Master’s Program in Energy Science, Technology and Policy
Graduate Student Handbook

Carnegie Mellon
ENGINEERING

Academic Year 2015-`16
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with Spring 2016 ADDENDUM pages i-ii added 2/25/2016

Master’s Program in Energy Science, Technology and Policy
Carnegie Mellon University
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Email: energy@andrew.cmu.edu
http://www.cmu.edu/engineering/estp/
**Background** - The Energy Science, Technology and Policy (EST&P) master’s degree program began in Fall 2010 and has operated successfully for the past six years with a two semester (Track-A) degree, and beginning in 2013 a three semester (Track-B) degree project option.

**Handbook Changes for 2016** - In order to align EST&P degree options with CMU College of Engineering and University policies and practices, EST&P has eliminated the “Track” designations with University approval of a new EST&P – Applied Studies degree that supersedes the former Track-B option.

The former Track-A option is unchanged and is now uniquely associated with the Energy Science, Technology & Policy two semester degree. Students selecting this degree option will continue to receive their Master of Science degree in EST&P. Beginning with the Fall Semester 2016 incoming class, students applying to the three semester Track-B degree option are admitted to the Energy Science, Technology & Policy - Applied Studies (EST&P-AS) degree and their diploma will show the Master of Science degree in EST&P-Applied Studies designation.

The admissions committee decisions were made for Fall 2016 considering the selected degree option, and offers of admission were presented to incoming students for either the EST&P degree (two semesters / 96 units) or the EST&P-AS degree (three semesters / 120 units). As described in the handbook, admitted students cannot automatically change from one track to another, or to a different degree program, after they have accepted admission. The procedure for a current student to request an EST&P degree change is now the same as requesting a transfer to another Engineering department or program. The student must apply to the new degree program; the application must be reviewed by the appropriate admissions committee; if admission is granted to the new degree then the necessary degree change paperwork is submitted to the registrar and to OIE as appropriate. To summarize:

a. The existing EST&P degree is unchanged; completed in two academic semesters of 48 units each to meet the 96-unit degree requirement (core + concentration + breadth).

b. The new three-semester EST&P-AS degree supersedes and replaces the former EST&P Track-B project option. A minimum of 120 units are required for the new degree with formal title: Master of Science in Energy Science, Technology and Policy – Applied Studies.

c. Energy core mini-courses (24 units) and Disciplinary Concentration course requirements (36 units) are identical for both EST&P and EST&P-AS degrees.

d. The breadth elective requirement for the new EST&P-AS degree is expanded from 36 to 60 units. Thirty six units of breadth electives must be satisfied by coursework following existing EST&P program rules. An additional 24 units of 39-660 Master’s EST&P Project (or equivalent pre-approved project course work) is required for the EST&P-AS degree.

**EST&P-AS degree project requirements and options** - During the first six years of program operation, a number of EST&P students have done master’s project or independent study work with engineering faculty members who are willing to supervise an appropriately sized and scoped project related to energy. Up to 12 units of Master’s Project have always counted as Breadth Elective towards the EST&P degree. The new EST&P-AS degree simply formalizes and standardizes a 24-unit project requirement for the three-semester degree option. In order for independent study project units to count towards the degree, students must submit an EST&P project approval form that is signed by the supervising faculty
member and then approved by an EST&P advisor. A letter grade must be assigned in the project coursework which is to be primarily conducted on campus. To summarize, project options for EST&P students include but are not limited to:

1. Students may create their own project opportunities by securing agreement for supervision from a College of Engineering faculty member. They sign up for 39-660 EST&P Master’s Project units or use a similar Masters Project or Independent Study course in the supervising faculty member’s department.

2. Students may apply internship credit: students on summer internship may register and pay for 3 or more units of 39-660 EST&P Masters Project or equivalent. Advance approval is required, with project/course supervision by EST&P advisor.

3. With advance approval of the EST&P advisor, up to 12 units of project-orientated engineering coursework may be counted towards meeting the EST&P-AS project 24-unit requirement. The full list is currently under review and is expected to include such project courses as:

   • 39-605/606 Engineering Design Projects, 12 units
   • 24-781/782 Engineering Computation Project, variable units
   • 12-718 Environmental Engineering, Sustainability and Science Project, 12 units
   • 12-745 Advanced Infrastructure Systems Project, 12 units
   • 10-701 Machine Learning (project section), 12 units
   • 18-587 Electrical Energy Conversion, Control and Management, 12 units (this capstone project class will also count as the maximum allowed 12 units of undergraduate coursework)

<table>
<thead>
<tr>
<th>Energy Science, Technology &amp; Policy (EST&amp;P) degree</th>
<th>Energy Science, Technology &amp; Policy - Applied Studies (EST&amp;P-AS) degree</th>
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</thead>
<tbody>
<tr>
<td>Master of Science (MS) degree</td>
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</tr>
<tr>
<td>2 semesters of full-time study</td>
<td>3 semesters of full-time study</td>
</tr>
<tr>
<td>96 units of coursework:</td>
<td>120 total units: 96 coursework + 24 MS Project</td>
</tr>
<tr>
<td>• 24 units: required four core mini-courses (39-610, -611, -612, -613)</td>
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</tr>
<tr>
<td>Up to 12 units of Master’s Project/Independent Study coursework can count as breadth elective</td>
<td>A minimum of 24 units of 39-660 Master’s EST&amp;P Project units (or equiv.) are required</td>
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I) Welcome and Introduction

The Faculty and Staff of the Energy Science, Technology and Policy (EST&P) program welcome you to an interdisciplinary master’s program in the College of Engineering. EST&P builds upon the significant accomplishments in energy by the Scott Institute for Energy Innovation and Carnegie Mellon University (CMU). Innovations from CMU faculty, researchers, students and graduates have been making an impact on state of the art energy technology and policy for many decades. The interdisciplinary nature of the EST&P program allows you to customize your energy-related breadth and depth coursework according to your personal and professional objectives. We are very proud of our alumni; nearly 100 to date.

This handbook is designed to guide and inform students entering the EST&P program. It contains detailed information about EST&P policies, procedures and degree requirements and it supplements the College of Engineering graduate policies and the University policies. As you join us for the sixth year of our Energy master’s program, we hope you have a productive and rewarding academic year, and that you will not hesitate to contact us with any questions.

A) Why EST&P?
Effective solutions to energy problems will come from engineers and technical managers who understand the interdisciplinary challenges of energy, and who are well informed on the broad issues of energy supply, demand, storage, utilization, policy, sustainability, and the environment. The EST&P program addresses this need with a professional engineering master’s degree that is based in engineering, aligned with new discoveries in science, attuned to sustainability and the environment, and informed by a broader perspective in economics and public policy. All EST&P graduates share core knowledge gained in four required courses: Energy Conversion & Supply, Energy Transport & Storage, Energy Demand & Utilization, and Energy Policy & Economics. Engineering depth is assured through your selection of disciplinary concentration in one of six CMU engineering disciplines, and this choice sets the template for more than one third of your graduate coursework.

Graduates of the EST&P program pursue diverse careers where they can lead in the development of new technologies and policies for the production, transport, and efficient use of energy. The curriculum is designed to prepare you for a position of responsibility in energy sectors including: traditional energy utilities and suppliers, alternative and renewable energy, power generation and distribution, energy intensive manufacturing, energy efficiency and sustainability practices, consulting companies, government labs, non-profits, and academic institutions.

B) Consumer Information
Students in the EST&P program are self-funded, are funded by their employer, or by external scholarships, fellowships, and educational loans. In this coursework-based professional master's program you are permitted to enroll in project based classes as well as some independent study and master’s project research courses, but only project (track-B) students are expected to do so. The CMU HUB website consumer information page provides access to information that
current and prospective students of the University may need in order to be informed consumers. The CMU website also provides student consumer information linked on their Middle States Accreditation pages.

C) Carnegie Mellon University Statement of Assurance
Carnegie Mellon University does not discriminate in admission, employment, or administration of its programs or activities on the basis of race, color, national origin, sex, handicap or disability, age, sexual orientation, gender identity, religion, creed, ancestry, belief, veteran status, or genetic information. Furthermore, Carnegie Mellon University does not discriminate and is required not to discriminate in violation of federal, state, or local laws or executive orders. Inquiries concerning the application of and compliance with this statement should be directed to the vice president for campus affairs, Carnegie Mellon University, 5000 Forbes Avenue, Pittsburgh, PA 15213, telephone 412-268-2056. Obtain general information about Carnegie Mellon University by calling 412-268-2000. The Statement of Assurance can also be found at: www.cmu.edu/policies/administrative-and-governance/statement-of-assurance.html.

D) Acknowledgements
This handbook was prepared with the help and support of several of our partner departments: Civil and Environmental Engineering, Materials Science and Engineering, Chemical Engineering and Electrical and Computer Engineering. Portions of the text herein have been copied with permission from each of their respective graduate student handbooks. EST&P program policies conform to The Word and College of Engineering graduate policies. These include policies on intellectual property, freedom of expression, student privacy, academic disciplinary actions, and academic integrity. Should there be any disagreement between this document and the policies of the College of Engineering and CMU, the College and University documents take precedence.

II) EST&P Administrative Information
The EST&P administrative offices and study lounge are located on the A-Level 300 wing of Doherty Hall in the A307 suite. Maps of campus are available on the CMU website, and the "Mapyst" campus navigation app is available for Android devices and as a web app. Directions: walking from core campus (the Cut) you enter the Doherty Hall main entrance on the first floor, take the stairs down one flight to A-level, and continue walking "downhill" towards Wean Hall. The last door on your right before you leave Doherty and enter the 5th floor of Wean Hall is labeled A300. Enter the A-300 corridor here, wind your way through the Physics Museum, and EST&P is the last door on the right before the exit.

