral plans of study only and can only be offered by faculty holding an earned doctorate.

6.1. Process

For an independent study, the student and instructor must fill out an independent study authorization form containing a 16-week schedule of activities (with milestones or deliverables) and respective due dates. The student, course instructor, and student's academic advisor/chair signs the form and provides it the graduate committee. The form must then be reviewed and approved by the committee. The chair of that committee then signs the form giving either approval or denial of the request. If the request is denied by the committee, the committee chair returns a copy to the student's academic advisor/chair for record keeping and conferral with the student. If the request is approved by the committee, the committee chair provides the form to the department head. The department head has final approval authority. After approving or denying the form, the department head signs the form and returns a copy to the student's academic advisor for record keeping and conferral with the student. Only upon department head approval is a student allowed to be enrolled in an independent study course. The entire independent study process must be completed prior to the start of the semester in which the independent study is to begin.

6.2. Procedural Requirements

To enroll in an independent study the student must:

1. Obtain an independent study authorization form from the CGT Graduate Studies web site at https://tech.purdue.edu/sites/default/files/files/CGT_Independent_Study_Authorization_Nov_2010.doc. This form is a request for permission to enroll in an independent study course (refer to the sample form in Appendix D for an example of the Independent Study form).
2. Meet with your professor to discuss your proposed study and secure his/her approval for the project you envision.
3. Incorporating your professor's input, prepare a detailed project prospectus (typed or word processed, use APA format, title page), including the following indicated sections:
 - a. Problem: Define the rationale and delimit your problem area (explain your interest in pursuing the project, why this area is of concern to you). How does this project relate to your degree objectives?
 - b. Purpose and Objectives: What do you hope to accomplish? Provide a physical numbered listing of all objectives you expect to accomplish.
 - c. Procedures: Explain the methods you expect to use and any unusual requirements for materials, equipment, or facilities. A graphical time line and two progress reports from the student must be submitted by the student to the professor in charge between weeks three and ten of the semester. Specifically, indicate key deadline dates for each progress report and deliverable. Provide a narrative, flow chart, or outline of step by step procedures used to complete this study. If applicable, provide a supply and material cost worksheet.
 - d. Outcomes: What will be the tangible results (deliverables, i.e. software source code, papers, reports, products, or summaries) of your study? Who will receive copies (office, professor, co working professor, and student)? Will you conduct a formal presentation of your results?
4. Meet with your professor in charge to discuss and refine your project prospectus.

NOTE: This prospectus should be about one to three pages in length. A good way to prepare a prospectus is to subhead it using the above categories and present the information below each subheading.

- e. 16-week outline: The 16 week outline should include a week-by-week listing of any meetings, milestones or other deliverables, along with associated due dates, that the student will undertake.

5. Revise the prospectus as necessary. Complete the INDEPENDENT STUDY AUTHORIZATION FORM (refer to the sample in Appendix D); attach it to the front of the prospectus; and secure the signatures of your academic advisor and the professor in charge of the independent study course you will be taking before pursuing the approval and signature of the appropriate committee.
6. Submit the signed copy of your request to the CGT Graduate Secretary, requesting that it be given to the appropriate committee for review.
7. Once the request for an independent study course is approved, the course will be available for registration.

***NOTE:** Independent study credit may not be used for graduate research credit (i.e., as a substitute for required CGT 698 credit hours).*

SECTION 7.0. THE CGT THESIS

The following sections describe in detail information related to the thesis requirements within CGT.

7.1 The Master's Thesis

A master's thesis in CGT is a significant piece of original work, typically involving research, a formal written description of that research, and an oral defense of the research. Typically, the thesis contributes new knowledge to the discipline against the backdrop of what others have contributed to the topic as well (via the literature review). The tone should be scholarly, with a primary audience of other researchers. The thesis is more than a term paper but less than a doctoral dissertation. For example, a synthesis and description of others' research and writings alone may be appropriate as a term paper. While a comprehensive "review of the literature" must be included as a section of the thesis, it is not sufficient by itself. On the other hand, a doctoral dissertation might use an experimental or survey methodology involving large numbers of subjects on a national or international level. A master's thesis may be narrower in scope, being restricted to a local problem, a smaller number of subjects, or a conceptual model. A thesis should not just be an expression of your opinions; conclusions and opinions must be based on research results and analysis.

To pursue the development of a thesis, students must first develop a thesis proposal and secure its approval by their graduate committee. A formal meeting of the student's graduate committee is required to evaluate the proposal and CGT's Graduate Studies Office is to be provided a copy of the approved proposal with a CGT Form 2 carrying the signatures of each committee member. Proposals are developed pursuant to student enrollment in one (1) to three (3) credit hour(s) of CGT 698 Research M.S. Thesis. Subsequent enrollment in CGT 698 for the additional required credits is contingent upon filing of the approved proposal. Students may receive no more than six (6) credits for CGT 698 on their EPOS.

7.1.1. Key Points about the Thesis

1. A thesis typically addresses a theory or knowledge gap. Often it does so by testing or evaluating or by developing and validating a concept or methodology.
2. Theses require documentation of the significance of the problem or gap in knowledge they address (i.e., they make a contribution to the discipline).
3. All theses result in a clearly identifiable new (requires documentation of originality) knowledge of significance.
4. Generally theses involve the use of one or more of the accepted research paradigms and established research techniques. They may be quantitative or qualitative in nature. They may involve historical or philosophical, scientific or technological perspectives. They may be experimental, descriptive or developmental in methodology. Other forms/paradigms of research scholarship may also be employed if approved by the committee.

5. The Thesis format must follow the *Purdue Graduate School Thesis Guidelines* as supplemented and detailed in this handbook. The format is APA citation format with some specific differences (see section 8.4 and 8.5).
6. Theses demonstrate a high level of reasoning, effective written communication, and are documented in a form that permits replication.
7. Theses are necessarily filed in Purdue's library (via the E-pubs section). Theses containing intellectual property are marked as confidential and not made publicly available.
8. Theses are filed with the University and the *ProQuest* Repository (<http://www.proquest.com/>). Theses containing intellectual property are marked as confidential and not made publicly available.
9. Statement of Integrity and Code of Conduct:
http://www.purdue.edu/purdue/about/integrity_statement.html

SECTION 8.0. THESIS PROCEDURES

Section 8.0 outlines specific procedures related to completing the thesis requirement. Procedurally a student must:

- a) Enroll in CGT 698 (typically one (1) to three (3) credit hours) to generate and successfully defend the thesis proposal. Proposals typically include chapters 1 (introduction) thru 3 (methodology).
- b) Defend proposal in front of graduate committee. The graduate committee is comprised of three (3) faculty. Students typically do a 20 to 30 minute presentation with sufficient time remaining for committee members to ask questions and help guide the proposed project.
- c) Obtain appropriate approvals (if applicable) to conduct research (CITI, IRB, HIPAA, FERPA, etc). See Section 9.0 of this handbook for more information.
- d) If approved, execute the thesis (during this time students enroll in subsequent required hours of CGT 698).
- e) Upon completion of the thesis students must meet with the CGT Thesis Advisor for approval of their format and then defend project in front of graduate committee.
- f) Upon successful defense of the thesis, students must deposit thesis with the University, deposit thesis with the department, and deposit thesis with committee.

