SOUTHERN UNIVERSITY
BATON ROUGE. LA

COLLEGE OF ENGINEERING

Master of Engineering Handbook

Office of Graduate Programs
Southern University and A & M College
Baton Rouge, Louisiana 70813

August 2012

TABLE OF CONTENTS

Administration and Engineering Graduate Faculty Committee……I

Engineering Graduate Faculty ……..2

Admissions Requirements……3
- Regular Admission
- Conditional Admission
- Provisional Admission
- Non-Degree Admission

Program and Degree Requirements……...5
- Degree Options
- Advisory Committee
- Thesis
- Final Report
- Change from Thesis to Non-Thesis Option
- Time Limitation
- Preparation for Graduation

Academic Advisement……..7
- Plan of Study
- Core Courses
- Technical Electives
- Course Substitution
- Choosing Project/Research Work
- Graduate Academic Standing
- Transfer of Graduate Credits
- Course loads

Graduate Financial Assistance……..15
- Teaching Assistantships
- Research Assistantships
- Fellowships and Tuition Scholarships
- Criteria for Awarding Assistantships and Scholarships

Appendix I ……17
1. Tentative Class Schedule ……...18
2. Course Descriptions ……..21
3. Checklist for Master of Engineering Degree with Project ……28
4. Checklist for Master of Engineering Degree with Thesis ……..29

Appendix II: Forms ……30
a. Plan of Study Form
b. Application for Transfer of Graduate Credit
c. Request for Course Substitution
d. Request for an Incomplete Grade
e. Request for Course Overload
f. Registration/Approval of Final Project/Report Proposal
g. Registration/Approval of Thesis Proposal
h. Request for Comprehensive Examination
i. Request for Master's Thesis Oral Defense
j. Master's Qualifying Examination Results
k. Application for a Change in Course Study
l. Application for Graduation
m. Application for Graduate Assistantship

ADMINISTRATION

DR. HABIB P. MOHAMADIAN | DEAN

College of Engineering
P.O. Box 9969, Baton Rouge, LA 70813
Phone: 225-771-4701 | Fax: 225-771-4877
E-mail: habib_mohamadian@subr.edu

DR. PATRICK CARRIERE | ASSOCIATE DEAN

College of Engineering
P.O. Box 9969, Baton Rouge, LA 70813
Phone: 225-771-4316 | Fax: 225-771-5721
E-mail: patrick_carriere@subr.edu

ENGINEERING GRADUATE FACULTY COMMITTEE

Dr. Patrick Mensah, Chair

Dr. Riyadh Al-Raoush

Dr. Fred Lacy

Dr. Guoqiang Li

Dr. Raife Smith

SPECIALTY AREA 1: MATERIALS SCIENCE AND ENGINEERING

Track 1: Advanced Engineering Materials

Dr. Samuel Ibekwe, Professor
Dr. Ravinder Diwan, Professor
Dr. Habib Mohamadian, Professor
Dr. Amitava Jana, Professor
Dr. Ghanashyan Joshi, Professor
Dr. Karen Crosby, Associate Professor
Dr. Eyassu Woldsenbet, Associate Professor
Dr. Dwayne Jerro, Associate Professor
Dr. Guoqiang Li, Associate Professor

Track 2: Electronic Materials and Processing Engineering

Dr. Pradeep Bhattacharya, Professor
Dr. Manjit Randhawa, Professor
Dr. Abolfazl Amini, Professor
Dr. Fred Lacy, Associate Professor

SPECIALTY AREA 2: SUSTAINABLE SYSTEMS ENGINEERING

Track 1: Environmental and Water Resources

Dr. Patrick Carriere, Professor
Dr. Emmanuel Nzewi, Professor
Dr. Chukwu Onu, Professor
Dr. R. Al-Raoush, Associate Professor

Track 2: Thermal Science and Engineering

Dr. Chun Ling Huang, Professor
Dr. Edgar Blevins, Associate Professor
Dr. Patrick Mensah, Professor

Track 3: Telecommunications and Computer Network Engineering

Dr. Ernest Walker, Professor
Dr. Hamid Majlesein, Professor
Dr. Zhengmao Ye, Associate Professor
Dr. Raife II Smith, Professor
Dr. Jiecai Luo, Associate Professor

SPECIALTY AREA 3: ENGINEERING MANAGEMENT

Faculty members from Areas 1 and 2.

ADMISSIONS REQUIREMENTS

Admission is a joint responsibility of the Graduate School and the College of Engineering. Initially the student sends a completed application form (paper or electronic) to the Graduate School. The Graduate School has certain requirements that must be satisfied before admission is granted to any graduate program at the University. As a preliminary step the Graduate School will request official transcripts of college level work and, in the case of international students, a TOEFL score.

When sufficient information such as personal statements by the applicant; letters of reference, descriptions of course work completed, and GRE scores are available, the application is sent to the College of Engineering for a recommendation. Then, the application is forwarded to the Department offering the specialty option. The prospective student who satisfies the general admission requirements of the Graduate School must also satisfy the requirements of the department into which they seek admission. Upon receiving the applicant's folder from the College of Engineering, the following steps will be taken:

1. The College of Engineering will identify the applicant's specialty option and will send his/her folder to the respective Departmental Graduate Program Committee through the department chair.
2. The Departmental Graduate Program Committee will evaluate the applicant's credentials and will recommend that the applicant be granted one of the following statuses:
    1. Regular Admission
    2. Conditional Admission
    3. Provisional Admission
    4. Non-Degree Admission
3. The department chair will review the recommendation of the Departmental Graduate Program Committee. Upon approval by the chair, a copy of the applicant's folder will be kept in the department file and the original sent to the College of Engineering.
4. The College of Engineering will review the recommendations of the departmental chair and the Departmental Graduate Program Committee. Upon concurrence with their recommendations, a copy of the applicant's folder will be kept for record keeping and the original will be forwarded to the Graduate School.
5. Official notification of admission will be made to the applicant by the Dean of Graduate School.

Regular Admission

Students who meet a cumulative minimum grade point average of "B" (3.0) for all undergraduate work, and have earned a minimum score of 1,000 (298) on the verbal and quantitative sections of the Graduate Record Examination (GRE), are admitted to regular graduate status. An international applicant who has not completed undergraduate degree requirements at an accredited United States educational institution must have a minimum TOEFL score of 550.