A) EST&P Affiliated Faculty and Staff Contact Information

<table>
<thead>
<tr>
<th>Last, First Name</th>
<th>Office</th>
<th>Phone</th>
<th>email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Khan, Neetha - Ombudperson</td>
<td>3317 Wean Hall</td>
<td>412-268-2332</td>
<td><a href="mailto:neetha@andrew.cmu.edu">neetha@andrew.cmu.edu</a></td>
</tr>
<tr>
<td>Landis, David - Exec. Dir., Prof (39-613)</td>
<td>A309 Doherty</td>
<td>412-268-7672</td>
<td><a href="mailto:DaveL@cmu.edu">DaveL@cmu.edu</a></td>
</tr>
<tr>
<td>Lomison, Ashley - Admin. Coordinator</td>
<td>A308 Doherty</td>
<td>412-268-2974</td>
<td><a href="mailto:alomison@andrew.cmu.edu">alomison@andrew.cmu.edu</a></td>
</tr>
<tr>
<td>Picard, Yoosuf – MSE Professor (39-610)</td>
<td>144 Roberts Hall</td>
<td>412-268-3044</td>
<td><a href="mailto:ypicard@cmu.edu">ypicard@cmu.edu</a></td>
</tr>
<tr>
<td>Samaras, Costa- CEE Professor (39-611)</td>
<td>103 Porter Hall</td>
<td>412-268-1658</td>
<td><a href="mailto:csamaras@cmu.edu">csamaras@cmu.edu</a></td>
</tr>
<tr>
<td>Siewiorek, Nora - Assistant Exec. Dir.</td>
<td>A308 Doherty</td>
<td>412-268-6072</td>
<td><a href="mailto:norann@andrew.cmu.edu">norann@andrew.cmu.edu</a></td>
</tr>
<tr>
<td>Whitacre, Jay – EPP/MSE Prof. (39-612)</td>
<td>4323 Wean Hall</td>
<td>412-268-5548</td>
<td><a href="mailto:whitacre@andrew.cmu.edu">whitacre@andrew.cmu.edu</a></td>
</tr>
</tbody>
</table>
For the extended list of EST&P-associated faculty from the College of Engineering Departments, please see the EST&P About Us: Faculty and Staff page.

**College of Engineering Department Locations and Department Head Contacts**

- **College of Engineering**
  - 110 Scaife Hall
  - Garrett, James H.
  - Dean of Engineering & Thomas Lord Professor of Civil and Environmental Engineering
  - 412-268-5090

- **Chemical Engineering**
  - 1107 Doherty Hall
  - Biegler, Lorenz
  - CHE Department Head & Bayer Professor of Chemical Engineering
  - 1111 Doherty Hall
  - 412-268-2232

- **Civil & Environmental Engineering**
  - 119 Porter Hall
  - Dzombak, David
  - CEE Department Head & Blenko University Professor of Civil & Environmental Engineering
  - 119D Porter Hall
  - 412-268-2946

- **Electrical & Computer Engineering**
  - Hamerschlag Hall
  - Kovacevic, Jelena
  - ECE Department Head & Schramm Professor of Electrical & Computer Engineering
  - 1106 Hamerschlag
  - 412-268-3299

- **Engr. & Public Policy**
  - 129 Baker
  - Sicker, Doug
  - EPP Department Head
  - 129 Baker Hall
  - 412-268-2838

- **Materials Science & Engr.**
  - 3325 Wean Hall
  - Rohrer, Gregory
  - MSE Department Head & W.W. Mullins Professor of Material Science & Engineering
  - 3327 Wean Hall
  - 412-268-2696

- **Mechanical Engineering**
  - 4th Floor Scaife
  - Robinson, Allen
  - MEG Department Head & Raymond J Lane Distinguished Professor of Mechanical Engineering
  - 401 Scaife Hall
  - 412-268-3657
B) University Offices

University Police: emergency 412-268-2323  
non-emergency 412-268-6232  www.cmu.edu/police

Student Health Services 412-268-2157  www.cmu.edu/health-services

Counseling & Psychological Services 412-268-2922  www.cmu.edu/counseling

Housing Services 412-268-2139  www.cmu.edu/housing

Dining Services 412-268-2139  www.cmu.edu/dining

Office of International Education 412-268-5231  www.studentaffairs.cmu.edu/oie

Intercultural Communications Center 412-268-4979  www.cmu.edu/icc

Sorrells Engineering & Science Library 412-268-2427  www.library.cmu.edu

Career & Professional Dev. Center 412-268-2064  www.cmu.edu/career

Global Communications Center 412-268-9633  www.cmu.edu/gcc

Asst.Vice Provost for Grad. Education 412-268-7307  www.cmu.edu/graduate

Enrollment & Finances for Grad Students  www.cmu.edu/hub/new-grad/

Graduate Education Programs & Services  www.cmu.edu/graduate/programs-services

Graduate Student Assembly  www.cmu.edu/stugov/gsa

Please see Appendix B. for more information relating to University’s offices and resources.

C) EST&P Office Suite and Study Lounge Information

The A-307 front door to the EST&P office suite is open Monday through Friday from 8am to 5pm when EST&P staff is present (except during official US holidays when the university is closed). After business hours your CMU student ID will work in the card swipe giving access to the study lounge and logging your entrance to the area. Do NOT prop open the door after-hours, and do NOT leave study lounge windows open when you leave.

A limited number of lockers are available in the EST&P office for student use. EST&P will issue a request for lockers at the beginning of each semester, and will use a lottery method to assign lockers if there are more requests than available space. Students assigned a locker are encouraged to secure it with a lock. EST&P and CMU are not responsible for any items lost or stolen from the lockers or study lounge.

The kitchen area in the EST&P study lounge is available for student use as long as everyone works together to maintain a clean and safe area. CMU custodial services will only empty trash and occasionally vacuum the floor. Do not leave cups or dirty dishes in the sink; they represent a health hazard and will eventually be thrown away. Do not leave food containers, trash, or any personal items in the study lounge. It is not the job of EST&P’s professional staff to clean up after you in the lounge, and each student is responsible to leave the lounge in reasonable order when you leave. Continued access and use of the study lounge is predicated on responsible behavior by each and every EST&P student. If the room is not kept in good condition and becomes a health and safety hazard, then EST&P will be forced to disable the card-swipe lock and only permit access to the study lounge during business hours when EST&P staff is present.

Mailboxes are not available for EST&P student assignment or personal use. If you plan to have something shipped to EST&P, please notify the staff in advance. To receive campus mail, please use the following address:  Your Name, c/o EST&P Program

Carnegie Mellon University  
5000 Forbes Ave, WEH 3325  
Pittsburgh, PA 15213-3890
**Printing**: As a CMU graduate student you have an assigned Andrew printing quota of $40 per semester. Please see [http://www.cmu.edu/computing/clusters/printing/quota.html](http://www.cmu.edu/computing/clusters/printing/quota.html) for computer cluster and printing information. A laser printer is currently available in the EST&P study lounge for limited black and white printing. This printer is a HP LaserJet Pro 400 model M401dne, and you can print from this by connecting your laptop to the printer’s USB cable.

**Computing**: Each student is assigned a single-sign-on account (Andrew account) which is required to access campus-wide and EST&P computing resources. Andrew accounts can be managed by visiting the Computing Services website at [www.cmu.edu/computing/accounts](http://www.cmu.edu/computing/accounts). Students may contact the Computing Services Help Center if you have any IT issues (i.e., computers, phones, printers, etc.) at 412-268-4357 or advisor@andrew.cmu.edu

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**D) University Policies & Expectations**

It is the responsibility of each member of the Carnegie Mellon community to be familiar with university policies and guidelines. In addition to this EST&P graduate student handbook, the following resources are available to assist you in understanding community expectations:

- Academic Integrity Website: [www.cmu.edu/academic-integrity](http://www.cmu.edu/academic-integrity)
- University Policies Website: [www.cmu.edu/policies](http://www.cmu.edu/policies)
- College of Engineering Graduate Student Policy website: [http://engineering.cmu.edu/current_students/graduates/policies.html](http://engineering.cmu.edu/current_students/graduates/policies.html)
- Graduate Education Website: [www.cmu.edu/graduate/policies](http://www.cmu.edu/graduate/policies)
- Computing Services Website: [www.cmu.edu/computing/guideline](http://www.cmu.edu/computing/guideline)
- Carnegie Mellon’s policy on alcohol and drugs. All students should be aware of university policies: [www.cmu.edu/policies/documents/DrugAlcohol.html](http://www.cmu.edu/policies/documents/DrugAlcohol.html)

International Students must register and attend the mandatory Office of International Education (OIE) international student orientation. If you are unable to attend orientation you may make an appointment to meet with an advisor in the Office of International Education in Warner Hall 3rd floor. You must check in with OIE **by the 10th day of classes** or face administrative withdrawal.

Assistance for Individuals with Disabilities: Students with disabilities are encouraged to self-identify with Equal Opportunity Services by contacting Larry Powell, 412-268-2013, lpowell@andrew.cmu.edu to access the services available at the university and to initiate a request for accommodations. See Appendix-B for more information relating to university’s policies and resources.

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**E) University Health Requirements**

As a full-time student, you must have medical insurance and required immunizations that meet the university’s minimum requirements. Please see 2015-2016 student health insurance criteria at [www.cmu.edu/health-services/student-insurance/forms](http://www.cmu.edu/health-services/student-insurance/forms).

- All full-time students must meet the university’s immunization requirements [www.cmu.edu/health-services/immunization](http://www.cmu.edu/health-services/immunization). You must complete an online immunization form and/or waiver **by June 30, 2015** documenting that you have either had the required vaccines or have had blood tests proving immunity to certain diseases. You can complete the immunization form in HealthConnect, accessible at [www.cmu.edu/health-services](http://www.cmu.edu/health-services). Failure to submit the online immunization form or meet
the requirements before the start of classes will result in disenrollment from classes and removal from university housing.

- Confirm enrollment in the required health insurance plan, or certify compliance with mandatory health insurance coverage at Student Health Services by September 14, 2015.

III) EST&P Program Requirements

The Master’s program in Energy Science, Technology and Policy is designed for students seeking a distinctive master’s degree that is based in engineering and informed by a broader perspective in economics and public policy. It is a College of Engineering interdisciplinary program; prospective students apply and receive admission offers directly into the EST&P program and NOT to one of the participating engineering departments. Students must, however, select one of six disciplinary concentration options that are associated with the six College of Engineering departments who cooperate with EST&P (MSE, ECE, CEE, CHE, EPP and MEG). This disciplinary concentration choice sets the requirements for 36 units of EST&P coursework as will be described in the following section.

The EST&P curriculum comprises 96 units of coursework and is designed to be completed in a minimum of two semesters (Track-A). A third semester project option (Track-B) is currently available for students choosing to do master’s project or independent study work, or who also need to remove a material deficiency by taking prerequisite coursework. Prospective students are advised that changes to the Track-B option are anticipated during the 2015-16 academic year. Up-to-date information regarding the EST&P project degree option will be posted on the program website. The program is interdisciplinary and draws faculty participation from multiple College of Engineering departments. It addresses a wide range of energy topics from the harvesting and conversion of energy to its distribution, demand and usage; including:

- Fundamental scientific principles governing and limiting energy conversion and transport
- Technological, regulatory and other barriers that exist today and engineering challenges for enabling future power systems and infrastructure
- Sustainability and environmental issues
- National and global socio-economical questions that govern energy policy and legislature

A) Curriculum and Degree Requirements

EST&P course work is distributed within the three categories indicated in the figure below (core, concentration, and breadth), as will be described in detail in the following text. All students must take the required four EST&P core energy courses.