8.1. Thesis CGT 698 Research M.S. Thesis Enrollment

Exact enrollment procedures can vary, but at least two consecutive enrollments in CGT 698 are required. Typically, **the first enrollment is for one (1) to three (3) semester hour(s) of credit in the next-to-last academic term** (but earlier enrollment is permitted if appropriate). During this academic session, a proposal is developed and approved by the advisory committee. Subsequent registration in CGT 698 is not permitted until the approved and signed proposal has been filed in the Graduate Studies Office. **The second CGT 698 enrollment is for three (3) to five (5) semester hours of credit**, in which the study is conducted, the final thesis written, and the study defended in an oral examination.

***NOTE:** The thesis proposal defense and the thesis final defense CANNOT occur in the same semester.*

Should the student not complete the project in the two enrollment periods, s/he is required to enroll for one (1) semester hour of credit each term until the project has been completed. The candidate must be enrolled in CGT 698 for at least one (1) semester hour of credit in the academic session in which the degree is awarded.

8.2. Grades for CGT 698 Research M.S. Thesis

Performance in any CGT 698 Research M.S. Thesis course is graded using the following scale:

- Satisfactory – used where the student has met or exceeded requirements for

satisfactory progress.

- Unsatisfactory – used where the student has not met requirements and has not invested appropriate amounts of effort.
- Incomplete – used where the student has invested appropriate amounts of satisfactory effort but the project is not yet finished.

8.3. Thesis Proposal Defense

Once the thesis proposal has been completed (the proposal typically includes the first three chapters of the thesis), the student works with the graduate chair to establish a meeting of the graduate advisory committee for defense and approval of the proposal. Typically the student does a 20 to 30 minute presentation, with sufficient time left to answer questions. Once the proposal is approved by the committee, a copy of the CGT Form 1 (signed by all committee members and the graduate student) and the final proposal are deposited in the CGT Graduate Studies Office. See Appendix F for an example of the CGT Form 1.

NOTE: The proposal defense and the final defense of the thesis CANNOT occur in the same semester. The proposal defense meeting must be scheduled two (2) weeks in advance of the date of the proposal defense. The proposal must also be provided to the committee two (2) weeks in advance of the date of the proposal defense.

8.4. APA and Formatting Requirements Theses

Theses in the CGT follow the university guidelines for formatting. Generally the formatting is aligned with the APA parenthetical citation format with some specific additions or modifications.

Theses (for both proposals and final documentation) must utilize the document templates provided by the university. Templates are provided at the following URL:

- University Templates:
<https://www.purdue.edu/gradschool/research/thesis/templates.html>

8.4.1. Notes about the Templates

The following lists some things to note about using the templates and formatting in general:

- In the required course, TECH 646, students will be familiarized with the templates and use them to generate their projects in the course. Most students take TECH 646 in the same semester that they intend to defend their proposal.
- The University template will not automatically format all elements as needed within CGT. Specific elements such as: figure captions, table captions, table verticals, table of contents, and list of tables and figures will require some manual adjustments to get them to format correctly.
- All students will have their formatting reviewed by the CGT Thesis Advisor

- (usually, the CGT Graduate Committee Chair) prior to their final thesis deposit.
- The Graduate School at Purdue typically hosts workshops on the use of the thesis templates each semester. Consult the Graduate School web site for the dates and times of these workshops.

8.5. Preparing Thesis Proposals

Generally each proposal has similar sections, but the order of the sections may vary as every individual and every proposed project is unique. The exact approach that the student takes is ultimately at the discretion of the major professor (advisor) and the student's graduate committee.

Proposals must be succinct and direct. Clear, jargon-free prose that establishes the need for the study and a proposed method of solution are required—nothing more (or less). While CGT faculty have not established specific proposal length requirements, a proposal should be sufficiently detailed to enable the graduate committee to render effective judgment and share appropriate advice on how to proceed. Typically, proposals are 30-50 pages (including figures, tables, and references but not counting appendices) to communicate essential detail.

Beyond content, there are two important factors in the writing of any professional paper, be it a proposal or a final report. One factor is format; the other is style. Format is the physical layout of a paper. Rules for indentation, type face, line length, etc., are considered format issues. Style requirements are created to facilitate clear communication. Globally, style indicates the manner of expression and the sequence in which material is organized. At a micro level, style concerns formality, person, tense, spelling, and abbreviation standards. Both format and style are important, and both have their place. Most publication manuals include both style and format guidelines.

Proposals are always written in future tense. Thus, statements that refer to procedures should be stated as, "This proposed study will collect data using . . ." or "Results of this study will be used to . . ." Similarly, CGT standards recommend that the proposal be written in third person. However, depending on the type of work being executed, first person writing may be acceptable. For example, most quantitative research projects use third person. Most qualitative research projects use first person. Students should consult with their graduate chair and discuss which is appropriate based upon the direction of their research and the methodology they intent to employ.

8.6. Thesis Proposal Contents

The following sections provide an overview of the major parts of a thesis proposal.

8.6.1. Thesis Cover Page

The thesis cover page is established based upon the University formatting guidelines. Appendix G shows an example of the thesis cover page. Note that the thesis and dissertation use the same page format. The thesis template (if macros are turned on)

will allow the user to select the appropriate elements from a drop down list. Students should fill in the thesis title (in all caps), type (Thesis), name, and graduate month and year of the thesis cover page.

Once approved, the thesis proposal is filed with the Office of Graduate Studies in the CGT following the proposal defense meeting. This original document then becomes the contract for the thesis. Students must also submit CGT Form 1: *Acceptance of Graduate Proposal* (see Appendix F).

8.6.2. Abstract

The student must prepare a one (maximum) page abstract that succinctly describes the proposed problem to be addressed, purpose for the study, the significance of the proposed study, an overview of the proposed methods to be employed and of the anticipated deliverables. Typically this section is less than 400 words.

8.6.3. Chapter 1: Introduction

The form of the introduction will vary with the nature of the proposed project; however it usually does not have a heading. Typically it ranges from one to two pages in length. It is important to remember that this is the sole chance to establish a frame of reference in the reader's mind. Appropriate introductions are brief and designed to establish the need for a study. There is no "right way" to write an introduction. There are, however, several possible ways to craft an introduction that will accomplish its intended goal. One common method is to identify the problem in a global way (without specifics). This approach creates an overall frame of reference that makes it much easier for the reader to focus on the more detailed portions of the proposal.

8.6.3.1. Statement of the Problem

There is no section of a proposal that gives beginning proposal writers more challenge than the "Statement of the Problem" section. Too often early drafts present either a restatement of the introduction, a detailed description of the methods to be used, or a suggested solution. None of these are appropriate statements of the problem. A problem is something that is wrong. Therefore, the statement of the problem is merely a brief description of what is wrong, written in specific enough terms that the reader can see the problem and not simply a problem space. One test of the quality of a problem statement is always, "Could the problem be recognized if the statement were being read for the first time?"

8.6.3.2 Research Question/Hypotheses

Once the statement of the problem is generated, where applicable, the research question and hypotheses follow. The research question is a testable statement of the problem. For example, maybe the statement of the problem acknowledges that a new method of learning is needed within a particular class. The research question would then be phrased, "What is the effect of learning technique X on scores in class Y?" This statement would be used to generate hypotheses that could then be tested statistically.

Another example might be that a new algorithm is needed to solve a problem on

in some computer domain. The research question might be, “Can an algorithm be developed to solve computer security in educational environments?” In this example, rather than statistics being used, the student might create the algorithm, test it, to see if it works or does not work under certain conditions.

A final example might be that company X needs to solve a workflow issue in a manufacturing process. The research question might be, “Can software X be used to make the workflow in company ABC more efficient and effective?” In this example, maybe the student will implement the software and then report on the effect related to efficiency and effectiveness.