Conditional Admission

Students who do not meet all admission criteria may be admitted for up to **one academic year** on a conditional basis. All students admitted on a conditional basis must maintain a GPA of 3.0 or higher. By the end of the academic year, the department must evaluate the student's performance and notify the graduate school and student of the final action to be taken regarding the student's admission status as either fully accepting the student or recommending the student be dropped from degree-seeking status.

Provisional Admission

Students who have applied for admission to the Graduate School, but whose credentials were not provided by the admission deadline, may be admitted provisionally, for **one semester**, upon the recommendation of the department to which they have applied. Since Provisional Admission has a time limitation of one semester, it cannot be extended or granted for the second time to the same student.

Non-Degree Admission

Students holding a bachelor degree from accredited colleges and universities may be enrolled in graduate – level courses without being admitted to a graduate program at Southern University. The non-degree status is intended to provide an applicant permission to take course. Therefore, applicants who are granted non-status should note that acceptance as a non-degree student does not in any way imply and/or guarantee subsequent change to regular admission status. Non-degree students are permitted to take a maximum of six hours per semester (Fall and Spring) and three credit hours during the Summer term.

Readmission

Any student previously enrolled in graduate study with regular status, who has not been in attendance for a minimum of two consecutives semesters, should apply for readmission to the Graduate School at least four weeks prior to the first day of registration for the term in which that student expects to resume studies.

The Master of Engineering program is interdepartmental (Civil Engineering, Electrical Engineering, and Mechanical Engineering) and interdisciplinary. It has three specialty areas:

Area 1: Materials Science and Engineering
- Track 1: Advanced Engineering Materials
- Track 2: Electronic Materials and Processing

Area 2: Sustainable Systems Engineering
- Track 1: Environmental and Water Resources
- Track 2: Thermal Science
- Track 3: Telecommunication and Computer Network

Area 3: Engineering Management

The program offers two degree-options:

1. Master of Engineering degree with a thesis
2. Master of Engineering degree with an engineering project

The distribution of credit hour requirements for the two options is illustrated in Table 1.

Table 1 Credit Hour Requirements for Master of Engineering Degree Options

Degree Options	# of Credit Hours for Core Courses	# of Credit Hours for Specialty Electives	# of Credit Hours (Project or Thesis)	Total Credit Hours
Master of Engineering (w/ Thesis)	12	12	6	30
Master of Engineering (w/ Project)	12	18	6	36

The thesis option requires a minimum of 24 credit hours of course work and a thesis (ENGR 600) carrying 6 credit hours. The Project option requires a minimum of 30 credit hours of course work and a project (ENGR 599) carrying 6 credit hours. The courses consist of a core requirement common for all specialty areas, technical electives specific to each specialty area, and approved general electives offered in other supporting university units.

Students must maintain a minimum cumulative Grade Point Average of 3.0 on a 4.0 scale. A maximum of two 400-level undergraduate courses may be used for graduate credit toward fulfilling the credit hour requirements of the technical electives. **All full-time students are required to take the one-hour graduate seminar (ENGR 577) every year.** No more than six credits from a previous master degree program may be applied toward a second master degree. These credits are applied only with the written approval of the Dean of the Graduate School, the graduate faculty advisor, and the chairperson of the department in which the second master degree is pursued.

Beginning in the first year of their enrollment in the program, students may take core courses and technical electives. Some students may omit some of these courses based on their previous course work at another institution. These cases will be evaluated on an individual basis. Prospective graduate students with overall promising records, but selective deficiencies, may take some undergraduate courses. These courses will be

considered prerequisites and therefore will not be counted toward the fulfillment of the core course requirement. General rules and policies by the Graduate School for thesis or non-thesis programs will be applied to the Master of Engineering Program.

Advisory Committee

The Advisory Committee for a master's degree with a thesis must consist of at least two members selected from the College of Engineering Graduate Faculty. It is recommended that a third member be selected from a field external to the student's department. The Advisory Committee for a master's degree with an engineering project must consist of only the member of the Graduate Faculty who advises the student and oversees his/her program. The duties of the committee are to advise the student, to check on the student's qualifications and progress, to supervise the preparation of the thesis/project and to conduct the final examination.

Thesis

Candidates for the master's degree with thesis **must prepare a thesis proposal** and a full thesis acceptable to the advisory committee and the Graduate School. **The thesis should be submitted to the advisory committee for review a week prior to the thesis defense**. The candidate must also pass an oral defense of his/her thesis. The candidate should consult the "Thesis Guidelines" published by the Graduate School for instructions concerning the format of the thesis. The University Calendar specifies final dates for submitting the original thesis and a copy to the Graduate School.

Final Engineering Report (for Non-thesis Option)

The student who elects the non-thesis option **must submit a project proposal** and a final project report acceptable to the advisory committee. The candidate should consult the "Policy on Final Project Guidelines" published by the Graduate School for instructions concerning the format of the project. The candidate must pass a comprehensive oral or written examination on his/her major field of study. This comprehensive examination must be taken **within six months** of the date the degree is to be awarded.

Change from Thesis to Non-Thesis Option

A student who wishes to change from thesis to the non-thesis option for the master's degree must obtain the permission of the advisory committee to make such a change. **This permission must be forwarded to the Graduate School for approval at least one full semester prior to the intended date of graduation.** The candidate must meet all the requirements of the non-thesis option.

Time Limitation

All work, including transferred credit, counted toward the master's degree must be completed during the seven-year period immediately preceding the date on which the degree is awarded.

Preparation for Graduation

Students must apply for graduation at the beginning of their final term of matriculation and according to the guidelines established by the Graduate School. ***It is the student's responsibility to ensure that all requirements have been met and that every deadline is observed***. Formal application for graduation must be filed on the official form at the Graduate School.