EST&P Core Energy Mini-courses (24 total units)

1. 39-610 Energy Conversion and Supply (6 units)
2. 39-613 Energy Transport and Storage (6 units)
3. 39-611 Energy Demand and Utilization (6 units)
4. 39-612 Energy Policy and Economics (6 units)
Disciplinary Concentration Course Options (36 units)

EST&P students must choose among one of six disciplinary concentrations, and the participating departments have defined the classes permitted to fulfill this requirement. Concentrations may include both required and elective courses, and vary in structure from department to department. For complete details please refer to Appendix A of this Handbook and/or pages on the EST&P Website: [http://www.cmu.edu/engineering/estp/degree-program/index.html](http://www.cmu.edu/engineering/estp/degree-program/index.html)

- Disciplinary concentration in Chemical Engineering
- Disciplinary concentration in Civil and Environmental Engineering
- Disciplinary concentration in Electrical and Computer Engineering
- Disciplinary concentration in Engineering and Public Policy
- Disciplinary concentration in Materials Science and Engineering
- Disciplinary concentration in Mechanical Engineering

Breadth Elective Course Options (36 units)

Upon consultation and **advance written approval** by the EST&P academic advisor, graduate level College of Engineering classes or pre-approved graduate level classes at Carnegie Mellon may be selected as breadth electives. Students are encouraged to take breadth elective course from outside the department associated with their disciplinary concentration. Up to 12 units of upper level undergraduate credit (400 or 500 level) can be applied toward this requirement, when the course is needed as preparation for a graduate class. If you choose to take courses outside of the College of Engineering, **advance written approval is required** for 18 units or more. Classes at the 300 level and below cannot be counted towards the EST&P degree. A maximum of 12 units of directed research / independent study / master’s project coursework can be applied.
toward the breadth requirement. A letter grade must be assigned for the course and **advance written approval is required.** The master’s project approval form must be submitted to the EST&P Academic Advisor by the first day of classes, and written (email) response will be provided within 4 business days. This form requires a 1-page plan of study describing the topic / expected outcomes, the method of evaluation, and must be signed by both the student and the supervising College of Engineering faculty member. The completed form will then allow the student to be registered for the appropriate number of units of EST&P master’s project course number 39-660. If a similar process or course number exists in the project faculty member’s home department, that procedure can also be followed. Please submit a copy of the completed departmental form to the EST&P office to be added to your folder.

B) **Registration and Degree Tracks**

Course registration is accomplished through CMU’s Student Information Online (SIO) system accessible through the HUB website. Students are responsible for enrolling in required core courses, pre-approved disciplinary concentration courses, and pre-approved breadth electives. Register as early as possible to reduce the chances you might be wait-listed in a desired course. Refer to the University calendar for official registration dates (mid-November for Spring registration; mid-April for Fall registration - [www.cmu.edu/hub/calendar.html](http://www.cmu.edu/hub/calendar.html)).

Before you begin online registration, please carefully review the degree and course requirements summarized here and in Appendix A. The EST&P Executive Director serves as an academic advisor for the program, and is available to help you create a program that meets both stated degree requirements and your personal / professional objectives. You should pay careful attention to required courses in your disciplinary concentration, and be aware that most graduate courses are taught only once per academic year.

Most students follow the EST&P Track-A program which is completed in two semesters (one academic year) of full-time study. Students typically begin in the Fall Semester and graduate at the end of Spring semester, but the program can also be taken entering in Spring semester and graduating in the Fall. Alternatively students may apply for admission to the EST&P Track-B project degree option which requires three semesters to complete (Fall->Spring->Fall OR Spring->Fall->Spring). Students complete the 96 units that meet all EST&P degree requirements, including master’s project or independent study and possibly supplementary coursework. Track-B is appropriate when 1.) Additional coursework or self-study is needed to remove a material deficiency when a student's undergraduate degree is different from their EST&P disciplinary concentration; or 2.) An experience-based professional study program is desired offering practice-based activities including master’s project coursework, or independent/directed study, or internship. All international students (on F-1 visa) joining a CIT Master's program in or after Fall 2015 semester are required to maintain full-time student status (i.e., registering for a minimum of 36 units) in all semesters including their last semester. [http://engineering.cmu.edu/current_students/graduates/policies.html#full-time](http://engineering.cmu.edu/current_students/graduates/policies.html#full-time)

The selection of Track-A or Track-B must be made at the time of application and admission to EST&P. In an exceptional case a student admitted to Track-B may be able to complete all degree requirements within two semesters and early exit (equivalent to having started as a Track-A degree student). Once you have successfully completed all of the 96-unit degree requirements you will be awarded the EST&P degree. International students admitted to the Track-A program are advised that you MAY NOT switch to Track-B once your data has been entered into the University registration and SIO/SEVIS systems in preparation for issuing your I-20. Of note for international students who are considering a Curricular Practical Training (CPT) internship: Track-B students who begin in the Fall semester are eligible for CPT in the summer
following their Spring semester (after two full-time semesters of study in the US). During your CPT internship you must register for a minimum of 3 units of Masters Project / Internship coursework, and you will be billed for the summer course units at the part-time per-unit tuition rate. Pre-completion OPT is also available as an alternative to CPT, and does not require summer course registration. Note however that an international student who is admitted starting in the Spring semester is not eligible for a summer off-campus internship because F1 Visa / I-20 rules require two semesters of full-time study be completed prior to internship eligibility. International students must consult with the Office of International Education (OIE) for eligibility before seeking an internship or signing an offer contract.

C) Program, Financial, and Student Status Issues

Graduate Transfer Credits - Up to 12 units of graduate work completed at other universities, with a grade point average in each course of 3.0 or better, may be considered for transfer credit, provided that such course work is part of a graduate program leading to the degree sought. Such transfer credit is not granted prior to admission to EST&P and must be approved after the student has satisfactorily completed at least 36 units of graduate courses at Carnegie Mellon. Transfer credit requests will be handled on a case by case basis, with special consideration to whether the transfer credits can be applied toward the EST&P degree requirements. Approval of transfer credits to CMU is no guarantee that courses can count towards the EST&P 96 unit requirement, and transfer credits will not substitute for EST&P’s core classes.

Cross-Registration/PCHE - All full-time Carnegie Mellon graduate students have the option of taking one course at any of the ten PCHE intuitions. CMU’s policy on cross-registration can be found here: http://www.cmu.edu/hub/registration/undergraduates/cross/

Financial Support - EST&P tuition is charged at the standard College of Engineering graduate student rate, and students are billed each semester for one-half of the academic year graduate tuition. The current College of Engineering’s graduate tuition and fees are posted on the HUB website Graduate Tuition & Fees page. A typical EST&P (Track A) student will complete the program in two semesters of full-time study so will pay for one academic year of tuition. The full cost of attendance is estimated for the College of Engineering by including activity & technology fees, transportation, off-campus housing, health insurance, etc. on the Hub website Itemized College of Engineering Cost of Attendance page. EST&P students will be charged full-time tuition for each semester of the program. As with other coursework based professional master's programs at Carnegie Mellon's College of Engineering, EST&P students are primarily self-funded through personal savings and educational loans, or externally funded through government or private fellowships or by their employer. General information on financial assistance for engineering graduate students is available on the College of Engineering site, and some additional information about graduate student fellowships and assistantships is also available.
**CMU Blackboard System** - Most of your instructors will use the CMU Blackboard web service to manage course communications, assignments, and reference materials. Carnegie Mellon’s Blackboard home page is: [www.cmu.edu/blackboard](http://www.cmu.edu/blackboard). You will automatically be enrolled in the EST&P Professional Resources (’15-’16) Blackboard site. Please check this site frequently as it contains important program and career related information. The site includes: Announcements, Calendar of events, Professional resources about Jobs & Internships, Program information, Energy links, and a Discussion board. Items of importance/interest will be posted directly on the site. You are expected to check Blackboard weekly and respond to requests for Blackboard submissions appropriately. EST&P students will use Blackboard to submit forms required by the program and to submit their resume to be included in the EST&P Resume Book.

**Financial Aid** - Graduate students should consult the graduate student financial aid information found on The HUB website: [http://www.cmu.edu/finaid/basics/graduate/aid.html](http://www.cmu.edu/finaid/basics/graduate/aid.html). Students will find the Graduate Financial Aid Guide, information about funding options and how to apply for financial aid and other helpful links. Those who find themselves in need of immediate funds for emergency situations should contact the Office of the Dean of Student Affairs (see Appendix A), [www.cmu.edu/student-affairs/index.html](http://www.cmu.edu/student-affairs/index.html), to inquire about an Emergency Student Loan.

**Full-Time, Part-Time, and Overload Status** - A full time EST&P student course load is 36 or more units; and a Track-A student must take 48 units per semester in order to complete the degree in two semesters. An EST&P student’s schedule is considered over-loaded when it exceeds 50 units per semester. For any schedule exceeding 54 units per semester you must have a minimum Quality Point Average (QPA) of 3.6 or above in your prior CMU/EST&P semester, and advance permission is required from the EST&P Program Advisor. International students are advised that dropping below 48 units (Track-A) or 36 units (Track-B) will affect their student visa status and must work with the Office of International Education (OIE). All international students (on F-1 visa) joining a CIT Master’s program in or after Fall 2015 semester are required to maintain full-time student status (i.e., registering for a minimum of 36 units) in all semesters including their last semester. [http://engineering.cmu.edu/current_students/graduates/policies.html#full-time](http://engineering.cmu.edu/current_students/graduates/policies.html#full-time)

**Deferred Admission Policy** - EST&P allows students to defer admission for one semester only (Fall admits defer to Spring semester, Spring Admits defer to the next Fall semester) using the form provided by the EST&P program. Written (email) approval of the request for deferred admission will be provided within 14 days. If you cannot attend until the following year you must reapply for admission in ApplyYourself. In such cases EST&P will sponsor your application fee in ApplyYourself, and will keep for your re-use any official tests scores, transcripts, and other documentation sent in support of your application.