While these are merely examples (and should not be assumed to fully define the wide range of CGT theses), nearly all projects should have a defined research question that is derived from the statement of the problem. Such a question should also be testable. Whether a thesis has hypotheses will depend on the type of research being conducted (quantitative or qualitative).

8.6.3.3. Significance of the Problem

Once the problem has been stated, the significance of the problem must be established. The significance section should be drafted in a manner that removes any question of the importance of the proposed study. This is the part of the proposal in which the proposed project can be tied to the student's overall plan of study and career goals. Generally, this section should "sell" the project as being worthy of doing in the business/industry and/or academic/disciplinary context. Often students will also deal with how or why this is important beyond the confines of Purdue. What contribution will be made to industry, academia or the world at large as a result?

One of the effective methods of strengthening this section is to highlight key citations from credible sources that indicate that the problem is real and that things would be better if it were solved. However, this should not be overdone. Selection of two or three major supporting pieces of literature is sufficient.

8.6.3.4. Statement of the Purpose/Scope

Once the problem and its significance have been stated, the purpose of the project must be described. Here is where the student indicates what they propose to do about the problem, that is, what part of it they wish to address and what the deliverables of their work will be. Often this section will also be used to define and limit (generally) the scope of the project. Typically the nouns and verbs that are a part of the statement of the problem or research question will be clarified and bounded. Later in the proposal the assumptions, limitations and delimitations provide further insight related to the scope and outline specific details related to scope limitation.

8.6.3.5. Definitions

Definitions must be included in a proposal whenever it is necessary to inform the reader of the unique way in which the terms are to be used in the proposed research. For example, if learning is to be defined as "a change in behavior", both the entering and

terminal behaviors must be defined. But, when terms are used in standard ways, it is not necessary to include the definitions.

An important issue to remember related to definitions is that each definition should have an associated citation. The students use (and definition) of terms should be based upon the academic or industrial literature. As such, because definitions usually use the words of others, most definitions are typically directly quoted source material. When this is the case, the citation should include source, date, as well as page number where the material occurs.

Definition lists usually also include acronyms and abbreviations. Be sure to spell out all acronyms or abbreviations not only in the definitions list, but also in the first instance of their use in the body text of the proposal. The sample paragraph below is what you should NOT do.

What would happen if the president of the BBB requested the assistance of the FTC in order to convince the DOC that it should investigate the effect of WSJ interference with NAFTA signatories regarding concerns about the impact of UL standards on GATT?

The preceding paragraph demonstrates the inappropriate and excessive use of acronyms. If acronyms are used to reduce volume/repetition in a proposal, convention requires the term to be spelled out in full the first time it is used and then followed by the acronym in parentheses. Thereafter, the acronym may be used in lieu of the full term. Even when spelled out on first use, abbreviations or acronyms should appear in the definition list.

8.6.3.6. Assumptions

Every study requires some assumptions; they will vary with the type of problem. Typically assumptions are things that could affect the results of the project, but are beyond the researcher's control. For example, one assumption could be that all members of the group being studied know Windows-based operating systems. Another assumption may be that employees will be willing to participate in the training exercise being proposed. Assumptions, of course, must be established as part of the proposal writing stage and they must be approved by the major professor and committee.

8.6.3.7. Limitations

Limitations are descriptions of potential weaknesses of a study. If the student knows about these at the time of generating the proposal they are advised to reveal them explicitly in advance. Often, however, in addition to any weaknesses known in advance of conducting a project, some invariably arise during the course of project execution. When this occurs, these new limitations are to be added to the limitations section of the final project report and they must be taken into account when discussing the project conclusions.

***NOTE:** The approved proposal is the contract for the study. If the proposal were ambiguous about its limits, the student could be required to gather further information to fill in missing gaps. It is very important to outline limitations in the proposal as they often assist in making sure committee expectations and student expectations match.*

8.6.3.8. Delimitations

Delimitations are restrictions in the scope of a project, that is, specific statements about things that you will NOT address. There are always constraining factors in a study. This is particularly true of projects in which time, money, and other resources are limited to those that the individual student can bring to the study.

A delimitation is a factor that will narrow the scope of the study being proposed. This is a factor that is known about before the study is performed. For example, one delimitation may be that time does not allow a follow-up after the initial treatment or evaluation. Will the study be limited to a single facility of Corporation X, or will it be conducted at multiple sites? Clearly, a multiple-site study is more generalizable than a study at a single location. However students must strike appropriate balance between generalizability and resource limits.

***NOTE:** Delimitations are distinctly different from limitations. A limitation is a potential weakness in a study. A delimitation is a specific, conscious limit in scope. Limits affect inference; delimits affect breadth of study.*

8.6.4. Chapter 2: Review of Literature

The review of literature serves several important functions. First, it is a method to indicate that the problem is more universal than the specific proposal. Second, it serves as a justification for the proposed study in that others have addressed related problems. Third, it positions the work in the field giving context to what has and has not been done and where this thesis is positioned therein. Fourth, it identifies possible methods for the conduct of the study by identifying possible data collection strategies, statistical procedures, or sources of other procedural information.

There are three principle justifications for additional investigation of a problem. One justification is that there are plausible alternative hypotheses to conclusions reported in existing studies. That is, there may be another possible variable that is influencing the results of existing studies. The second reason for proposing a new study is to determine if the reported study can be duplicated (replicated) in a new environment. A third reason for conducting a study accounts for the introduction of new data or procedures that have become available. In this case, the review of literature serves to demonstrate that no examples of the use of new techniques could be found.

Typically the review of the literature includes some appropriate description of four sections:

- A description of the problem and its significance

- A description of the methodology and terms employed to conduct the review of the literature itself
- A description of the literature pertinent to choices of data collection and analysis
- A summary of the review of the literature section

For the purposes of a proposal, the review of literature should focus on the key studies. These cannot be determined without extensive review of the literature prior to the preparation of the proposal. The review must be sufficiently extensive to insure that all sides of an issue have been researched and that a balanced evaluation of the problem area has been accomplished. Only the most germane or seminal studies should be included.

Committee members will typically ask discipline- and literature-based questions regarding the problem, significance, purpose and procedure sections. While it is imperative that the proposal's literature review be summarized, it is equally important that extensive literature review be done before undertaking the writing of the proposal. It is infinitely easier to do a thorough research review prior to the writing of the proposal for another reason: the more the problem is studied, the more possible solutions will be discovered. Also, it should be noted that reviewing of the literature does not cease after a proposal is accepted. Typically, effective researchers/developers continue to review the most pertinent literature throughout their conduct of the study. Subsequently, all appropriate literature will be integrated into the final report/thesis, so the time and effort will not be lost.

The review should generally concentrate on the current literature. For example, if the student is interested in a "Hawthorne effect" study, reference to the original work is only appropriate in a historical context. Failure to review the current literature can fatally flaw the proposal. A study that has recently been conducted may inadvertently be proposed.

8.6.5. Chapter 3: Methodology

All procedures to be used in the proposed study should be defined. Whenever possible, the proposed procedure should be justified by reference to other published studies that were used and recommend the steps defined. This will insure that the advisory committee understands the steps the student wishes to take and establishes those steps as appropriate in other published studies.

Theses in CGT typically include the creation of something and an assessment of it. The "something" might be an intervention to be used on humans, an apparatus, a new process, a new technology and so forth. However, this alone is not sufficient for a thesis. The thing created must also be assessed or evaluated. This assessment could be a physical test (such a testing the new thing to see how it performs) or a statistical test (such as comparing measures before and after and executing statistics on it to evaluate how it performs).