Plan of Study

Upon being accepted to the Graduate School, each student is assigned an academic advisor who is a member of the department graduate faculty. The student must consult with his/her academic advisor to establish an advisory committee. The student must then formulate a **Plan of Study** for earning a specific degree, which is to be filed with the College of Engineering Graduate Program Office **before the end of the first semester of study**. The academic advisor, the advisory committee, the chairperson of the respective department, and the College of Engineering must all approve the student's plan of study. The plan of study should be submitted for approval no later than the student's second term in Graduate School. Students with deficient backgrounds will be advised to take appropriate undergraduate courses. If the advisor feels that such remedial work will delay the student's progress through various requirements, the student, the advisor, and the advisory committee will agree on a written schedule for the student to meet these requirements. **Deviations from the Plan of Study must be approved in advance and in writing by the advisory committee in order for the student to remain in good academic standing.**

Area I: Materials Science and Engineering

The following are core courses for Track 1 or 2.

Core Courses (Select 12 Hours)

ENGR 530	Advanced Computer Applications for Engineers	3
ENGR 540	Fundamentals of Engineering Materials	3
ENGR 550	Numerical Methods for Engineering Applications	3
ENGR 500	Probability and Statistics for Engineers	3
ENGR 520	Mathematical Methods in Engineering	3

Track 1: Advanced Engineering Materials

Electives (Select 12 to 18 Hours)

MEEN 430	Introduction to Finite Elements	3
MEEN 551	Fracture Mechanics and Fatigue in Materials	3
MEEN 552	Corrosion Science & Engineering	3
MEEN 563	Composite Materials	3
MEEN 565	Characterization of Materials	3
MEEN 588	Topics in Materials Science and Engineering	3

Degree Options (Select 6 Hours)

ENGR 599	Engineering Project	6
ENGR 600	Thesis	6

Foundation Courses for Track 1

A student lacking an undergraduate degree in engineering must show competency in the following courses:

MATH 264	Calculus I	4
MATH 265	Calculus II	4
MATH 395	Calculus III and Differential Equations	4
CHEM 112	General Chemistry Lab	1
CHEM 132	General Chemistry	3
PHYS 221/223	General Physics/Lab	4
PHYS 222 /224	General Physics II/Lab	4
MEEN 227	Mechanics of Materials	3

MEEN 235	Materials Science and Engineering	3
MEEN 335	Material Processing	3

Track 2: Electronic Materials and Processing

Electives (Select 12 to 18 Hours)

ELEN 418	Theory and Fabrication of Solid-State Devices	3
ELEN 419	Integrated Circuit Analysis	3
ELEN 526	Solid States Physics	3
ELEN 536	Physics of Semiconductor Devices	3
ELEN 541	Integrated Circuit Processing & Fabrication and Lab	3
ELEN 544	Integrated and Fiber Optics	3
ELEN 546	VLSI Technology	3
ELEN 589	Topics in Electronic Materials and Processing Engineering	3

Degree Options (Select 6 Hours)

ENGR 599	Engineering Project	6
ENGR 600	Thesis	6

Foundation Courses for Track 2

A student lacking an undergraduate degree in engineering must show competency in the following courses:

MATH 264	Calculus I	4
MATH 265	Calculus II	4
MATH 395	Calculus III and Differential Equations	4
CHEM 112	General Chemistry Lab	1
CHEM 132	General Chemistry	3
PHYS 221/223	General Physics/Lab	4
PHYS 222 /224	General Physics II/Lab	4
ELEN 212	Electronic Properties of Matter	3

Specialty Area 2: Sustainable Systems Engineering

The following are core courses for Track 1, 2, or 3.

Core Courses (12 Hours)

ENGR 500	Probability and Statistics for Engineers	3
ENGR 530	Advanced Computer Applications for Engineers	3
ENGR 550	Numerical Methods for Engineering Applications	3
ENGR 560	Optimization Theory and Methods	3

Track 1: Environmental and Water Resources

Electives (Select 12 to 18 Hours)

CIEN 421	Water and Wastewater Analysis	3
CIEN 462	Design of Water & Sewage Treatment Plants	3
CIEN 475	Solid/Hazardous Waste Management	3
CIEN 511	Solid/Hazardous Waste Management	3
CIEN 512	Biological Waste Treatment	3
CIEN 515	Advanced Industrial Waste Treatment	3

CIEN 516	Atmospheric Dispersion Modeling	3
CIEN 588	Topics in Environmental Engineering	3

Degree Options (Select 6 Hours)

ENGR 599	Engineering Project	6
ENGR 600	Thesis	6

Foundation Courses for Track 1

A student lacking an undergraduate degree in engineering must show competency in the following courses:

MATH 264	Calculus I	4
MATH 265	Calculus II	4
MATH 395	Calculus III and Differential Equations	4
CHEM 112	General Chemistry Lab	1
CHEM 132	General Chemistry	3
PHYS 221/223	General Physics/Lab	4
PHYS 222 /224	General Physics II/Lab	4
CIEN 325	Introduction to Environmental Engineering	3
CIEN 321/MEEN 312	Fluid Mechanics	3

TRACK 2: THERMAL SCIENCE

Electives (Select 12 to 18 Hours)

MEEN 421	Thermal Environmental Engineering	3
MEEN 574	Advanced Applied Heat Transfer	3
MEEN 578	Computational Fluid Dynamics	3
MEEN 579	Two-Phase Flow and Heat Transfer	3
MEEN 581	Energy Management and Applications	3
MEEN 589	Topics in Thermal Science and Engineering	3

Degree Options (Select 6 Hours)

ENGR 599	Engineering Project	6
ENGR 600	Thesis	6

Foundation Courses for Track 2

A student lacking an undergraduate degree in engineering must show competency in the following courses:

MATH 264	Calculus I	4
MATH 265	Calculus II	4
MATH 395	Calculus III and Differential Equations	4
CHEM 112	General Chemistry Lab	1
CHEM 132	General Chemistry	3
PHYS 221/223	General Physics/Lab	4
PHYS 222 /224	General Physics II/Lab	4
MEEN 300	Thermodynamics	3
MEEN 442	Heat Transfer	3

TRACK 3: TELECOMMUNICATIONS AND COMPUTER NETWORK

Electives (Select 12 to 18 Hours)

ELEN 405	Digital Signal Processing	3
ELEN 475	Computer Networks	3
ELEN 521	Digital Transmission and Data Communications	3
ELEN 523	Communication Network Engineering	3
ELEN 533	Information Theory	3
ELEN 535	Systems Analysis and Management	3
ELEN 588	Topics in Telecommunications and Computer Network Engineering	3

Degree Options (Select 6 Hours)

ENGR 599	Engineering Project	6
ENGR 600	Thesis	6

Foundation Courses for Track 2

A student lacking an undergraduate degree in engineering must show competency in the following courses:

MATH 264	Calculus I	4
MATH 265	Calculus II	4
MATH 395	Calculus III and Differential Equations	4
CHEM 112	General Chemistry Lab	1
CHEM 132	General Chemistry	3
PHYS 221/223	General Physics/Lab	4
PHYS 222 /224	General Physics II/Lab	4

SPECIALTY AREA 3: ENGINEERING MANAGEMENT

This specialty area is for students with a B.S. degree in engineering. It only offers the degree option with engineering project.