**Master’s Thesis** - The Energy Science, Technology and Policy is a professional master’s program for which no Master’s Thesis is required.
IV) Academic Standards and Graduation Requirements

A) Course and Minimum QPA
All courses that are counted towards the 96-unit EST&P course requirement for graduation must be taken for credit with a letter grade assigned. Any courses taken as audit or with pass/fail grading cannot be counted towards the 96-unit degree requirement. For each course taken, the policies and procedures of the instructor, the department, and college in which the course is offered must be followed by EST&P students. The grade will be that assigned by the course professor/instructor. The decision to use plus or minus grading is at the discretion of each course instructor. Mid-semester grades are optional, and Final Grades are posted online to SIO at the end of each semester.

Carnegie Mellon graduate students are graded on a letter grade scale, which can optionally include plus or minus designations at the discretion of the course instructor. The letter grades assigned should be interpreted as follows:

A -- Excellent; student work exceeds expectations
B -- Good; student work is acceptable for an EST&P student
C -- Marginal; student work is not up to EST&P program standards
D -- Unacceptable work for an EST&P student, does not count towards the degree

EST&P students must maintain a minimum overall QPA of 3.0 or above to remain in good academic standing and satisfy the requirements of the Master's Degree. Students with QPAs lower than 3.0 at the end of a semester are notified by the EST&P Program Advisor that they are on academic probation and must increase their QPA during the next academic year semester. No course with a grade lower than C will be counted toward the Master's Degree requirements. When calculating the QPA to meet graduation requirements, the average grade of the 96 units that meet the EST&P degree requirements shall be at least B. If a student has taken more than 96 total units, then the student may choose any 96 units of the first 120 units attempted to compute the grade average, providing that the selected 96 units meet all EST&P degree requirements. Students must also maintain a minimum QPA of 3.0 or above in all required courses. Required courses are the four EST&P Core Classes (39-610, 39-611, 39-612, 39-613), plus an additional course if required by the student's selected disciplinary concentration. Further, if a grade of C or lower is earned in any required course, the student will be immediately placed on academic probation and must retake that course and pass with a grade of B or better prior to graduation.

B) Academic Probation
At the end of each semester, after grades have been posted, the academic performance of each student is reviewed. Courses that negatively affect the core QPA cannot be moved from the core requirement unless another completed course can replace the course with the lower grade. The QPA for academic review is computed based on the guidelines for graduation requirements.

Any student with a core QPA of less than 3.0, with a cumulative QPA of less than 3.0, or with a QPA of less than 3.0 in the most recent full semester completed, is immediately placed on academic probation. Initially, the student will receive written and electronic notification of their placement on academic probation, including a description of the specific terms of their probation and the timeframe and requirements to remove probation. All students on probation are subject to the following penalties:

- Cannot receive service project support during a probation semester
- Cannot be selected to receive awards, travel/conference funding, etc.
• May not formally represent the EST&P as an officer or other positions in a student club or campus organization

In most cases a student on academic probation will automatically be removed from probation at the end of the subsequent enrolled semester if their cumulative and core QPA calculations improve to the required 3.0 standard

If an EST&P student has a core or cumulative QPA lower than 3.0 during an initial or subsequent semester, the student may be permanently dropped from the EST&P program and will not graduate. If this occurs, the student will have an opportunity to appeal to the Provost. Unless the decision is overturned, the student is not entitled to a refund of tuition or student fees.

C) Graduation Requirements and Statute of Limitations
It is the responsibility of each student to ensure that she or he has completed all the necessary coursework for graduation. The EST&P Executive Director and Assistant Executive Director are available to advise students during the semester, but only the student can be held responsible for failure to meet graduation requirements. Note that the EST&P curriculum and graduation requirements may be revised from time to time. However, the requirements in effect at the time of a student's matriculation will dictate the graduation requirements that he or she must follow.

All units required for a master’s degree in the College of Engineering, whether earned in residence or transferred from another institution, must be recorded on the transcript within six years of the date the student enrolled in the program. This statutory period can be extended by the College of Engineering’s Associate Dean for Graduate and Faculty Affairs for special circumstances that do not make it possible for the student to complete the requirements within the statutory period. Any request for a waiver of the statute of limitations for master’s degree studies must be approved by the EST&P Executive Director and by the College of Engineering’s Associate Dean for Graduate and Faculty Affairs. The waiver request must explain the exceptional circumstances that warrant an extension. For cases in which a waiver is granted, the waiver will cover specific courses and will specify a time period for completion of the program.

D) Leave of Absence, Withdrawal & Enrollment Verification
Students in the EST&P program are expected to attend all classes and participate in all program activities. This excludes any defined academic break periods, and official University holidays. For the most up-to-date University calendar please see http://www.cmu.edu/hub/calendar.html.

Leave of absence - A student may need to take a temporary leave of absence for many reasons. Students are required to file a Leave of Absence form with the HUB, after securing the appropriate signature approvals. The leave will take effect on the date that the form is signed by the Dean of Engineering. Return from voluntary leave of absence requires program approval through a Request for Return from Leave of Absence form. Students in good standing in all courses, and on no academic action when taking a Leave of Absence, will be reinstated with the same standing as prior to the leave. Students in poor standing, or on academic probation at the time they request a Leave of Absence, must submit a written request asking for re-instatement to the program. This request will be evaluated by the EST&P admissions committee, who will respond in writing to the request within two weeks. All requests for reinstatement must be submitted within the time limit imposed by the 6-year statute of limitations described above.
Withdrawal - A student who decides to leave the university with no intentions of returning is required to file a Withdrawal form with the HUB. A student cannot return from a Withdrawal. For more information visit the University’s Student Leave and Student Return policies.

Enrollment Verification - Enrollment Services is the only University office that can provide an official letter of enrollment, official transcript, or enrollment verification. Enrollment verification can be requested online through The HUB. If necessary, you can request the EST&P program to provide a letter certifying your disciplinary concentration as this information is not specified on either your diploma or transcript.

V) Academic Integrity

Carnegie Mellon maintains the highest ethical standards, and makes continuous effort to identify and create the kind of academic environment that its members wish to enjoy. As a CMU graduate student you are an important participant in our University partnership that includes all faculty, staff, administrators, undergraduates, and graduate students. Thus, you are responsible for academic integrity, honesty, and fairness as is the responsibility of each university community member.

The CMU Office of Research Integrity and Compliance website describes the university’s position on ethical research: “Carnegie Mellon University is responsible for the integrity of research conducted at the university. As a community of scholars, in which truth and integrity are fundamental, the university must establish procedures for the investigation of allegations of misconduct of research with due care to protect the rights of those accused, those making the allegations, and Carnegie Mellon University. Furthermore, federal regulations require the university to have explicit procedures for addressing incidents in which there are allegations of misconduct in research. Research misconduct is defined as fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results…”

In support of the university’s position, EST&P recommends that all incoming students take the CMU / CIT recommended training offered by the Collaborative Institutional Training Initiative (CITI). All EST&P students with service projects, or taking Independent Study or Master’s Project coursework are required to complete the training by the end of the first week of classes, and to submit the certificate of successful completion. The CIT Graduate Student Policy provides the following instructions, “For CIT graduate students, the CITI physical science module package is recommended rather than the module package for engineers, although both are acceptable. The courses are available at CITI’s website at https://www.citiprogram.org/. Select Carnegie Mellon University as your participating institution when you create your account. This topic is described fully in the CIT Graduate Student Policy at the following link: http://engineering.cmu.edu/current_students/graduates/policies.html#rcr.

REQUIRED Plagiarism Quiz: The University of Indiana has an exceptional website that provides examples and a quiz to see if you understand the difference between proper and improper attribution of text. EST&P students are required to complete this quiz before the end of the first week of classes, and print and submit the certification given when the quiz is passed. Certifications will be submitted via the EST&P blackboard site and collected by the EST&P Administrative Coordinator. Submitting this certification indicates that you have learned and understand the approved processes for text attribution. You will be held responsible for this
information if a conflict arises in the academic year. Please complete the plagiarism quiz using
the following link: https://www.indiana.edu/~istd/plagiarism_test.html

Academic Integrity violations may arise when a student misinterprets course syllabus
instructions prohibiting group collaboration on graded homework, or from blatant falsification of
submitted work. Both situations result in disciplinary action, so please review carefully the
policy on academic integrity at http://www.cmu.edu/academic-integrity/. While you should
view the threat of disciplinary action as a serious one, it is equally important that you take up the
ideal of Academic Integrity as foundational to your educational experience at CMU. We
encourage you to embrace this part of the intellectual thread that binds you with the University
community. Accordingly, the complete CMU Statement on Academic Integrity is quoted here.

Policy on Academic Integrity - DATE OF ISSUANCE: This policy was approved by
President’s Council on April 11, 2013 and replaces the University’s Policy on Cheating and
Plagiarism, which was originally issued to campus on June 16, 1980 as Organization
Announcement #297, and then revised in 1990.

ABSTRACT: Academic credit awarded to an individual should represent the work of that
individual. Therefore, students at Carnegie Mellon are expected to produce their own original
academic work. Collaboration or assistance on academic work to be graded is not permitted
unless explicitly authorized by the course instructor(s). The citation of all sources is required.
When collaboration or assistance is permitted by the course instructor(s), the acknowledgement
of any collaboration or source of assistance is likewise required. Failure to do so is dishonest and
is the basis for a charge of cheating, plagiarism, or unauthorized assistance. Such charges are
subject to disciplinary action.

Students at Carnegie Mellon are engaged in intellectual activity consistent with the highest
standards of the academy. The relationship between students and instructors and their shared
commitment to overarching standards of respect, honor and transparency determine the integrity
of our community of scholars. The actions of our students, faculty and staff are a representation
of our university community and of the professional and personal communities that we lead.
Therefore, a deep and abiding commitment to academic integrity is fundamental to a Carnegie
Mellon education. Honesty and good faith, clarity in the communication of core values,
professional conduct of work, mutual trust and respect, and fairness and exemplary behavior
represent the expectations for ethical behavior for all members of the Carnegie Mellon
community.

A) University Policy Statement

In any manner of presentation, it is the responsibility of each student to produce her/his own
original academic work. Collaboration or assistance on academic work to be graded is not
permitted unless explicitly authorized by the course instructor(s). Students may utilize the
assistance provided by Academic Development, the Global Communication Center, and the
Academic Resource Center (CMU-Q) unless specifically prohibited by the course instructor(s).
Any other sources of collaboration or assistance must be specifically authorized by the course
instructor(s).

In all academic work to be graded, the citation of all sources is required. When collaboration or
assistance is permitted by the course instructor(s) or when a student utilizes the services provided
by Academic Development, the Global Communication Center, and the Academic Resource
Center (CMU-Q), the acknowledgement of any collaboration or assistance is likewise required. This citation and acknowledgement must be incorporated into the work submitted and not separately or at a later point in time. Failure to do so is dishonest and is subject to disciplinary action.