Most theses can be classified along multiple dimensions as to the type of research

being done. Projects can fall in to the following classifications:

- Quantitative, qualitative or mixed methods
- Clinical or technical
- Human subjects or “things and stuff”
- Theoretical or applied

The important thing to note about research in the CGT is that there is not one type or only one class of research. Research in CGT is as varied as the physical attributes of the students who choose to pursue their degree within it.

8.6.6. List of References

The reference list should include only the publications cited in the body of the proposal. All reference citations within the body of the proposal and the reference list must comply with the standards of the most recent edition of the Publication Manual of the American Psychological Association.

8.7. Obtaining Permissions to Conduct Research

To conduct research often requires various types of permission, depending on the type of research being conducted. For example, use of human subjects (even for what many consider innocuous research such as anonymous surveys) requires IRB approval. Section 9.0 of this handbook provides more information the various permissions that may be needed as well as further information.

8.8. Preparing the Final Thesis

Students must become very familiar with the Purdue Graduate School’s Thesis Manual and template even before they begin writing the final thesis. It is good practice for the student and their major professor to confer and agree on an initial outline for their thesis. Furthermore, to make it easier to establish consistency throughout their document, students are advised to also become comfortable with the paragraph heading style and outlining features of their word processor.

NOTE: Color figures may be used within the thesis.

NOTE: If a thesis is greater than 350 pages, it must be separated into two volumes. Consult with the Graduate School for how this is done.

8.8.1. Final Thesis Contents

The exact structure of a thesis is subject to committee approved adaptations as long as the resulting document still meets the requirements of CGT. The typical thesis consists of five chapters which are supplemented by some preliminary and appendix materials as shown in the outline below:

- Cover Page
- Abstract
- Dedication & Acknowledgements

- Table of Contents
- List of Tables
- List of Figures
 - Chapter 1: Introduction
 - Statement of the Problem
 - Research Question/Hypotheses (if applicable)
 - Significance of the Problem
 - Purpose of the Study
 - Definition
 - Assumptions
 - Limitations & Delimitations
 - Summary
- Chapter 2: Review of the Literature
- Chapter 3: Procedures and Data Collection - The outline of this chapter is highly variable, but typically it includes sections describing:
 - The methods employed to conduct the study
 - Justification for selection of the chosen methods
 - Instrument and data collection process development and validation
 - Description of the data collection
 - Chapter 4: Presentation of Data & Findings - The outline of this chapter is highly variable, but typically it includes sections describing:
 - Description of data conditioning and analyses
 - Presentation of the data
 - Discussion as needed
- Chapter 5: Conclusions, Discussion and Recommendations
 - Conclusions
 - Discussion
 - Recommendations
 - Summary
- List of References
- Appendices
- Vita

8.8.2. Chapter 4: Presentation of the Data and Findings

Chapter 4 of the thesis provides a presentation of the data. Typically chapter 4 does not include interpretations or conclusions; it simply presents the facts of what the data say. In quantitative research, this may be elaboration on the results of statistical tests, or the results of tests of an apparatus or new device. In qualitative research, this chapter typically presents the narratives from interviews, raw documents or other artifacts discovered. Interpretation of what the data mean, that is, conclusions made from the data, are typically reserved for chapter 5 of the thesis.

8.8.3. Chapter 5: Conclusions, Discussion, and Recommendations

Chapter 5 of the thesis focuses on the conclusions that can be drawn from the data, as well as discussion (where the conclusions are typically tied back or compared to the literature in the field and the existing findings in the field). At the end of this chapter

are recommendations; usually this is a discussion of parts of the thesis that could be expanded to form entire studies in their own right. Recommendation may also include things the researcher would have done differently in the current study.

There are different ways to structure chapter 5. Sometimes the writer will take each research question and its associated hypotheses and deal with them in turn (in the conclusions). At other times, other structures can be used. Ultimately, chapter 4 and 5 should be written as dictated by the research, the researcher, and the graduate committee.

***NOTE:** There are times when a thesis might have more than five chapters. Depending on the scope or breadth of the study, more chapters may be necessary. Typically chapters one (1) thru three (3) are standardized in the contents they contain. However subsequent chapters vary in title and contents depending on the research being conducted.*

8.8.4. Appendices

The appendices of a thesis are used to provide supporting materials to the work. There is no set number of appendices, nor is there a common structure. Related to structure, appendices are usually ordered in the manner in which they are referenced in the body of the material (and, indeed, all appendices should be referenced in the text body that occurs in the chapters). Some examples of items that might be included in the appendix of a thesis include:

- IRB or other approval documents that establish the ability to conduct the research or conduct it in a legal manor.
- Tests, surveys, or other instruments used in the study.
- Examples of code, programs or images used in the study.
- Transcripts of interviews, focus groups or other qualitative data.
- Raw quantitative data gathered during the study.

***NOTE:** With anything included in the thesis, the writer must insure that they maintain anonymity (where applicable) and do not break copyright agreements (for example, most tests are copyrighted).*

With all of these items, the goal is to provide enough detail in the thesis that someone else could take the thesis and replicate it.

SECTION 9.0. CERTIFICATIONS, PUBLICATIONS & INTEGRITY

The following sections provide information about certifications (FERPA, IRB, CITI, etc.) and resources available at Purdue. Information about research integrity, plagiarism and copyrights conclude this section of the handbook.

9.1. Certifications & Approvals

To be able access student information and to conduct research at Purdue University requires that faculty and students alike be certified in specific ways. Accessing student information requires FERPA certification. To conduct research requires CITI certification and IRB approval (when human subjects are involved). The following sections provide more information about these items.

9.1.1. Family Educational Rights and Privacy Act (FERPA)

To be able to access student information via Purdue’s various computer systems (such as myPurdue), faculty and students must be aware of certain legal issues associated with such data. FERPA protects and makes confidential student information beyond basic “directory information” about the student.

NOTE: Purdue University’s official FERPA policy is outlined in Executive Memorandum C-51 available at: http://www.purdue.edu/policies/pages/records/c_51.html

Purdue University requires that faculty and students who have a justifiable need to access student information be trained and certified. Faculty and students can become FERPA certified by accessing: <https://www2.itap.purdue.edu/SSTA/certifications/select.cfm?groupid=1>.

9.1.2. Collaborative Institutional Training Initiative (CITI) Certification

The CITI Program is a subscription service providing research ethics education to all members of the research community. Purdue University uses this system to certify faculty and graduate students to conduct research. Of particular importance, researchers involved in the use of human subjects are required to complete the CITI web-based education program in order to be certified as eligible to engage in human subject research at Purdue University. All researchers on an IRB protocol must complete the CITI training before the IRB protocol will be approved. To become CITI certified, faculty and students should create an account at <https://www.citiprogram.org/> and then go through the required training modules. Graduate students who serve as collaborators on research are also required to pass CITI certification.

9.1.3. Institutional Review Board (IRB) Approval

The IRB is a unit of the Human Research Protection Program (HRPP), which is housed within the Office of Research Administration (ORA), located in room 300 Hovde Hall.

***NOTE:** The IRB is an extension of the Office of the Vice President for Research (<http://www.purdue.edu/research/vpr/>). Faculty and graduate researchers should become familiar with the wealth of information available on the VPR's web site.*

The IRB website provides detailed steps, forms, and example IRB proposals for all Purdue University faculty and students conducting human subjects research. Researchers need to obtain permission to conduct any studies at Purdue University by submitting IRB proposals and completing certain workshops and online training protocols (see CITI Certification above).