Core Courses (Select 12 Hours)

ENGR 500	Probability and Statistics for Engineers	3
MGMT 592	Business Strategic Decision Making	3
ENGR 560	Optimization Theory and Methods	3
ENGR 570	Engineering Management Methods	3
MGMT 587	Project Management	3

Engineering Elective Courses (Select 9 Hours)

Elective(s)	(Other Master of Engineering Specialty Areas)	3

Business Electives (Select 9 Hours)

ECON 515	Managerial Economics	3
MGMT 510	Operations Management	3
MGMT 520	Organizational Behavior and Leadership	3
MGMT 547	Entrepreneurship	3

MGMT 587	Project Management	3
MKTG 591	Marketing Management	3
EBIZ 546	Global Supply Chain Management and ERP	3

Degree Option (6 Hours)

ENGR 599	Engineering Project	6

Foundation Courses

Engineering students lacking an undergraduate degree in Management must show competency in the following course.

MGMT 300	Principles of Management	3

Transfer of Graduate Credits

A formal request for the transfer of graduate credits must be submitted on the designated Graduate School form. Master's degree graduate credits are limited to a maximum of six credit hours from other institutions.

Course Substitution

Substitutions of courses in a student's approved Plan of Study may be permitted upon the written approval of the student's advisor, the department chair, the dean of his/her college, and the Dean of the Graduate School. The Dean of the Graduate School will make the final decision on course substitutions.

Table 2 Course Substitution

Maximum Number of Credit Hours of Course Substitution	Graduate School Limit	Master of Engineering Limit
	12	6

A request for course substitution must be submitted on the designated form from the Graduate School together with catalog description, course outline or syllabus of both the substitution course and the course being submitted. Master's degree substitutions are limited to a maximum of six credit hours; including credits transferred from other institutions (see Table 2).

Choosing Project/Research Work

Graduate students' introduction to a project or research subject, for all but remedial students, should normally occur in the second semester of graduate work. Therefore, every student should enroll for at least one unit of a project/research course in his/her department during each semester after the first. This is to be done via formally discussing possible topics for project/research with research professors and then being accepted by one of these professors to work with. The choice of a project or research subject may well be tentative at this stage, so students are free to change their fields after they have combined their interests and gained more experience.

When a student has selected a project/research advisor, and an advisor has agreed to take on the student, he/she should inform the DEGP of this choice in writing. This advisor will usually become the student's academic advisor. The relationship that develops between a graduate student and his/her project/research advisor is unique. It requires close collaboration and a certain amount of conformance to the advisor's way of doing things. In addition, it is expected that both the advisor and the advisee will invest an extensive amount of time and other resources into this relationship. Typically, a project/research advisor will use her/his grant or contract money to support a student. Students are encouraged to begin the selection of a project/research advisor early in their career here at Southern University. The student and her/his project/research advisor are encouraged to take steps as early as possible to form a lasting agreement to enter a work-relationship that will be mutually beneficial. Should it be necessary for a student to make a future change of academic advisor, the DEGP should be immediately notified in writing. A student who changes project/research advisors will generally have to begin a new project/research, which will prolong the length of time necessary to complete his/her thesis.

Accordingly, the Director of the Engineering Graduate Program (DEGP) has chosen to establish several guidelines that strongly encourage both graduate students and graduate faculties to follow. These guidelines are:

1. Students are to file a project/research proposal in their first year at Southern University. Normally the first summer provides an opportunity to begin a trial project or research proposal with an advisor. This project/research proposal should normally indicate a project/research advisor, the topic or subject matter to be focused on, and the intended mechanisms to be used for support of the project/research.

2. Once a student begins working on a project/research, he/she can still change advisors—if the project/research or the work-relationship appears to become unsuitable for his/her goals. However, before a student can formally accepts a new position as a Research Assistant (RA) with another advisor, the student and his/her new advisor should consult with the previous advisor to arrange the transfer with minimum disruption.

3. If an advisor (or student) decides that a work-relationship should not continue, the department will make all reasonable attempts to provide "bridge" support until the student is able to find a new advisor; presuming that the student remains in good *academic standing*. However, one of the reasons that a project/research advisor may decide to terminate support is because he/she feels that the student is not making satisfactory progress toward the Master of Engineering degree. If this case proves warranted, the DEGP, after meeting with the student, may decide to recommend that the student withdraw from the Master of Engineering Program.

Students working with project/research advisors located outside the department are subject to some additional regulations. They must designate a member of the department of their specialty option to serve as the official advisor for the research. That person will become the student's academic advisor and will chair both the student's Master of Engineering candidacy committee and his/her project or thesis committee. In general, students working with project/research advisors outside the department must be supported by RA's or external fellowships.

Graduate Academic Standing

In order to remain in good academic standing the student must take the courses agreed upon in the Plan of Study and should maintain a minimum of a "B" average (3.0 GPA on 4.0 scale). A student should discuss any C's with his/her academic advisor. Any student with two or more C's should discuss the problem with the academic advisor and the DEGP. The renewal or continuation of a student's assistantship will depend on remaining in good standing in each succeeding semester. Receiving a grade of "F" in any semester is sufficient grounds for immediate termination of an assistantship. In addition to maintaining suitable grades, graduate students must carry out their teaching and/or research duties to the satisfaction of the appropriate graduate faculty.

Course Loads

A request for course overload must be submitted on the designated Graduate School form. Master's degree course loads are limited to a maximum of twelve credit hours (see Table 3).