Instructors have a duty to communicate their expectations including those specific to collaboration, assistance, citation and acknowledgement within each course. Students likewise have a duty to ensure that they understand and abide by the standards that apply in any course or academic activity. In the absence of such understanding, it is the student’s responsibility to seek additional information and clarification.

B) University Policy Violations
Cheating occurs when a student avails her/himself of an unfair or disallowed advantage which includes but is not limited to:

1. Theft of or unauthorized access to an exam, answer key or other graded work from previous course offerings.
2. Use of an alternate, stand-in or proxy during an examination.
3. Copying from the examination or work of another person or source.
4. Submission or use of falsified data.
5. Using false statements to obtain additional time or other accommodation.
6. Falsification of academic credentials.

Plagiarism is defined as the use of work or concepts contributed by other individuals without proper attribution or citation. Unique ideas or materials taken from another source for either written or oral use must be fully acknowledged in academic work to be graded. Examples of sources expected to be referenced include but are not limited to:

1. Text, either written or spoken, quoted directly or paraphrased.
2. Graphic elements.
3. Passages of music, existing either as sound or as notation.
5. Scientific data.
6. Concepts or material derived from the work, published or unpublished, of another person.

Unauthorized assistance refers to the use of sources of support that have not been specifically authorized in this policy statement or by the course instructor(s) in the completion of academic work to be graded. Such sources of support may include but are not limited to advice or help provided by another individual, published or unpublished written sources, and electronic sources. Examples of unauthorized assistance include but are not limited to:

1. Collaboration on any assignment beyond the standards authorized by this policy statement and the course instructor(s).
2. Submission of work completed or edited in whole or in part by another person.
3. Supplying or communicating unauthorized information or materials, including graded work and answer keys from previous course offerings, in any way to another student.
4. Use of unauthorized information or materials, including graded work and answer keys from previous course offerings.
5. Use of unauthorized devices.
6. Submission for credit of previously completed graded work in a second course without first obtaining permission from the instructor(s) of the second course. In the case of
concurrent courses, permission to submit the same work for credit in two courses must be obtained from the instructors of both courses.

C) EST&P Protocol and Penalties for Academic Integrity Violations

Violations will be handled on a case by case basis. In addition to the course-level action imposed by the instructor, students will be subject to the following penalties:

- Will have any service projects or awards provided by EST&P rescinded immediately, including retroactive rescinding of awards received in previous semesters.
- Cannot be selected to receive EST&P awards, travel/conference funding, Course Assistant position, etc.
- May not formally represent the EST&P as an officer or other positions in a student club or campus organization

In accordance with the university’s policy, a student who violates the academic integrity policy will not be permitted to drop the course in which the offense occurred in order to avoid the penalty. If the student attempts to drop the course, he/she will be re-enrolled. If the student retakes the course or an equivalent course to fulfill the program requirement or prerequisite, he/she will be charged additional tuition. Students who want to appeal an academic integrity action must state in writing to the Provost their intention to do so within one week of the penalty date in questions, and then must submit their written appeal to the Provost no later than two weeks after said penalty date. Appeals must be in writing, with appropriate documentation.

In extreme cases where the first violation is particularly deplorable as determined by the EST&P Executive Director and Assistant Executive Director, a student may be permanently dropped from the EST&P program. Upon a second academic integrity violation, the student will immediately be dropped from the EST&P program.

University-wide Academic Disciplinary Protocol - Procedures for dealing with allegations of these policy violations are detailed in the university’s Academic Disciplinary Action Procedures for Graduate Students: [www.cmu.edu/academic-integrity/documents/academic-disciplinary-actions-overview-for-graduate-students.2013.pdf](http://www.cmu.edu/academic-integrity/documents/academic-disciplinary-actions-overview-for-graduate-students.2013.pdf) which is published as part of The WORD student handbook. Periodic review of these procedures will be overseen by the Dean of Student Affairs or her/his designee in consultation with Faculty Senate and the relevant student governing bodies. Any amendments to these procedures are subject to the approval of Faculty Senate. Additional guidelines and procedures for graduate students may exist at the college/department/program level, in which case they are communicated in the college/department/program graduate student handbook.

VI) Grievance Resolution; Graduate & University Ombudsman

Graduate students are expected to discuss any concerns or grievances initially with members of their academic program, including the Executive Director, Assistant Executive Director, and/or academic advisor as appropriate. If a student wishes, the Associate Dean for Graduate and Faculty Affairs of the College of Engineering is available for consultation. All such discussions will be considered confidential provided no laws are broken and unless otherwise told by the graduate student.

If resolution of an academic grievance or concern cannot be obtained within their academic departments, graduate students may file a formal appeal of academic actions to the Associate
Dean for Graduate and Faculty Affairs of the college. If a resolution cannot be reached by this process, an appeal may be made to the Provost at the request of either the student or the college.

A summary of the graduate student appeal and grievance procedures is available at the following link: www.cmu.edu/graduate/policies/appeal-grievance-procedures.html

Within the EST&P program, students are encouraged to work the Executive Director and Assistant Executive Director when problems arise. However, situations may arise where students need advice on some aspect of their activities or interactions with others in the EST&P program, yet may not feel it is appropriate to speak with their advisor or another member of the faculty. While close friends and family are important resources in such situations, it is also true that their scope of experience might not include working toward a Master’s degree in Engineering at Carnegie Mellon. For this reason, the administrative home department of the EST&P program relies on a Graduate Ombudsperson. The Materials Science and Engineering Ombudsperson is Neetha Khan and you may contact her at 412-268-2332 or neetha@andrew.cmu.edu. She is available to consult with students about any situation that affects their work and, where appropriate, offer advice or attempt to resolve a problem. Conversations with the Ombudsperson are confidential (provided no laws are broken and unless otherwise told by the graduate student) and the Ombudsperson will not communicate information to the EST&P program office, Executive Director or Assistant Executive Director, Engineering Department Heads, or other faculty members without the student's consent.

The Assistant Vice Provost for Graduate Education, Suzie Laurich-McIntyre, is the university Ombudsman for graduate students. You may contact her at 412-268-7307 or suzannel@andrew.cmu.edu. The Ombudsman’s role is to provide support for graduate students under complete confidentiality (provided no laws are broken and unless otherwise told by the graduate student). The Ombudsman will assist and support graduate students to help clarify issues and suggest possible solutions to problems as well as direct students to the appropriate departmental and college processes and resources for handling conflicts.

VII) EST&P Student Roles and Responsibilities

Masters students are responsible to track their progress towards completion of EST&P degree requirements by monitoring their course registration and degree progress in Student Information On-Line (SIO). In addition, please check Andrew email daily and blackboard frequently for communications from your professors and from EST&P program staff. When questions arise first consult this student handbook, official CMU website, EST&P blackboard, or other appropriate official references. If further clarification is then needed, consult with EST&P staff. For example, your fellow classmates are not official resources concerning whether a specific course will count towards your degree requirements as he/she might have different circumstances than your own. You must have prior written advisor approval to count any course not specifically on an approved list in this document or on the EST&P website. A few general guidelines:

- Be respectful of your fellow students, professors and EST&P staff member’s time. If you are late for, or miss your confirmed appointment a new appointment will probably need to be scheduled.
• Take responsibility for your own learning, wellbeing, and decision making. Be an active member in the many and various communities: EST&P, GSA, Carnegie Mellon, the energy profession, etc.
• Be aware that making a request does not mean it will be granted.

A) Attendance Requirements and Timeframes
Students must be physically present and attend class at the start of each semester. As a courtesy to others, students should drop a course as soon as they decide not to take it. This will allow a waitlisted student to be enrolled and will limit the disruption to any team-based projects. It is not uncommon to be waitlisted from the time of registration up until the tenth day of class. This is common practice across the university to ensure that students within their home department have priority to register for courses they must take in order to graduate. CMU students are not permitted to register for two courses that conflict in time. Delays caused by failing or dropping a class, or academic probation due to poor grades, are not allowable reasons for extension of a program of study. All EST&P students must attend final exams as scheduled by the university and individual course instructors; neither the EST&P program nor course instructors have control over the university exam schedule. Please keep this in mind when arranging travel at the end of a semester; having purchased airline tickets is not an acceptable excuse for missing a final exam.

Timing of requests: Please allow at least 24 hours (one business day) to process a required form, compose a letter of recommendation or respond to an email request. EST&P Staff can occasionally accommodate a “last minute” request, but cannot guarantee to be available for immediate response should you bring a form to be signed right before attending an information session where it is due.
B) Academic Advisor
The role of the Academic Advisor is complex and can vary from student to student, but at least two characteristics can be identified: mentor and evaluator. The Advisor is responsible for evaluating the student’s progress, and for jointly working with the student toward a successful outcome. Make an appointment with your advisor when you need specific information on course options and degree progress, or need professional advice. Your advisor will do his/her best to provide information and point you to resources relevant to your issue or concern. A few additional points:

- Your Advisor will not “make a decision for you”. The Advisor might be able to provide some positive and negative aspects towards a particular decision path, but ultimately the decision is up to the student regarding the issue at hand or inquiry.
- The EST&P Advisor is a cooperative partner along with other CMU resources helping each student stay on track towards academic and professional career success
- A conversation with your advisor that takes place in the hallway or EST&P lounge does not count as “written approval”. Written approval is defined as either a signed form, notes in the official student file, a letter or an email.

Change of Advisor – The executive director and assistant executive director serve as academic advisors for all EST&P students. It is the responsibility of both the Advisor and Student to seek accommodations of differences in good faith. If a student wishes to change their academic advisor, this can be done via an email request to the program’s administrative coordinator who will make the update to the student’s file.

Changing Academic Requirements and Policies - In the relentless pursuit of excellence, the EST&P program may change its requirements from time to time. EST&P uses a “grandfather” policy with regard to these changes; that is, every student has the right to graduate under the policies in effect at the time of entry into the graduate program or to graduate under the policy in force at the time of receiving the degree. It is the responsibility of each student to read and understand the contents of this handbook. This handbook is not exhaustive and is subject to change, clarification and revision at any time.

C) Professional Development Resources and Opportunities
Carnegie Mellon University and the EST&P program offer a number of professional development opportunities and benefits such as: on-campus career fairs, professional networking opportunities, career counseling, conference registration and travels funds, professional development support, service projects, and Graduate Student Assembly (GSA) representation. The following list identified opportunities application procedures; note that applying does not guarantee approval or acceptance of your request.