9.2. Resources

The following sections acknowledge important resources provided by various units across campus.

***NOTE:** The Vice President for Research provides a handbook titled, *Research Handbook: A Guide to the Grants Process at Purdue University* located at: <http://www.purdue.edu/research/vpr/rschdev/documents/researchhandbook.pdf>*

9.2.1. Research Oversight

The Office of the Vice President for Research (VPR) provides much information for faculty and students concerning issues pertaining to research. The VPR provides research oversight concerning Export Control (transport of commodities, software, technical data and certain other information to foreign countries), use of controlled substances for research purposes, use of radiation/lasers, use of biologically hazardous materials, use of animals as well as research involving humans. Faculty and students should be aware of the information available, particular if their research includes any of these or if they are traveling abroad (<https://www.purdue.edu/research/vpr/rschadmin/rschoversight.php>).

9.2.2. Responsible Conduct of Research (RCR)

The RCR is a joint program between the Graduate School and the Office for the Vice President for Research. This program provides workshops, online training and tutorials, as well as assists in setting policy relative to the conduct of research at Purdue University. More information about the RCR is available at: <http://www.purdue.edu/research/vpr/rschadmin/rcr/>.

9.2.3. Purdue University Psychometric Instruction/Investigation Laboratory (PUPIL)

Purdue University Psychometric Instruction/Investigation Laboratory (PUPIL) Consulting Service, located in BRNG 3157 (phone: 496-3233), is available to respond to and provide resources for questions involving measurement/assessment, psychometrics, and educational and behavioral sciences empirical research. Their web site is located at: <https://engineering.purdue.edu/VPR/CORES/ptUnit?unit=Education>

9.2.4. Statistical Consulting Service (SCS)

The Department of Statistics provides statistical software and design consulting services for the University community – free of charge. The Statistical Consulting Service can help with statistical software problems and data analysis issues. *Statistical Software Consulting* provides assistance with the set up and running of a wide variety of statistical computing programs, including SAS, SPSS, Minitab and S-Plus. Software consulting is available in MATH G175 on a drop-in basis. *Experimental Design and Data Analysis Consulting* is available during the Fall, Spring and Summer semesters. Services include assistance with all phases of research projects: proposal preparation, design of studies, survey design, data input strategies, data import/export, analysis of data, interpretation of results, presentation of results, and other statistics or probability problems. More information is available at: <http://www.stat.purdue.edu/scs/>.

9.2.5. Center for Instructional Excellence (CIE)

The CIE provides valuable teaching resources (and teaching scholarship resources) to faculty. Graduate student TAs can obtain various certificates by completing a series of free workshops and seminars. The certificates include: Graduate Teaching Certificate (GTC), Graduate Teacher Certificate Alternative, Advanced Graduate Teacher Certificate (AGTC), Preparing Future Faculty Program (PFFP), and the Graduate Teacher Technology Certificate (GT2C). In addition, the website provides teaching tips, teaching consultation, and information about instructional data processing (e.g., test scoring and page scanning services). More information is available at: <http://www.cie.purdue.edu/>.

9.2.6. Sponsored Programs Services (SPS)

SPS assists Purdue's faculty, staff, and students in securing and managing sponsored program support, and in delivering maximum public benefit from sponsored projects. SPS manages the process of proposal submission, award management, reporting and various contracts that may result from a sponsored award. For more information about SPS and their services, see <http://www.purdue.edu/sps/>.

9.2.7. Discovery Park

Discovery Park, located adjacent to campus, is a collection of large-scale centers that lead Purdue's interdisciplinary research efforts. Some of these centers include Bindley Bioscience Center, Birck Nanotechnology Center and Burton D. Morgan Center for Entrepreneurship. There are various ways in which graduate students can engage Discovery Park. For more information, see <http://www.purdue.edu/dp/>.

9.2.8. Purdue Research Foundation (PRF)

The PRF is a nonprofit foundation that 1) manages gifts, bequests and endowments; 2) makes funding available to faculty, staff and students to aid in scientific investigation, research or educational studies; 3) acquires, constructs and improves Purdue's facilities, grounds and equipment; and 4) manages intellectual property developed at Purdue. More information about PRF is available at: <http://www.prf.org/>.

9.2.8.1. PRF Research Parks

The Purdue Research Parks are the result of Purdue University's commitment to spur economic growth in Indiana's high-tech sector. Under development since the late '90s by the Purdue Research Foundation, a private, nonprofit foundation created to assist Purdue, the parks are focused on companies operating in the arenas of life sciences, homeland security, engineering, advanced manufacturing and information technology. More information about the PRF Research Parks is available at: <http://www.purdueresearchpark.com/about/>.

9.2.8.2. Office of Technology Commercialization (OTC)

Purdue Research Foundation's Office of Technology Commercialization (OTC) operates one of the most comprehensive technology transfer programs among leading research universities in the United States. Services provided by this office support the economic development initiatives of Purdue University and benefit the university's academic activities.

Purdue's intellectual property is an asset we strive hard to protect, market and license. We work hand-in-hand with Purdue faculty-, staff- and student-entrepreneurs to provide the resources needed to better understand Purdue policies related to intellectual property and the processes whereby this intellectual property (patents, copyright, trademarks, and tangible research property) can become an actual product or service. To ensure the long-term success of the innovations, we take the process one step further – at times – and help our inventors form startup companies complete with investor support and qualified management teams. More information about the OTC is available at: <https://www.purdue.edu/discoverypark/main/assets/pdfs/dptour/Office%20of%20Technology%20Commercialization%20Material%203.pdf> .

***NOTE:** All faculty and students should be familiar with Purdue University's policy on intellectual property. See Purdue University's Policy VIII.4.1, Intellectual Property at: <http://www.purdue.edu/senate/docs/content/8AACD85A-ABE9-AABC-BD7BFF8ED6EA352F.pdf>*

9.3. Integrity

Purdue University has a tradition of ethical conduct spanning its history. As a land-grant institution, Purdue demonstrates responsiveness to its constituencies and extends to them access to our knowledge resources. We nurture relationships with other partners in education who support our vision or join us to foster common interests. We integrate our mission with our responsibilities. We contribute our knowledge resources impartially in serving our public purposes. As faculty, students, staff, and administrators, we are a community of dedicated learners, scholars, professionals, and practitioners - all contributing our talents to uphold our standards, and improve ourselves and the broader community in which we live and work. Our responsibilities and obligations toward the advancement of learning, discovery, and engagement in the University and in Indiana extend to our nation and the world. Purdue's statement of integrity is meant to provide an

overarching declaration that informs specific policies and procedures regarding conduct, enforcement, and accountability. Such policies and procedures either exist in official University documents or will be developed as necessary.

NOTE: Purdue's Statement of Integrity is available at: http://www.purdue.edu/Purdue/about/integrity_statement.html

9.3.1. Plagiarism, Falsification, and Fabrication

Purdue University maintains the highest academic and ethical standards research conducted by faculty and graduate students. It is important to note that the university sees the acts of plagiarism, falsification and fabrication as equal as acknowledged by the following university policy on research misconduct:

"Research misconduct" shall mean, for the purposes of this policy, fabrication, falsification, plagiarism, or other practices that seriously deviate from those that are commonly accepted within the scientific and academic community for proposing, conducting, or reporting research. It does not include honest error or honest differences in interpretations or judgments of data (Excerpt from the *Purdue University Policy on Research Misconduct (VIII.3.1)*).