Table 3: Course Loads

	Graduate School	Master of Engineering
Maximum Credit Hours	15	12
Minimum Credit Hours	9 for Fall & Spring 6 for Summer	9 for Fall & Spring 6 for Summer

Financial assistance is available to graduate students from a large number of sources. They are granted through the Graduate School, the College, or through various departments and divisions on campus, using a semester by semester basis over an academic year. Students who are recipients of assistantships, fellowships, or scholarships from the Graduate School, or a department, or the College are usually exempted from having to pay out-of-state fees. The different categories of assistantships are:

Graduate Teaching Assistantships

Graduate Teaching Assistants (GTA's) are assigned to graduate faculty members in their particular area. They have primary responsibility for teaching a course and they must have earned at least 18 graduate semester hours in their teaching discipline prior to the appointment. They must be directly supervised by an experienced faculty member in their teaching discipline.

Students whose native language is not English will be evaluated by the Coordinator of English Language Services in the College of Education. Special courses in English as a second language may be recommended as a result of the evaluation. It is expected as a condition of employment is that the student makes a good faith effort in teaching such courses. Continuation of assistantships into a second semester, and future renewals, are dependent upon certification that the GTA's attended classes regularly, worked diligently, showed improvement, and passed the English Speak Test.

Graduate Research Assistantships

Graduate Research Assistantships (GRA's) are available to many of our graduate students. The availability of research assistantships depends upon individual research professors and is also subject to the needs of contracts and interests of students. Research assistantships are normally given for the academic year, but summer support is often available.

Fellowships and Tuition Scholarships

Southern University has some fellowship support for new students; which take the form of full support to a few outstanding students, in addition to a teaching assistantship. Outstanding students are nominated for industrial or private foundation fellowship as these funds become available.

CRITERIA FOR AWARDING ASSISTANTSHIPS AND SCHOLARSHIPS

Assistantships

Students should meet the following conditions to be eligible for an assistantship:

1. Student must be admitted into the Master of Engineering Degree program at a regular status.
2. Student must score a minimum of 3,000 points derived from GPA x GRE (GRE consists of Verbal and Quantitative scores).
3. Student must be enrolled full-time (nine or more credits hours) or (six credit hours in summer session)

Tuition –Waiver/Scholarship

Students who enroll full-time but have no assistantship shall be considered for tuition scholarship subject to the following conditions:

1. Student must be enrolled full-time (nine or more credits hours) or (six credit hours in summer session).
2. Students with full-time employment must earn less than $40,000 per year.
3. Student must have a GPA of 3.00 or higher.

Note:

Policy for Graduate Students Failing to Carry Nine Credit hours to Term Each Semester

1. Assistantship will be revoked for dropping to less than nine credits each semester.
2. Students will be removed from payroll for the period that they dropped to less than nine credit hours.
3. Students are encouraged to substitute or add a new course within the add/drop period, whenever a previously scheduled course is dropped.

APPENDIX I

AREA 1: MATERIALS SCIENCE AND ENGINEERING

Core Course Schedule for Track 1 and 2

Fall Semester	Spring Semester
Numerical Methods For Engineering Applications (ENGR 550)	Fundamentals of Engineering Materials (ENGR 540)
Advanced Computer Applications for Engineers (ENGR 530)	Probability and Statistics for Engineers (ENGR 500) or Mathematical Methods in Engineering (ENGR 520)

Elective Courses for Track 1

Fall Semester	Spring Semester	Summer Semester
MEEN 551	MEEN 552	ENGR 599 or 600
MEEN 563	MEEN 565	MEEN 588
ENGR 599 or 600	ENGR 599 or 600	

Elective Courses for Track 2

Fall Semester	Spring Semester	Summer Semester
ELEN 536	ELEN 544	ENGR 599 or 600
ELEN 541	ELEN 546	ELEN 589
ENGR 599 or 600	ENGR 599 or 600	

AREA 2: SUSTAINABLE SYSTEMS ENGINEERING

Core Course Schedule for Track 1, 2, and 3

Fall Semester	Spring Semester
Probability and Statistics for Engineers (ENGR 500)	Numerical Methods for Engineering Applications (ENGR 550)
Advanced Computer Applications for Engineers (ENGR 530)	Optimization Theory and Methods (ENGR 560)

Elective Courses for Track 1

Fall Semester	Spring Semester	Summer Semester
CIEN 511	CIEN 515	ENGR 599 or 600
CIEN 512	CIEN 516	CIEN 588
ENGR 599 or 600	ENGR 599 or 600	

Elective Courses for Track 2

Fall Semester	Spring Semester	Summer Semester
MEEN 574	MEEN 579	ENGR 599 or 600
MEEN 578	MEEN 581	MEEN 589
ENGR 599 or 600	ENGR 599 or 600	

Elective Courses for Track 3

Fall Semester	Spring Semester	Summer Semester
ELEN 521	ELEN 522	ENGR 599 or 600
ELEN 523	ELEN 533	ELEN 588
ENGR 599 or 600	ENGR 599 or 600	

AREA 3: ENGINEERING MANAGEMENT

Core Course Schedule

Fall Semester	Spring Semester
Probability and Statistics for Engineers (ENGR 500)	Business Strategic Decision Making (MGMT 592)
Optimization Theory and Methods (ENGR 560)	Engineering Management (ENGR 570) Or Project Management (MGMT 587)

Engineering Elective Courses

Select any electives from Area 1 or 2.

Business Elective Courses

Fall Semester	Spring Semester	Summer Semester
ECON 515	MGMT 520	ENGR 599 or 600
MGMT 547	EBIZ 546	CIEN 588
Engineering Electives	Engineering Electives	

AREA 1: MATERIALS SCIENCE AND ENGINEERING

CORE COURSES FOR TRACK 1 AND 2

ENGR 500. Probability and Statistics for Engineers (Credit, 3 hours).
Probability distributions, Statistical Inferences, Regression Analysis, Multiple Regression, Hypothesis testing, Design of Experiments and Analysis of Variance, Non-parametric Statistics, Statistical Quality Control, Stochastic Processes.

ENGR 520. Mathematical Methods in Engineering. (Credit, 3 hours).

ENGR 530. Advanced Computer Applications for Engineers (Credit, 3 hours).
This course provides students with an in-depth look at the capabilities and limitations of computers in engineering applications. Packed with examples, it shows how to use the computer as an analytical tool in the development, testing and documentation of a structured problem.