1. EST&P Professional Development Allocation: Each EST&P student may apply for up to $100 in professional development expense reimbursement over the time they are enrolled in the EST&P program. Expenses MUST be preapproved and allocated by the EST&P directors, and must meet CMU guidelines for allowable non-employee expense reimbursement. Typical allowed expenses include: printing of CMU business cards, energy conference student-registration fee, poster printing and the like.

2. Service Projects: A limited number of service projects are offered to incoming EST&P students with exceptional qualifications. Service Project offers are made by the admissions committee prior to the acceptance of admission; students commit 80 hours of service during the semester and will receive a corresponding ~15% reduction in their
semester tuition. Service project recipients must be full-time EST&P students, and with satisfactory performance a service project may be extended for one additional semester. They will not be offered at any other time other than admission, however see point 8.

3. **Graduate Student Conference Funding** is available through the Graduate Student Assembly and the Provost's Office, and is managed by the Office of the Assistant Vice Provost for Graduate Education. Preference is given to students making presentations and the award amount is up to $500 per student with a maximum of $1,000 per group. The open application periods and deadlines are listed on the [graduate education website](http://www.graduate.cmu.edu). Read and follow all the directions, and make sure you can meet all criteria for acceptance including required post-conference activities of reporting and publicity participation.

4. **EST&P Conference Supplemental Reimbursement**: There are opportunities throughout the academic year to attend energy related conferences, present posters or papers, and represent the EST&P program. If you wish to attend and participate in a professional meeting or conference and to represent EST&P, you may submit a conference travel application to EST&P requesting financial support. This must sufficiently in advance for review, and if awarded to make as cost efficient travel plans as possible. Your professional development allocation will be used as part of any awarded conference funding, and preference is given to supplement GSA conference funding awards.

5. **The Carnegie Mellon Career and Professional Development Center** provides career preparation resources, including guidance in preparation of resumes and cover letters, interviewing skills, and career networking and career fair opportunities. Be sure to sign up for TartanTRAK for full access to CPDC resources.

6. **The CMU Graduate Education office** provides numerous programs and services of value to EST&P professional master’s students. Check their [Professional Development page](http://www.graduateducation.cmu.edu) for up-to-date listing of events.

7. **EST&P has sponsored student-run Energy Career Symposium** events in 2013, 2014 and 2015. If there is sufficient student interest to support the event EST&P will do so again in 2016 (with a tentative date of February 12, 2016).

8. **OTHER OPPORTUNITIES**, as will be announced during the academic year. These may include opportunities to serve as a Course Assistant for an EST&P class, special assignments to support EST&P development and marketing, etc. When available, EST&P will advertise these opportunities to all eligible students and provide an application process.

9. **Graduate Student Assembly (GSA)**: The GSA is a University-wide branch of student government that represents all graduate students at Carnegie Mellon. EST&P students elect their own representative to GSA who will serve as their contact regarding GSA issues and events. Moreover, GSA returns a portion of your student fees to the EST&P student group if you are represented, and these funds can be used to support social and educational events as decided by the EST&P students.

   a. The EST&P GSA election will be held during orientation on August 25, 2015. Interested candidates will have the opportunity to give a brief speech. Present students will vote and majority rules.

   b. Responsibilities of the EST&P GSA representative include: attending GSA meetings, organizing at least one social event a semester (i.e., rock climbing, bowling, ice skating, etc.), sitting on funding award committee, acting as a liaison between EST&P program staff and students, and recruiting helpers for the Energy Career Symposium and other student events.
D) Academic Calendar, Prerequisites, and Course Audits
EST&P adheres to the official CMU academic calendar. The Heinz College and the Tepper School follow their own calendars with dates that differ from the university’s calendar for add, drop, audit, and pass/fail deadlines. EST&P students must adhere to these deadlines if they are taking courses from these colleges.

As a graduate student SIO may allow you to register for courses without the published prerequisite. However it is each student’s responsibility to have adequate background knowledge to be successful in the courses they take.

Auditing a course means being present in a classroom without receiving academic credit or a letter grade. An audited course will appear on a student’s transcript. The extent of the student’s participation must be arranged and approved by the course instructor. Typically, auditors are expected to attend class as though they are regular class member. Those who do not attend the class regularly or prepare themselves for class will receive a blank grade. Otherwise, the student receives the grade ‘O’, indicating the audit. The units of audited courses count toward the maximum course load units, but do not count toward degree requirements.

E) Safeguarding Educational Equity
CMU Policy Against Sexual Harassment and Sexual Assault - Sexual harassment and sexual assault are prohibited by CMU, as is retaliation for having brought forward a concern or allegation in good faith. The policy can be viewed in its entirety at: www.cmu.edu/policies/documents/SA_SH.htm. If you believe you have been the victim of sexual harassment or sexual assault, you are encouraged to make contact with any of the following resources:

- Sexual Harassment Advisors, found in appendix A of the Policy Against Sexual Harassment and Sexual Assault;
- Survivor Support Network, found in appendix B of the Policy Against Sexual Harassment and Sexual Assault;
- Sexual Harassment Process and Title IX Coordinators, found in section II of the Policy Against Sexual Harassment and Sexual Assault;
- University Police, 412-268-2323
- University Health Services, 412-268-2157
- Counseling & Psychological Services, 412-268-2922

Maternity Accommodation Protocol - Students whose anticipated delivery date is during the course of the semester may consider taking time away from their coursework and/or research responsibilities. All female students who give birth to a child while engaged in coursework or research are eligible to take either a short-term absence or formal leave of absence. Students in coursework should consider either working with their course instructor to receive incomplete grades, or elect to drop to part-time status or to take a semester leave of absence. Students engaged in research must work with their faculty to develop plans for the research for the time they are away. Students are encouraged to consult with relevant university faculty and staff as soon as possible as they begin making plans regarding time away. Students must contact the Office of the Dean of Student Affairs to register for Maternity Accommodations. Students will complete an information form and meet with a member of the Dean’s Office staff to determine resources and procedures appropriate for the individual student. Planning for the student’s discussion with her academic contact(s) (advisor, associate dean, etc.) will be reviewed during this meeting.
VIII) EST&P Degree Requirements Check-List  
Master’s Program in Energy Science, Technology and Policy  
Academic Year 2015-’16

NAME: ________________________  Student ID #: ________________________

CORE COURSES: 24 units required for all EST&P students

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course #</th>
<th>Units</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>FALL</td>
<td>39-610</td>
<td>6</td>
<td>Energy Conversion &amp; Supply</td>
</tr>
<tr>
<td>FALL</td>
<td>39-613</td>
<td>6</td>
<td>Energy Transport &amp; Storage</td>
</tr>
<tr>
<td>SPRING</td>
<td>39-611</td>
<td>6</td>
<td>Energy Demand &amp;Utilization</td>
</tr>
<tr>
<td>SPRING</td>
<td>39-612</td>
<td>6</td>
<td>Energy Policy &amp; Economics</td>
</tr>
</tbody>
</table>

DISCIPLINARY CONCENTRATION: 36 units required in accordance with departmental list

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course #</th>
<th>Units</th>
<th>Title</th>
</tr>
</thead>
</table>

___ TOTAL ≥ 36 units

BREADTH ELECTIVES: 36 units required, College of Engineering graduate courses and/or pre-approved CMU graduate courses, with maximum of 12-units undergraduate courses needed as preparation for a graduate class

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course #</th>
<th>Units</th>
<th>Title</th>
</tr>
</thead>
</table>

___ TOTAL ≥ 36 units
IX) Appendix A. Approved Disciplinary Concentration Courses

Disciplinary concentration in Chemical Engineering

REQUIRED: 06-665 Process Systems Modeling (MS level SP: 12 units)
Alternate required course for AY2014:
06-705 Adv. Chemical Engineering Thermodynamics (PhD level FA: 12 units)

PLUS 24 units selected from the following list of classes:

<table>
<thead>
<tr>
<th>M.S. level courses recommended as CHE disciplinary concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>06-623 Mathematical Modeling of Chemical Engineering Processes</td>
</tr>
<tr>
<td>06-625 Chemical and Reactive Systems</td>
</tr>
<tr>
<td>06-663 Analysis and Modeling of Transport Phenomena</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PhD courses permitted as CHE disciplinary concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>06-702 Advanced Reaction Kinetics</td>
</tr>
<tr>
<td>06-703 Advanced Fluid Dynamics</td>
</tr>
<tr>
<td>06-704 Heat and Mass Transfer</td>
</tr>
<tr>
<td>06-713 Mathematical Techniques in Chemical Engineering</td>
</tr>
<tr>
<td>06-720 Advanced Process Systems Engineering</td>
</tr>
</tbody>
</table>
## Disciplinary concentration in Civil and Environmental Engineering

The CEE disciplinary concentration is defined as 36 units of approved CEE graduate-level courses (other than independent study or graduate project courses). Courses are selected in consultation with the EST&P advisor considering the student's interests. Courses are available in sustainability, water quality, air quality, advanced infrastructure, mechanics and other areas.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-704</td>
<td>Probability and Estimation Methods for Engineering Systems</td>
<td>FA</td>
<td>12</td>
</tr>
<tr>
<td>12-706</td>
<td>Civil Systems Investment Planning and Pricing</td>
<td>FA</td>
<td>12</td>
</tr>
<tr>
<td>12-765</td>
<td>S.T. International Climate Change Adaptation &amp; Infrastructure Adaptation</td>
<td>(occasional)</td>
<td>6</td>
</tr>
<tr>
<td>12-766</td>
<td>S.T. Climate Change, Impacts, and Adaptations</td>
<td>SP</td>
<td>12</td>
</tr>
<tr>
<td>12-712</td>
<td>Introduction to Sustainable Engineering</td>
<td>FA</td>
<td>12</td>
</tr>
<tr>
<td>12-714</td>
<td>Environmental Life Cycle Assessment</td>
<td>SP</td>
<td>12</td>
</tr>
<tr>
<td>12-740</td>
<td>Data Acquisition, Sensing, and Instrumentation</td>
<td>FA</td>
<td>6</td>
</tr>
<tr>
<td>12-741</td>
<td>Data Management and Analysis</td>
<td>FA</td>
<td>6</td>
</tr>
<tr>
<td>12-742</td>
<td>Computational Decision Support</td>
<td>FA</td>
<td>6</td>
</tr>
<tr>
<td>12-743</td>
<td>Decision Contexts for Civil Infrastructure Domain</td>
<td>SP</td>
<td>6</td>
</tr>
<tr>
<td>12-744</td>
<td>AIS Systems Project Preparation Course</td>
<td>FA</td>
<td>3</td>
</tr>
<tr>
<td>12-745</td>
<td>AIS Systems Project Course</td>
<td>SP</td>
<td>18</td>
</tr>
<tr>
<td>12-749</td>
<td>Special Topics: Climate Change Adaptation</td>
<td>FA</td>
<td>6</td>
</tr>
<tr>
<td>12-750</td>
<td>Infrastructure Systems</td>
<td>SP</td>
<td>12</td>
</tr>
<tr>
<td>12-751 / 651</td>
<td>Air Quality Engineering</td>
<td>SP</td>
<td>12 / 9</td>
</tr>
<tr>
<td>12-752</td>
<td>Special Topics: Data-Driven Building Energy Management</td>
<td>FA</td>
<td>6</td>
</tr>
</tbody>
</table>
Disciplinary concentration in Electrical and Computer Engineering