9.3.1.1. Plagiarism

Plagiarism is serious violation of research conduct and every researcher, faculty and graduate student needs to be conscious of what it is, and how to avoid it. Plagiarism is to steal or pass off the words, ideas, or intellectual product of another as one's own. It is essentially literary theft as it regards works of a written nature. Plagiarism is typically defined as the use of four or more adjacent words from a specific source.

To avoid plagiarism, you must give credit whenever you use:

- Another person's idea, opinion, or theory;
- Any facts, statistics, graphs, drawings—any pieces of information—that are not common knowledge;
- Quotations of another person's actual spoken or written words; or
- Paraphrase of another person's spoken or written words.

9.3.1.2. Strategies for Avoiding Plagiarism

The following are some general strategies to avoid unintended plagiarism:

- Put in quotations everything that comes directly from the text, **especially when taking notes.**
- Paraphrase, but be sure you are not just rearranging or replacing a few words (which is conscious plagiarism). Instead, read over what you want to paraphrase carefully; cover up the text with your hand, or close the original source so you can't see any of it (and so aren't tempted to use the text as a "guide"). Write out the idea in your own words without peeking.

- Check your paraphrase against the original text to be sure you have not accidentally used the same phrases or words, and that the information is accurate.

9.3.1.3. Guidelines for Quoting and Citing

The following are some guidelines that can be used for determining when to quote and when to cite material from other sources:

- If paraphrasing or writing about the ideas presented by another, citation is necessary (Smith, 2008).
- If using four or more words (even with “permission to use”), quotation and citation is necessary. Quotations over 40 words long should be “blockquoted” as per APA format specifications.
- All quotations require a page number following the quotation or integrated into the citation.
- **If you are in doubt how to give credit, quote and cite the source.**

9.3.2. Self-checking for Plagiarism

To assist Purdue faculty and students, the Graduate School, in partnership with the Office of the Vice President for Research, has initiated this voluntary self-check service called *iThenticate*. The software checks submitted documents against thousands of articles that are published in journals and conference proceedings as well as text that appears on the Web. A similarity report is generated that highlights excerpts in the submitted document that match similar text in documents found in print and on the Web. Similarity reports can be helpful in detecting occurrences of inadvertent replication and neglect in referencing.

9.3.2.1. Rules Governing Usage

iThenticate is expressly for use as a tool for checking documents before submission to committees, journals, publishers, and archives, to help students and faculty prevent incidences of unintended plagiarism. The service is free for Purdue faculty and is only for individual use.

Use of the service by students is limited to individual work authored or co-authored by the student for the purpose of screening for potential plagiarism violations prior to submission. The screening service is not to be used for checking the work of others; screening articles of any kind previously submitted for publication; or screening documents of any kind previously submitted for deposit with the Graduate School, for review by an academic committee, or for archiving within the University.

Since the report generated by *iThenticate* only provides citations of language similarity, judgment on the part of the student is often necessary as to whether the submitted text is substantively different from similar text found in the literature. Students are encouraged to seek assistance from their advisors and to consult the Graduate School

resources - <http://www.purdue.edu/GRADSCHOOL/research/rcr/index.cfm>.

9.3.2.2. Procedure for iThenticate

It is the goal of the university to grant all faculty at Purdue the ability to use the *iThenticate* system. Students do not have direct access to the system. For students to gain access to the system, they must contact a faculty member who has access. However faculty can process documents on behalf of students and then provide the results.

Most CGT faculty have access to the *iThenticate* system. If you have a document you would like to have analyzed, contact your advisor and/or chair and she or he can submit it on your behalf, and provide the results to you. You may also request CGT's Thesis Format Advisor to process your document as well. Please note that as part of the Thesis Format Advising Process, all graduate students will have their thesis analyzed in the *iThenticate* system.

NOTE: The iThenticate system accepts the following file formats: Microsoft Word, searchable pdf, LaTeX, postscript, and plain text. Scanned documents converted to pdf or encapsulated in Word or LaTeX are not acceptable. Also note that you should delete all images from your file before submitting it for processing (so as to reduce file size).

9.3.3. Copyright Issues with Figures

Figures and images included in a publication can pose significant issues for authors. Generally, any figure that is directly from another source, such as a journal, book, or other publication (including web publications) are copyrighted. Including them within one's publication requires more than just a citation if used directly from the source. If you desire to use an image from another publication or from an online source, the safest course of action is to secure a release to do so. Otherwise, it could be classified as copyright infringement. A secondary method, albeit in certain cases it could still be considered copyright infringement, is to redraw the image. However, in many cases, redrawing or recreating the image is not enough to ensure it is still not a copyright infringement.

A release to use an image can vary from a specific legal document to a simple email. The key element of a release is that the "copyright holder" gives you permission to use the image for your purposes. Yet, determining who the copyright holder is can sometimes be quite difficult. And, often authors do not fully understand what rights they have.

If you want to use an image, the first course of action is to email the author of the source from which the image is being taken. A release from an author needs to include two things:

1. That the author has the right to grant use of the image.

2. That he or she gives permission for the image to be used for your specific purposes.

It is always a good idea, even if an author gives permission, to follow up with the publisher of the source from which the image is taken and ensure a release is not also needed from the publisher.

As with issues of plagiarism, copyright infringement issues resulting from the illegal use of images is a serious matter. The author should do everything in his or her power to ensure the legitimacy of the use of materials in his or her publications. It is safer to not include an image if you cannot secure appropriate permissions than run the risk of copyright infringement.

SECTION 10.0. POST-PROJECT/THESIS ACTIVITIES

The following section outlines the specific tasks and activities that occur once the student has executed and documented her or his thesis.

10.1. Appointment of the Examining Committee & Scheduling the Final Oral Examination

The examining committee will usually be the same as the student's advisory committee. The major professor and student are jointly responsible for finding a common date, time, and period when all advisory committee members can meet for the final examination and this must occur within the deadlines established by the Graduate School. The graduate student is expected to take initiative to begin this procedure in conjunction with the availability of the chair and graduate committee. Typically the Graduate Administrative Assistant in CGT will find appropriate facilities for the meeting. The date, time, period and equipment needed for the meeting are to be transmitted to the CGT Administrative Assistant by the student.

NOTE: The proposal defense and the final defense of the thesis CANNOT occur in the same semester. The final defense meeting must be scheduled two (2) weeks in advance of the date of the defense. The final thesis must also be provided to the committee two (2) weeks in advance of the date of the defense.

Following the notice of final examination date, the CGT Graduate Administrative Assistant will schedule an appropriate meeting room (equipment other than standard equipment offered by Purdue is the responsibility of the student to arrange).

10.2. Declaring Graduation Candidacy

In the semester that a student intends on defending their thesis, he or she must declare candidacy as they register for classes. An email that is initiated by the student is sent to his or her Chair and the CGT Administrative Assistant asking for permission to be enrolled as a Candidate by their Chair. The Chair will respond to the student and the CGT Graduate Administrative Assistant and if approved the CGT Graduate Administrative Assistant will proceed with registering the student for CAND for that intended semester.

NOTE: In order to be eligible to graduate, an approved Plan of Study must be on file with the Graduate School before the start of the final semester (see Graduation Deadlines Calendar on the Graduate School web page for deadlines).

10.3 Completing the CGT 698 Requirement

At the conclusion of the final oral examination, the major professor and each member of the examining committee will sign the Graduate School Form.

NOTE: The Graduate School permits NO EXCEPTIONS to its published deadlines. If all degree requirements are not met in the semester in which candidacy is declared, the student must register for one (1) semester hour of CGT 698 each subsequent semester until all requirements are met.