ENGR 540. Fundamentals of Engineering Materials (Credit, 3 hours).

ENGR 550. Numerical Methods for Engineering Applications (Credit, 3 hours).
This course covers numerical methods for solution of engineering problems; system of linear equations, ordinary differential equations (ODEs) including one-dimensional initial value problems and boundary value problems; partial differential equations (PDEs) including elliptic, parabolic and hyperbolic PDEs.

ELECTIVE COURSES FOR TRACK 1

MEEN 430. Introduction to Finite Elements (Credit, 3 hours).
Presents an introduction to the nature and capabilities of finite elements techniques, and methods in engineering science and practices. Prerequisites: MEEN 221, 227, 312, and MATH 395.

MEEN 551. Fracture Mechanics & Fatigue in Materials (Credit, 3 hours).
Theory of ductile and brittle fracture, fracture mechanics and mechanism; fracture and design of components, effects of temperature; the S-N curve, cycle stress-strain, structural fracture of fatigue; effects of material variables on fracture, related topics.

MEEN 552. Corrosion Science and Engineering (Credit, 3 hours).
Corrosion and degradation processes in materials, their mechanisms, theory and control of corrosion, corrosion testing and design of structural materials, current literature on oxidation behavior and corrosion.

MEEN 563. Composite Materials (Credit, 3 hours).
Basic constituents of composites, and relationship between the physical parameters of each constituent, micromechanical and macromechanical analysis, and failure criteria.

MEEN 565. Characterization of Materials (Credit, 3 hours).
Theory and principles of crystallography, Microstructural characterization techniques such as SEM, TEM, X-ray diffraction, microstructural analysis, fractography.

MEEN 588. Topics in Materials Science and Engineering (Credit, 3 hours).
Individual or group study in one or more areas of Materials Science and Engineering or related topics.

ELECTIVE COURSES FOR TRACK 2

ELEN 418. Theory and Fabrication of Solid-State Devices (Credit, 3 hours).
A study of the theory and fabrication of semiconductor devices including diodes, transistors, and integrated circuits. Prerequisite: ELEN 312. ELEN 419. Integrated Circuit Design and Analysis.

ELEN 419. Integrated Circuit Analysis. (Credit, 3 hours).
A study of integrated circuit technology. The physics of various devices considered along with fabrication techniques to provide a basis for circuit modeling, circuit analysis, and the comparison of devices on the basis of speed, reliability, power handling capability, economics, etc. Large-scale integrated logic circuits and linear integrated circuit design and application will be for integrated logic circuits and linear integrated circuits. Prerequisite: ELEN 313. ELEN 418 also recommended.

ELEN 526. Physics of Semiconductors (Credit, 3 hours).
This course analyzes the nature of solids and uses principles form physics to examine and explain the characteristics of solid materials. Topics such as crystal structure, quantum mechanics, energy bands, electron transport, and conductivity will be presented.

ELEN 536. Physics of Semiconductor Devices (Credit, 3 hours).
Introduction to the physical principles underlying semiconductor device operation and the application of these principles to specific devices. Emphasis will be placed on understanding device operation rather than circuit properties.

ELEN 541. Integrated Circuit Processing and Fabrication and Lab (Credit, 3 hours).
This course provides students with the fundamentals needed for advanced semiconductor processing, particularly, basic processes common to all Integrated-Circuit technology and provides a base for understanding of what can and cannot be achieved through integrated-circuit fabrication.

ELEN 544. Integrated Fiber Optics (Credit, 3 hours).
Propagation of waves in electric thin films and cylindrical guides. Bit limitation rate due to material dispersion and multimoding. Step index and graded index fibers. Switching and modulation by integrated optics techniques.

ELEN 546. Very Large Scale Integration (VLSI)Technology (Credit, 3 hours).
Modern VLSI technologies, MOS and Bipolar device electrical characteristics are very sensitive to structural details and hence to fabrication techniques. This course concentrates on how VLSI devices and circuits are fabricated and on what future changes are likely.

ELEN 589. Topics in Electronic Materials and Processing Engineering (Credit, 3 hours).
Individual or group study in one or more areas of Electronic Materials and Processing engineering or related topics.

DEGREE OPTIONS FOR TRACK 1 AND 2

ENGR 599. Engineering Project (Credit, 3-15 hours).
Continuation of research on Engineering Project. Satisfactory oral defense of topic is required for graduation.

ENGR 600. Thesis (Credit, 3-15 hours).
Continuation of research on Thesis. Satisfactory oral defense of topic is required for graduation.

AREA 2: SUSTAINABLE SYSTEMS ENGINEERING

CORE COURSES FOR TRACK 1, 2 AND 3

ENGR 500. Probability and Statistics for Engineers (Credit, 3 hours).
Probability distributions, Statistical Inferences, Regression Analysis, Multiple Regression, Hypothesis testing, Design of Experiments and Analysis of Variance, Non-parametric Statistics, Statistical Quality Control, Stochastic Processes.

ENGR 530. Advanced Computer Applications for Engineers (Credit, 3 hours).
This course provides students with an in-depth look at the capabilities and limitations of computers in engineering applications. Packed with examples, it shows how to use the computer as an analytical tool in the development, testing and documentation of a structured problem.

ENGR 550. Numerical Methods for Engineering Applications (Credit, 3 hours).
This course covers numerical methods for solution of engineering problems; system of linear equations, ordinary differential equations (ODEs) including one-dimensional initial value problems and boundary value problems; partial differential equations (PDEs) including elliptic, parabolic and hyperbolic PDEs.

ENGR 560. Optimization Theory and Methods (Credit, 3 hours).

ELECTIVE COURSES FOR TRACK 1

CIEN 421. Water and Wastewater Analysis (Credit, 3 hours).
Chemical kinetics and equilibrium, acid-base chemistry, oxidation reduction reactions, precipitation, dissolution and the application of the principles of gravimetric,
volumetric, and colorimetric methods to the laboratory analysis of water and wastewater. Prerequisites: CIEN 325

CIEN 462. Design of Water & Sewage Treatment Plants (Credit, 3 hours).
Design and operation of water and wastewater treatment systems including physical, chemical,
and biological principles, and design of water and wastewater treatment plants. Prerequisites: CIEN 323 and 325.