36 Units from the following selection of classes:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Delivery</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-418</td>
<td>Electric Energy Processing: Fundamentals and Applications</td>
<td>SP: 12 units (undergrad)</td>
<td></td>
</tr>
<tr>
<td>18-587</td>
<td>Electrical Energy Conversion, Control and Management</td>
<td>FA: 12 units (undergrad)</td>
<td></td>
</tr>
<tr>
<td>18-618</td>
<td>Smart Grids and Future Electric Energy Systems</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>18-630</td>
<td>Introduction to Security and Policy</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>18-649</td>
<td>Distributed Embedded Systems</td>
<td>FA: 12 units</td>
<td></td>
</tr>
<tr>
<td>18-730</td>
<td>Introduction to Computer Security</td>
<td>FA: 12 units</td>
<td></td>
</tr>
<tr>
<td>18-731</td>
<td>Network Security</td>
<td>SP: 12 units</td>
<td></td>
</tr>
<tr>
<td>18-771</td>
<td>Linear Systems</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>18-777</td>
<td>Complex Large-Scale Dynamic Systems</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>18-819B</td>
<td>S.T. Introduction to Solar Arrays - Modeling Analysis, and Design</td>
<td>SP: 12 units</td>
<td></td>
</tr>
<tr>
<td>18-875</td>
<td>Economics and Engineering of Electric Energy Systems</td>
<td>SP: 12 units</td>
<td></td>
</tr>
<tr>
<td>18-879M</td>
<td>Optimization in Energy Networks</td>
<td>SP: 12 units</td>
<td></td>
</tr>
<tr>
<td>18-879S</td>
<td>Networked Control Systems</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>18-882</td>
<td>Special Topics in Energy Systems: Power Electronics</td>
<td>FA: 12 units</td>
<td></td>
</tr>
</tbody>
</table>
**Disciplinary concentration in Engineering and Public Policy**
The EPP disciplinary concentration is defined as 36 units of approved EPP graduate-level courses (other than independent study or graduate project courses). These will be selected in consultation with the EST&P advisor and considering the student's area of interest.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>19-424</td>
<td>Energy and the Environment - note: undergraduate course for which grad. student enrollment is limited; counts as 9 of the allowed 12 undergrad units</td>
<td>FA: 9 units (undergrad)</td>
<td></td>
</tr>
<tr>
<td>19-472</td>
<td>Fundamentals of Electric Power Systems - - note: undergraduate course; counts as the allowed 12 undergrad units towards EST&amp;P degree</td>
<td>12 units (undergrad)</td>
<td></td>
</tr>
<tr>
<td>19-612</td>
<td>Special Topics (S.T.) Introductory Life Cycle Assessment</td>
<td>SP: 12 units</td>
<td></td>
</tr>
<tr>
<td>19-617</td>
<td>Infrastructure Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19-624</td>
<td>S.T. Emerging Energy Policies</td>
<td>FA: 12 units</td>
<td></td>
</tr>
<tr>
<td>19-625</td>
<td>Sustainable Energy for the Developing World</td>
<td>SP: 12 units</td>
<td></td>
</tr>
<tr>
<td>19-626</td>
<td>Climate Science and Policy</td>
<td>12 units</td>
<td></td>
</tr>
<tr>
<td>19-638</td>
<td>Smart Grids and Future Electric Energy Systems</td>
<td>FA: 12 units</td>
<td></td>
</tr>
<tr>
<td>19-653</td>
<td>S.T. Climate Change Mitigation</td>
<td>SP: 12 units</td>
<td></td>
</tr>
<tr>
<td>19-655A</td>
<td>S.T. Climate Change, Impacts and Adaptation</td>
<td>FA: 12 units</td>
<td></td>
</tr>
<tr>
<td>19-655C</td>
<td>S.T. Design, Innovation and Strategy</td>
<td>FA: 12 units</td>
<td></td>
</tr>
<tr>
<td>19-656</td>
<td>S.T. CO2 Capture and Sequestration</td>
<td>SP: 6 units</td>
<td></td>
</tr>
<tr>
<td>19-683</td>
<td>S.T. Science, Technology &amp; Innovation Policy</td>
<td>FA: 12 units</td>
<td></td>
</tr>
<tr>
<td>19-688</td>
<td>Innovation for Energy and the Environment</td>
<td>12 units</td>
<td></td>
</tr>
<tr>
<td>19-696</td>
<td>S.T. Sustainable Development &amp; Innovation</td>
<td>FA: 9 units</td>
<td></td>
</tr>
<tr>
<td>19-714</td>
<td>Environmental Life Cycle Assessment</td>
<td>SP: 12 units</td>
<td></td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
<td></td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------------------------------------</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>19-717</td>
<td>Introduction to Sustainable Engineering</td>
<td>FA: 12 units</td>
<td></td>
</tr>
<tr>
<td>19-724</td>
<td>Materials for Energy Storage (occasional)</td>
<td>6 units</td>
<td></td>
</tr>
<tr>
<td>19-736</td>
<td>Energy and Materials in Policy Making (occasional)</td>
<td>6 units</td>
<td></td>
</tr>
<tr>
<td>19-739</td>
<td>Engineering &amp; Economics of Electric Energy Systems</td>
<td>SP: 12 units</td>
<td></td>
</tr>
<tr>
<td>19-740</td>
<td>Combustion &amp; Air Pollution Ctrl</td>
<td>SP: 12 units</td>
<td></td>
</tr>
<tr>
<td>19-751</td>
<td>Air Quality Engineering</td>
<td>FA: 12 units</td>
<td></td>
</tr>
<tr>
<td>19-881 / 19-882</td>
<td>Special Topics: Seminar in Electric Power I/II (Electric Market Restructuring / Low Carbon Electric Power)</td>
<td>6 units</td>
<td></td>
</tr>
</tbody>
</table>
**Disciplinary concentration in Materials Science and Engineering**

**REQUIRED:**
- 27-798 Thermodynamics I (FA: 6 units)
- 27-799 Thermodynamics II (FA: 6 units)

Plus 24 additional units selected from the following list of classes:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>27-705</td>
<td>Nanostructured Materials</td>
<td>SP</td>
<td>12</td>
</tr>
<tr>
<td>27-718</td>
<td>Soft Materials</td>
<td>FA</td>
<td>12</td>
</tr>
<tr>
<td>27-721</td>
<td>Processing Design</td>
<td>FA</td>
<td>12</td>
</tr>
<tr>
<td>27-724</td>
<td>Materials for Energy Storage</td>
<td>SP-A4</td>
<td>6</td>
</tr>
<tr>
<td>27-725</td>
<td>Materials in Nuclear Systems</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>27-727</td>
<td>Mechanical Behavior in Extreme Environments</td>
<td>SP</td>
<td>6</td>
</tr>
<tr>
<td>27-728</td>
<td>Materials for Future Energy Systems</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>27-729</td>
<td>Solid State Devices for Energy Conversion</td>
<td>FA</td>
<td>6</td>
</tr>
<tr>
<td>27-730</td>
<td>Energy Consumption and Minimization in Metals Production</td>
<td>FA</td>
<td>6</td>
</tr>
<tr>
<td>27-750</td>
<td>Advanced Characterization and Microstructural Analysis</td>
<td>SP</td>
<td>12</td>
</tr>
<tr>
<td>27-752</td>
<td>Foundations of Semiconductor Nanostructures</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>27-765</td>
<td>Special Topics: Materials and Society</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27-766</td>
<td>Diffusion in Materials</td>
<td>FA</td>
<td>6</td>
</tr>
<tr>
<td>27-770</td>
<td>Electronic, Magnetic, and Optical Properties</td>
<td>SP</td>
<td>12</td>
</tr>
<tr>
<td>27-788</td>
<td>Defects in Materials</td>
<td>FA</td>
<td>6</td>
</tr>
<tr>
<td>27-794</td>
<td>Chemical Stability of Materials in Extreme Environments</td>
<td>FA</td>
<td>6</td>
</tr>
<tr>
<td>27-796</td>
<td>Structure of Materials</td>
<td>FA</td>
<td>6</td>
</tr>
<tr>
<td>27-797</td>
<td>Bonding of Materials</td>
<td>FA</td>
<td>6</td>
</tr>
</tbody>
</table>
**Disciplinary concentration in Mechanical Engineering**

**REQUIRED:** 24-722 Energy System Modeling (FA: 12 units)

24 units selected from the following list of classes

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Term</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>24-616</td>
<td>Tribology - Friction, Lubrication &amp; Wear</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>24-628</td>
<td>Special Topics: Energy Trans &amp; Conv. at Nano Scale</td>
<td>SP:</td>
<td>12</td>
</tr>
<tr>
<td>24-629</td>
<td>Special Topics: Direct Solar &amp; Thermal Energy Conversion</td>
<td>FA:</td>
<td>12</td>
</tr>
<tr>
<td>24-640</td>
<td>Special Topics: Climate Change Mitigation</td>
<td>SP:</td>
<td>12</td>
</tr>
<tr>
<td>24-644</td>
<td>Special Topics: Advanced Power Plant Design</td>
<td>SP:</td>
<td>12</td>
</tr>
<tr>
<td>24-711</td>
<td>Fluid Mechanics</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>24-718</td>
<td>Computational Fluid Dynamics</td>
<td>SP:</td>
<td>12</td>
</tr>
<tr>
<td>24-721</td>
<td>Advanced Thermodynamics</td>
<td>FA:</td>
<td>12</td>
</tr>
<tr>
<td>24-730</td>
<td>Advanced Heat Transfer</td>
<td>FA:</td>
<td>12</td>
</tr>
<tr>
<td>24-731</td>
<td>Conductive Heat Transfer</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>24-732</td>
<td>Convective Heat Transfer</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>24-733</td>
<td>Radiative Heat Transfer</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>24-736</td>
<td>Two-Phase Flow &amp; Heat Transfer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24-642</td>
<td>Fuel Cell Systems</td>
<td>FA:</td>
<td>12</td>
</tr>
<tr>
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<td>SP:</td>
<td>12</td>
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X) Appendix B. University Resources

Key Offices for Graduate Student Support

Office of the Assistant Vice Provost for Graduate Education

www.cmu.edu/graduate; grad-ed@cmu.edu

The Office of the Assistant Vice Provost for Graduate Education, AVPGE, directed by Suzie Laurich-McIntyre, Ph.D., Assistant Vice Provost for Graduate Education, provides central support for graduate students in a number of roles. These include: being an ombudsperson and resource person for graduate students as an informal advisor; resolving formal and informal graduate student appeals; informing and assisting in forming policy and procedures relevant to graduate students; and working with departments on issues related to graduate students and implementation of programs in support of graduate student development.