If any problems or deficiencies in the report are indicated by the examining committee, these must be corrected before the project or report will be approved by each committee member. In order for graduation to occur during any semester, completion of all required edits/corrections must occur and be approved before the established deadlines.

The last step involves submitting a copy of the approved project report to each of the following: University, department, and Graduate Committee. Sections 10.5, 10.6 and 10.7 cover each of these in detail.

10.4. Formatting Review for Theses

Students are required to contact the CGT Thesis Format Advisor **at least two weeks** before they defend their thesis. The CGT Thesis Format Advisor will review the formatting of your thesis and inform you of any formatting errors that you need to fix before depositing your thesis. A thesis formatting check is mandatory. If you do not meet with the CGT Thesis Advisor and get the electronic approval on Form 9, you **will not graduate** on time.

The Thesis Formatting Review requires that you email the CGT Thesis Advisor a copy of your thesis, and proof of completion of the CGT exit survey available at https://purdue.qualtrics.com/jfe/form/SV_d3UQnIKBx5QLc9L.

10.5. The Oral Defense of the Thesis

At most oral defense meetings, the student conducts a 20 to 30 minute presentation and then the faculty committee is allowed to ask questions. If time permits, guests in the audience may also ask questions, but this is at the discretion of the chair. Students should discuss the final defense meeting with her or his chair in advance to verify the method by which the chair will conduct the meeting.

10.6 University Deposit of the Thesis

Following successful defense of a thesis, students must deposit their thesis with the Graduate School. Information about the thesis deposit is available at <https://www.purdue.edu/gradschool/research/thesis/>.

NOTE: The graduate chair or the student may desire to hold the thesis in confidentiality status for a certain period of time. Both graduate chair and student must agree on confidentiality status.

10.7. Departmental Deposit of the Thesis

When filling out the Electronic Thesis Acceptance Form be sure to grant open access so the Purdue Libraries can include your thesis in the departmental collection in Purdue epubs.

10.8. Copies of Final Thesis for Graduate Committee

Most faculty prefer a traditionally printed and bound copy, whereas others might prefer a digital/electronic copy. Confer with your chair to determine which he or she prefers. Typically whatever is done for the chair is also done for the rest of the committee. If your chair requests a bound copy, the Purdue University Boiler Copy Center can assist you. Typically faculty request a “case (book) bound” copy. More information about this may be found at: <http://www.purdue.edu/printingservices/>.

10.9. Additional Requirements for Graduation

Additional items that M.S. students must complete for graduation include:

- *Graduate School Survey.* All students must complete the Graduate School Exit Survey if they wish to graduate. Students typically receive an email and/or notification in the *myPurdue* system that details how they complete this requirement.
- *Optional Copyright Fee.* If students would like their thesis to be officially registered with the U.S. Copyright Office, they may pay an additional \$65 fee.

10.10. Participating in Commencement

All graduating students are encouraged to participate in the university’s commencement ceremonies. This is a time justifiably used to reflect on your accomplishments with pride and to share in the success of others, including the faculty, as well. Information pertaining to commencement (dates, attire, etc.) is available via: <http://www.purdue.edu/registrar/>.

SECTION 11.0. OVERALL MASTER'S DEGREE PROCEDURAL CHECKLIST

To help students progress through their degree requirements, the following checklist will help map a path through the Computer Graphics Technology Master of Science. Specific and official deadlines are announced each semester via the Graduate School web site. Table 11.1 shows a helpful chart.

Table 11.1. *CGT M.S. Timetable*

Semester	End of the 1st	End of the 2nd	End of the 3rd	End of the 4th
Coursework	Complete CGT 501	Complete IT 507 or Stat 501	Complete TECH 646 Complete CGT 698 (1-3 credits)	Finish Coursework Complete CGT 698 (5-3 credits)
Advisor / Committee	Work with advisor on research area and possible committee members	Establish committee	Schedule/attend thesis proposal defense meeting	Schedule/attend thesis defense meeting
Electronic Plan of Study	Create/File draft EPOS	File Official EPOS	File EPOS Changes (as necessary)	File EPOS Changes (as necessary)
Thesis	Attend another student's thesis defense	Generate research idea	Thesis Proposal Defense (Chapters 1 – 3 complete) IRB or other required approvals	CGT Thesis Advising Appt. Final Thesis Defense GS Thesis Deposit Appt. CGT Thesis Deposit (e-Pubs) Committee Deposit
Graduation requirements				CGT Publication req. CGT Exit Survey GS Exit Survey Cap and Gown Order Attend Graduation

11.1. First Semester

1. If the transcripts submitted with the application for admission were not complete, arrange to have two (2) copies of the final transcript showing receipt of the baccalaureate (Bachelor's) degree sent to the CGT Graduate Secretary.
2. Sign up for and complete CGT 501.

With the help of the major professor:

3. Discuss your career and educational objectives and, within the framework of the CGT master's degree, draft a preliminary plan of study. Review the optional related areas as you work.
4. Begin selecting a master's committee consisting of your Major Professor and at least two graduate faculty members. At least two of your committee members must be regular, CGT graduate faculty. You may select one or more additional faculty to serve on your master's committee and in some cases this is clearly advantageous (see section 4.3 and 4.4 of this handbook).

5. Discuss the preliminary plan of study with each of the potential members of the advisory committee (see section 5.0 of this handbook).
6. Using the Electronic Plan of Study (EPOS) system, submit your draft plan of study (see section 5.0 of this handbook).
7. Refine the plan of study, if needed, based on the committee's suggestions.
8. Using the Electronic Plan of Study (EPOS) system, submit your final plan of study (see section 5.0 of this handbook) by the end of the second semester of study.
9. Identify a tentative thesis problem area.
10. Register for classes for the next semester following approval of the plan of study (see Section 4.6 of this handbook).

11.2. Succeeding Semesters

1. Register for classes as appropriate for the next semester (see Section 4.6 of this handbook).
2. Register for TECH 646 (during your second or third semester) and begin planning for your thesis (see section 8.4 of this handbook).
3. During your third semester at the latest, register for one (1) semester hour of CGT 698 and begin work on the thesis proposal (see section 8.1 and 8.2 of this handbook).
4. Schedule a defense meeting for the thesis proposal (at least two weeks in advance of the meeting). All committee members must be present. Once the committee has approved the proposal, submit the proposal and signed CGT Form 1 to the CGT Graduate Administrative Assistant (see section 8.5 of this handbook).
5. After the proposal is approved, begin work on the thesis (3 to 5 semester hours of CGT 698, to complete the actual thesis). (See sections 8.1, 8.2, and 10.3 of this handbook).

11.3. Final Semester

1. Register for any remaining courses on the plan of study (see section 4.0 of this handbook).
2. Ensure that any changes in your plan of study have been approved using the Change process within the electronic plan of study generator, located on *myPurdue* (see section 5.0 of this handbook).
3. An email that is initiated by the student is sent to his or her Chair and the CGT Administrative Assistant asking for permission to be enrolled as a Candidate by their Chair. The Chair will respond to the student and the CGT Graduate Administrative Assistant and if approved the CGT Graduate Administrative Assistant will proceed with registering the student for CAND for that intended semester.
4. Register for at least one (1) semester hour of CGT 698 (or the remaining number of hours to bring your total research hours to the minimum required). (See section 10.3 of this handbook).
5. Arrange the scheduling of the final oral examination at least three weeks prior to the exam date. Thesis students must provide the meeting details to the CGT Administrative Assistant who then submits a Request for Examining Committee (GS Form 8) to the Graduate School (see Appendix I for an example of this form; see

section 10.1 of this handbook).