CIEN 475. Solid/Hazardous Waste Management (Credit, 3 hours).
Generation, onsite storage, collection, transfer and transport, processing and recovery, and disposal of solid/hazardous wastes. Prerequisite: CIEN 325.

CIEN 511. Solid/ Hazardous Waste Management Engineering (Credit, 3 hours).
A comprehensive study of solid and hazardous waste management including identification, generation, transportation, risk assessment, and techniques and technologies for control and treatment; engineering design of control technologies and strategies for selecting them.

CIEN 512. Biological Wastewater Treatment (Credit, 3 hours).
Overview of biological wastewater treatment; microbial metabolism; bacterial growth; biological treatment processes; aerobic and anaerobic suspended and attached growth treatment systems; biological nutrient removal; and design of biological unit processes.

CIEN 515. Advanced Industrial Waste Treatment (Credit, 3 hours).
A comprehensive study of the industrial waste treatment processes and toxicity reduction in industrial effluents; physical, chemical, and biological treatment processes; wastewater reclamation and reuse and design of treatment systems.

CIEN 516. Atmospheric Dispersion Modeling (Credit, 3 hours).
Fundamentals of air pollution meteorology and atmospheric dispersion of pollutants. Dispersion models, with emphasis on the Gaussian plume model, use of computer dispersion models to predict ambient concentrations of pollutants, regulatory aspects of modeling.

CIEN 588 Topics in Environmental Engineering (Credit, 3 hours).
Individual or group study in one or more areas of environmental engineering or related topics.

ELECTIVE COURSES FOR TRACK 2

MEEN 421. Thermal Environmental Engineering (Credit, 3 hours).
Covers air and humidity calculations, heating and cooling loads, cooling systems, physiological reactions to the environment, air distribution systems, principles of refrigeration, and cryogenic systems. Prerequisite: MEEN 301

MEEN 574. Advanced Applied Heat Transfer (Credit, 3 hours).
Fundamentals of conduction, convection, and radiation heat transfer. Practical engineering applications of heat exchangers, different design approaches. Boiling and condensation, convection fouling factors, mixed mode heat transfer. Topics from current applications such as heat transfer in electronic equipment.

MEEN 578. Computational Fluid Dynamics (Credit, 3 hours).
Advanced numerical method for solving Navier-Stockes equations. Numerical solutions to boundary layer problems. Solutions to potential flows. Students will be required to perform projects in selected areas.

MEEN 579. Two-Phase Flow and Heat Transfer (Credit, 3 hours).
Current Status of multi-phase flow and heat transfer application to design; reviews of single-phase and two-phase flow heat transfer, principles of liquid cooling of electronic devices, basic one-dimensional treatment of two-phase pressure drop flows and current state of the art in liquid-vapor phase change heat transfer.

MEEN 581 Energy Management and Applications (Credit, 3 hours).
Application of basic principles of energy management; case studies of energy conservation opportunities; energy audits; and building load computer simulation.

MEEN 589. Topics in Thermal Science and Engineering (Credit, 3 hours).
Individual or group study in one or more areas of Thermal Science and Engineering or related topics.

ELECTIVE COURSES FOR TRACK 3

ELEN 405. Digital Signal Processing (Credit, 3 hours).
Introductory course in digital signal processing. Topics include discrete-time description
of signals, the f-transform, digital filter structures, infinite impulse response filter design techniques, finite impulse response design techniques, finite precision effects, and inverse filtering. Prerequisites: ELEN 340 and ELEN 390.

ELEN 475. Computer Networks (Credit, 3 hours).
Presents the study and design of computer networks to include protocols, network interfacing, network performance, etc. Prerequisite: Senior standing or approval of instructor.

ELEN 521. Digital Transmission and Data Communication Network Engineering (Credit, 3 hours).
Introduction to the fundamentals of digital transmission technology, topics include voice digitization using PCM, DPCM techniques, low bit rate coding of speech and data, time division, frequency division and statistical multiplexing, framing, synchronization, line coding, error detection and correction, data modulation, baseboard and carrier transmission techniques, characterization of transmission media, data communication protocols and seven-layer ISO model, design, analysis, and implementation of local and wide area networks, circuit switching, packet switching, contention protocols, collision detection, token passing, Ethernet, buses and rings.

ELEN 523. Communication Network Engineering (Credit, 3 hours).
The design of transmission systems for voice, high-speed data, and mobile services using fiber optics, satellites, microwave, mobile radio, and cable. Emphasis will be placed on examining an application, determining traffic type and characteristics, and choosing the appropriate media and protocol to support transmission.

ELEN 533. Information theory (Credit, 3 hours).
Introduction of discrete information sources and the fundamental concept of entropy and data compression codes. Introduction to application of information theory to cryptography. Introduction to Shannon's source coding theorems. An overview of digital communication systems and concept of information.

ELEN 535. Systems Analysis and Management (Credit, 3 hours).
Introduces the student to basic systems analysis tools and the procedures for conducting a systems analysis. Topics will include the design of system requirements, feasibility studies and cost analysis, detailed design, implementation, system testing, and system life cycle management. The student will implement these concepts through studies and/or projects.

ELEN 588. Topics in Telecommunication and Computer Network Engineering (Credit, 3 hours).
Individual or group study in one or more areas of Telecommunication and Computer Network engineering or related topics.

DEGREE OPTIONS FOR TRACK 1, 2 AND 3

ENGR 599. Engineering Project (Credit, 3-15 hours).
Continuation of research on Engineering Project. Satisfactory oral defense of topic is required for graduation.

ENGR 600. Thesis (Credit, 3-15 hours).
Continuation of research on Thesis. Satisfactory oral defense of topic is required for graduation.

AREA 3: ENGINEERING MANAGEMENT

CORE COURSES

ENGR 500. Probability and Statistics for Engineers (Credit, 3 hours).
Probability distributions, Statistical Inferences, Regression Analysis, Multiple Regression, Hypothesis testing, Design of Experiments and Analysis of Variance, Non-parametric Statistics, Statistical Quality Control, Stochastic Processes.

MGMT 592. Business Strategic Decision Making (Credit, 3 hours).
Study of business policies integrating the functions of all fields of business administration with emphasis on a top management viewpoint of the operations of the business enterprise. This capstone course for the graduate business curricula and includes comprehensive examination.