6. Schedule Thesis Format Advising meeting with the CGT Thesis Advisor to occur two weeks prior to the final oral examination via the CGT Graduate Administrative Assistant (see section 10.4 of this handbook).
7. Schedule University deposit meeting with Mark Jaeger in the Graduate School (see section 10.6 of this handbook).
8. Use Purdue's *iThenticate* system to check the authenticity of your thesis (see section 9.3.2 of this handbook).
9. Satisfy the final oral examination requirement and make any revisions to the thesis that are required by your committee (see section 10.5 of this handbook).
10. Submit a final copy of your thesis to the Purdue Library e-Pubs section prior to the deadline established by the CGT Graduate Studies office (see section 10.7 of this handbook).
11. Provide final copies of your thesis project to your chair and graduate committee (see section 10.8 of this handbook).

SECTION 12: CGT DEPARTMENTAL EXPECTATIONS FOR GRADUATE STUDENTS

- Attend all meetings scheduled by the chair of their advisory committee.
- If awarded an assistantship, attend **all** scheduled course meetings or research meetings as outlined by the supervising faculty member.
- Submit a draft Plan of Study **before** their **first** semester is complete.
- Establish an advisory committee **before** the **second** semester is complete and POS.
- Attend an IRB sponsored workshop when appropriate and complete the online training modules.
- Submit to the graduate advisory committee a Thesis Proposal **before** starting on the project **and** at least two weeks before the advisory committee review meeting (proposal defense).
- Successful presentation/defense of the Thesis Proposal will be completed **no later than the end of the semester prior** to the semester in which the student intends to graduate.
- Submit the final Thesis Report to the advisory committee **at least two weeks** before the scheduled presentation date (final defense date).
- Adhere to the established standards as outlined in the *CGT Graduate Student Handbook*.
- Acquire professional writing and editing support as necessary during the preparation of the research proposal and/or thesis.
- Prepare a paper for publication in a refereed/trade journal or presentation at a conference in conjunction with work done for the thesis.
- Attend another student's defense/oral examination.

SECTION 13: GRADUATE FACULTY IN COMPUTER GRAPHICS TECHNOLOGY

The offering of graduate courses and the detailed supervision of graduate students is the province of the graduate faculty. Members of the University faculty are not automatically members of the graduate faculty. Authority to teach graduate-level courses and to supervise graduate students is granted by the Dean of the Graduate School upon recommendation by the Director of Graduate Study for CGT. Each faculty member desiring to serve as a graduate faculty member must make formal application to and be certified by the Graduate School of Purdue University. Each faculty member certified by the Graduate School is assigned a maximum level of participation based on academic record and professional experience.

The approved graduate faculty members in Computer Graphics are listed at <https://polytechnic.purdue.edu/degrees/ms-computer-graphics-technology/graduate-faculty> .

**APPENDIX A:
FIVE-YEAR COMBINED B.S./M.S. DEGREE
PROGRAM IN COMPUTER GRAPHICS TECHNOLOGY**

<https://polytechnic.purdue.edu/degrees/computer-graphics-technology/five-year-bs-and-ms-cgt>

**Five-Year Combined B.S. /M.S. Degree Program In Computer Graphics
Technology**

The five-year combined BS/MS Degree Program in Computer Graphics Technology enables outstanding students to complete the Bachelor of Science in Computer Graphics Technology and the Master of Science in Technology with a Specialization in Computer Graphics Technology in a total of five years, rather than six years or more (if pursued separately).

The program does not alter the requirements for either degree, but allows students to count up to nine (9) credits of graduate level courses toward both degrees, thereby reducing the total time to complete the MS degree. With advanced placement credit, credit by examination, full course loads, summer courses, or a combination of these, students can comfortably complete both degrees in no more than five (5) years from the beginning of their academic career in CGT.

Admission Requirements

Requirements for admission to the Combined Degree Program in CGT include a minimum 3.5 GPA in CGT courses and a cumulative overall GPA of at least 3.2. Students must also complete 93 of the 123 credits in the CGT BS degree by the end of their sixth (6th) semester.

Admission Process

Students desiring to apply to the Combined CGT program do so at the beginning of their sixth (6th) semester (the second semester of the junior year). If accepted to the program, a student begins taking graduate courses in the senior year (one during the first semester of the senior year, and two during the second semester). It is also possible to take courses during the summer between one's junior and senior year. One advantage to the student is that the Graduate Record Examination (GRE) is not required to pursue the MS under this program.

Applying to the Program:

1. Fill out the *CGT Dual Program Application* and an MS-BS Plan of Study form and example are located at :
2. <https://polytechnic.purdue.edu/degrees/computer-graphics-technology/five-year-bs-and-ms-cgt>
3. Meet with your undergraduate counselor to verify your CGT and cumulative GPA. Your counselor will need to sign the *CGT Dual Program Application* form.

4. Seek out and meet with a CGT Graduate Faculty Member who you would like to serve as your graduate advisor. You will want to find a CGT Graduate Faculty member whose research interests align with your interested. A listing of CGT Graduate Faculty and their related interest areas is located at: <https://polytechnic.purdue.edu/degrees/ms-computer-graphics-technology/graduate-faculty> The CGT Dual Program Application form requires that you develop your five-year plan of study. Work with your graduate advisor for assistance on this.
5. Submit an Electronic Graduate School Application online Leave the questions that ask about the GRE unanswered. The GRE is not required for the combined program.
6. Pay the required application fee.
7. Submit a *Statement of Purpose* electronically with your online application (max 500 words). It should describe your purpose for wanting the MS degree, reasons for wanting to study at Purdue, professional plans, career goals, and research interests.
8. Ask three CGT faculty members to provide letters of recommendation (submitted electronically). When you apply online, the website will contact them to complete an electronic recommendation.
9. Following receipt of these materials, the CGT Graduate Committee will meet to accept or reject the application to the program. Following the meeting, the student will be informed of the result.

Deadline for completion of applications:

For admission in August: April 1 & for admission in January: November 1.

Admission by the Graduate School will constitute acceptance into the BS/MS program and you will then have dual status as an undergraduate student and as a graduate student during your senior year.

Degree and Program Requirements

- The requirements for each degree are the same as for students pursuing the degrees separately.
- The BS degree must be awarded prior to the M.S. degree.
- **No more than 9 graduate credit hours can be taken by an undergraduate student who has not yet been awarded the BS degree.**
- Students in the program may use up to nine credits of graduate level courses toward both the MS and BS as free electives or technical elective (if applicable) in the BS program.
- Graduate plans of study will be submitted to the graduate school. Plans of study may be modified with approval of the student's graduate committee.
- Students in the program must:
 - Take at least one 50000- or 60000-level course each semester after the junior year.
 - Follow the BS and MS plans of study so as to complete both degrees within five years of beginning the CGT BS program.
 - Maintain and graduate with at least a 3.0 graduate GPA in both programs.
 - The Graduate Committee may grant exceptions for compelling reasons.

- *Students who leave the program, whether for failure to meet the program requirements or by withdrawal, will cease to be graduate students but may continue as undergraduate students if they have not been awarded the BS. Such students may apply for regular admission to graduate study; but they will not be permitted to use on a subsequent MS plan of study any graduate courses used to fulfill BS requirements.*

Please contact the CGT Graduate Studies office at cgtgradinfo@purdue.edu with any questions you may have regarding this program.