ENGR 560. Optimization Theory and Methods (Credit, 3 hours).

ENGR 570. Engineering Management (Credit, 3 hours).
Introduction to broad field of engineering management with specific emphasis on subjects such as project management, value engineering, constrained optimization, maintenance management, and enterprise resource planning (ERP). Students will be required to perform projects in selected areas.

MGMT 587. Project Management (Credit, 3 hours).

ENGINEERING ELECTIVE COURSES

Select any electives from Specialty Area 1 or 2.

BUSINESS ELECTIVE COURSES

ECON 515. Managerial Economics (Credit, 3 hours).
This course is a combination of intermediate microeconomic theory, statistics and econometrics, and some business management. It emphasizes the use of micro-economic analysis as a practical tool for decision making in consumption, management and public policy. The economic behavior of individuals (consumers and producers) in various types of markets as well as market themselves will be studied with intensive use of graphs, computer/statistical applications and algebraic equations.

MGMT 510. Operations Management (Credit, 3 hours).
This course focuses on the major managerial issues in manufacturing management and the statistical/analytical tools that can be used to manage them. The major operations management issues are quality management and control, capacity management, plant location, layout and design, production planning and scheduling, inventory management, and related topics. The analytical tools covered include queuing theory, statistical quality control, linear programming, and related topics.

MGMT 520. Organizational Behavior and Leadership (Credit, 3 hours).
A course in organization structure management process and technology as they affect human behavior, control processes, communication systems, and other dimensions of the organization. Emphasis is placed on the study of "classic" readings these fields, so that the student can understand both the state of art in theory, research, and practice, as well as gain insight into the historical development of ideas. Organization theory topics covered will be include organization structure, strategy, conflict, politics, culture and design. Organization behavior topics covered will include individual-level phenomena such as employee attitudes, motivation and behaviors, and meso-level phenomena including group and team dynamics.

MGMT 547. Entrepreneurship (Credit, 3 hours).
This course covers the entrepreneurial process from conception to birth of the new venture. It looks at both process and people involved in assessing ideas, exploiting opportunities, gathering resources and converting concepts into businesses. It explores the practical tools which students can use to further their careers in business, both in entrepreneurship and in more "traditional" corporate environments. A key aspect of the course is working in teams to write business plan for a new or dramatically expanded venture.

MGMT 587. Project Management (Credit, 3 hours).

MKTG 591. Marketing Management (Credit, 3 hours).
An advanced applied course in marketing management and decision making. This course focuses on the decisions that managers make and the tools that they use to support an effective marketing strategy. It provides a strategic way to think about the firm's products, services, and markets, including marketing strategy and implementation. Topics include the study of customer/buyer behavior, market segmentation, competitive analysis, product development and positioning, advertising and promotion, and pricing issues.

EBIZ 546. Global Supply Chain Management and ERP (Credit, 3 hours).
This course examines contemporary issues in the management and integration of raw material procurement, inventory management, and finished goods delivery. In addition, students will have hands-on experience of using ERP software such as SAP. The topics covered include planning and managing inventories, transportation, network design, and financial factors influencing supply chain decisions.

ENGINEERING PROJECT

ENGR 599. Engineering Project (Credit, 3-15 hours).
Continuation of research on Engineering Project. Satisfactory oral defense of topic is required for graduation.

Master of Engineering Program
Southern University and A&M College
Baton Rouge, Louisiana

Name	Academic Advisor
Department	Specialty Area

Checklist for Master of Engineering Degree with Project

- ☐ Select Major Professor/Academic Advisor
- ☐ Establish Advisory Committee
- ☐ Submit Plan of Study to Advisory Committee for Approval
- ☐ Submit Plan of Study to DEGP and Graduate School
- ☐ Submit Project Proposal to Advisory Committee for Approval
- ☐ Submit Registration of Project Proposal to DEGP and Graduate School
- ☐ Write and Submit Project to Advisory Committee for Approval
- ☐ Request for Comprehensive Examination
- ☐ Submit Project to DEGP for Approval
- ☐ Submit Project to Graduate School for Approval
- ☐ Apply for graduation

Note:
It is the student's responsibility to ensure that all requirements have been met and that every deadline is observed.

Southern University and A&M College
Master of Engineering Program
Baton Rouge, Louisiana

Name	Academic Advisor
Department	Specialty Area

Checklist for Master of Engineering Degree with Thesis

- ☐ Select Major Professor/Academic Advisor
- ☐ Establish Advisory Committee
- ☐ Submit Plan of Study to Advisory Committee for Approval
- ☐ Submit Plan of Study to DEGP and Graduate School
- ☐ Submit Thesis Proposal to Advisory Committee for Approval
- ☐ Submit Registration of Thesis Proposal to DEGP and Graduate School
- ☐ Write and Submit Thesis to Advisory Committee for Approval
- ☐ Request for Master's Thesis Oral Defense
- ☐ Submit Thesis to DEGP for Approval
- ☐ Submit Thesis to Graduate School for Approval
- ☐ Apply for graduation

Note:
It is the student's responsibility to ensure that all requirements have been met and that every deadline is observed.

APPENDIX II: FORMS

Southern University and A&M College | Master of Engineering Program
Plan of Study

Every Graduate Student must submit a Plan of Study to his/her Academic Advisor for approval by the Director of Master of Engineering Program before the end of the first semester of study.

Initial Date for Plan of Study	**Revised Date for Plan of Study**

Last Name:	First Name	Middle Initial
Student Identification Number	Phone Number:	Email:
Address		

Specialty Area (check one): ☐ 1 ☐ 2 ☐ 3 Track Name:

Option (check one): ☐ Thesis ☐ Project Academic Advisor:

Dept. Abr.	Course No.	Course Title	Credit Hours	Final Grade	Semester	Year
		Total Hours Listed for Credit				

PREREQUISITES OR OTHER COURSES Not applicable for graduate credit		**I understand that additional course work may be added to the plan of study by my advisory committee to correct deficiencies.**

Approval Recommended:

(Committee Chair) (or Academic Advisor)	Signature	Dept	(Signature of Student)		Dept
(Member)	Signature	Dept	(Member)	Signature	Dept
(Member)	Signature	Dept	(Member)	Signature	Dept

Program Director Date