The Office of the AVPGE often partners with the division of Student Affairs to assist graduate students with their Carnegie Mellon experience. Senior members of the student affairs staff are assigned to each college (college liaisons) and are often consulted by the Assistant Vice Provost for Graduate Education and departments on an individual basis to respond to graduate student needs.

The Office of the Assistant Vice Provost for Graduate Education (AVPGE) offers a robust schedule of professional development opportunities. Some are geared towards a specific population (master’s students, PhD students at the beginning of their program, graduate students seeking tenure track positions, etc.) and others are open to all graduate students (time management, balancing, staying healthy). A full schedule of programs can be found at: http://www.cmu.edu/graduate/.

The Office of the AVPGE also coordinates several funding programs, and academically focused seminars and workshops that advise, empower and help retain all graduate students, particularly graduate students of color and women in the science and technical fields. The fundamental goals of our programs have been constant: first, to support, advise and guide individual graduate students as they work to complete their degrees; second, to contribute to the greatest degree possible to the diversification of the academy. Visit the Graduate Education website for information about:

- Conference Funding Grants
- Graduate Small Project Help (GuSH) Research Funding
- Graduate Student Professional Development: seminars, workshops and resources
- Graduate Women Gatherings (GWG)
- Inter-university Graduate Students of Color Series (SOC)

Office of the Dean of Student Affairs

www.cmu.edu/student-affairs/index.html

The Office of the Dean provides central leadership of the metacurricular experience at Carnegie Mellon. The offices that fall under the division of Student Affairs led by Dean of Student Affairs Gina Casalegno, include:

- Career and Professional Development Center
- Counseling & Psychological Services (CAPS)
- Housing & Dining Services
- Orientation & First Year Programs (note: for undergraduate students)
• Office of International Education (OIE)
• Student Activities
• Student Life

Graduate students will find the enrollment information for Domestic Partner Registration and Maternity Accommodations in the Office of the Dean of Student Affairs and on the website. The Office of the Dean of Student Affairs also manages the Emergency Student Loan (ESLs) process. The Emergency Student Loan service is made available through the generous gifts of alumni and friends of the university. The Emergency Student Loan is an interest-free, emergency-based loan repayable within 30 days. Loans are available to enrolled students for academic supplies, medication, food or other expenses not able to be met due to unforeseeable circumstances. The Office of the Dean of Student Affairs also provides consultation, support, resources and follow-up on questions and issues of Academic Integrity:
www.cmu.edu/academic-integrity.

Assistance for Individuals with Disabilities
The Office of Disability Resources at Carnegie Mellon University has a continued mission to provide physical and programmatic campus access to all events and information within the Carnegie Mellon community. We work to ensure that qualified individuals receive reasonable accommodations as guaranteed by the Americans with Disabilities Act (ADA) and Sections 503 and 504 of the Rehabilitation Act of 1973. Students who would like to receive accommodations must submit a Voluntary Disclosure of Disability Form to access@andrew.cmu.edu to begin the interactive accommodation process. For more information please see www.cmu.edu/hr/eos/disability/index.html. Students with disabilities are encouraged to self-identify with Equal Opportunity Services by contacting Larry Powell, 412-268-2013, lpowell@andrew.cmu.edu to access the services available at the university and initiate a request for accommodations.

Eberly Center for Teaching Excellence & Educational Innovation
www.cmu.edu/teaching
Support for graduate students who are or will be teaching is provided in many departments and centrally by the Eberly Center for Teaching Excellence & Educational Innovation. The Eberly Center offers activities for current and prospective teaching assistants as well as any graduate students who wish to prepare for the teaching component of an academic career. The Center also assists departments in creating and conducting programs to meet the specific needs of students in their programs. Specific information about Eberly Center support for graduate students can be found at: www.cmu.edu/teaching/graduatestudentsupport/index.html.

Carnegie Mellon Ethics Hotline
The health, safety and well-being of the university community are top priorities at Carnegie Mellon University. CMU provides a hotline that all members of the university community should use to confidentially report suspected unethical activity relating to financial matters, academic and student life, human relations, health and campus safety or research.

Students, faculty and staff can anonymously file a report by calling 877-700-7050 or visiting www.reportit.net (user name: tartans; password: plaid). All submissions will be reported to appropriate university personnel. The hotline is NOT an emergency service. For emergencies, call University Police at 412-268-2323.
Graduate Student Assembly
www.cmu.edu/stugov/gsa/index.html
The Carnegie Mellon Student Government consists of an Executive Branch and a Legislative Branch. This is the core of traditional student government, as governed by the Student Body Constitution. The Executive Branch serves the entire student body, graduate and undergraduate, and consists of one president and four vice-presidents. The Legislative Branch for graduate students, The Graduate Student Assembly (GSA) passes legislation, allocates student activities funding, advocates for legislative action in locally and in Washington D.C. on behalf of graduate student issues and needs, and otherwise acts on behalf of all graduate student interests. GSA also contributes a significant amount of funding for conferences and research, available to graduate students through application processes. GSA also plans various social opportunities for graduate students and maintains a website of graduate student resources on and off-campus, www.cmu.edu/stugov/gsa/resources/index.html. Each department has representation on GSA and receives funding directly from GSA’s use of the student activities fee for departmental activities for graduate students. The department rep(s) is the main avenue of graduate student representation of and information back to the graduate students in the department.

Intercultural Communication Center (ICC)
www.cmu.edu/icc/
The Intercultural Communication Center (ICC) is a support service offering both credit and non-credit classes, workshops, and individual appointments designed to equip nonnative English speakers (international students as well as international students who attended high school in the U.S.) with the skills needed to succeed in academic programs at Carnegie Mellon. In addition to developing academic literacy skills such as speaking, reading and writing, students can learn more about the culture and customs of the U.S. classroom. The ICC also helps international teaching assistants (ITAs) who are non-native English speakers develop fluency and cultural understanding to teach successfully at Carnegie Mellon and provides ITA testing, required testing indicating a nonnative speaking student has a language proficiency required before being allowed to work with undergraduates in classes, labs or individual meetings.

Office of International Education (OIE)
www.studentaffairs.cmu.edu/oie/
Carnegie Mellon hosts international graduate and undergraduate students who come from more than 90 countries. Office of International Education (OIE) is the liaison to the University for all non-immigrant students and scholars. OIE provides many services including: advising on personal, immigration, academic, social and acculturation issues; presenting programs of interest such as international career workshops, tax workshops, and cross-cultural and immigration workshops; supporting international and cultural student groups such as the International Student Union and the International Spouses and Partners Organization; maintaining a resource library that includes information on cultural adjustment, international education and statistics on international students in the United States; posting pertinent information to students through email and the OIE website, and conducting orientation programs.

Key Offices for Academic & Research Support
Computing and Information Resources
www.cmu.edu/computing
Computing Services provides a comprehensive computing environment at Carnegie Mellon. Graduate students should seek Computing Services for information and assistance with your Andrew account, network access, computing off-campus, campus licensed software, email,
calendar, mobile devices, computer security, cluster services and printing. Computing Services can be reached at it-help@cmu.edu.

The Carnegie Mellon Computing Policy establishes guidelines and expectations for the use of computing, telephone and information resources on campus. The policy is supported by a number of guidelines graduate students should know. The policy and guidelines are available at: www.cmu.edu/computing/guideline/index.html.

Research at CMU
www.cmu.edu/research/index.shtml
The primary purpose of research at the university is the advancement of knowledge in all fields in which the university is active. Research is regarded as one of the university’s major contributions to society and as an essential element in education, particularly at the graduate level and in faculty development. Research activities are governed by several university policies. Guidance and more general information is found by visiting the Research at Carnegie Mellon website.

Office of Research Integrity & Compliance
www.cmu.edu/research-compliance/index.html
The Office of Research Integrity & Compliance (ORIC) is designed to support research at Carnegie Mellon University. The staff work with researchers to ensure research is conducted with integrity and in accordance with federal and Pennsylvania regulation. ORIC assists researchers with human subject research, conflicts of interest, responsible conduct of research, export controls, intellectual property rights and regulations, and institutional animal care & use. ORIC also consults on, advises about and handles allegations of research misconduct.

Key Offices for Health, Wellness & Safety
Counseling & Psychological Services
www.studentaffairs.cmu.edu/counseling
Counseling & Psychological Services (CAPS) affords the opportunity for students to talk privately about issues that are significant for them in a safe, confidential setting. Students sometimes feel confused about why they are feeling upset and perhaps confused about how to deal with it. An initial consultation with a CAPS therapist will clarify options and provide a recommendation to the appropriate mental health resource at Carnegie Mellon or the larger Pittsburgh community. CAPS services are provided at no cost. Appointments can be made in person or by telephone, 412-268-2922.

Health Services
www.cmu.edu/HealthServices/
University Health Services (UHS) is staffed by physicians, advanced practice clinicians and registered nurses who provide general medical care, allergy injections, first aid, gynecological care and contraception as well as on-site pharmaceuticals. The CMU student insurance plan covers most visit fees to see the physicians and advanced practice clinicians & nurse visits. Fees for prescription medications, laboratory tests, diagnostic procedures and referral to the emergency room or specialists are the student’s responsibility and students should review the UHS website and their insurance plan for detailed information about fees. UHS also has a registered dietician and health promotion specialists on staff to assist students in addressing nutrition, drug and alcohol and other healthy lifestyle issues. In addition to providing direct health care, UHS administers the Student Health Insurance Program. The Student Health
Insurance plan offers a high level of coverage in a wide network of health care providers and hospitals. Graduate students should contact UHS to discuss options for health insurance for spouses, domestic partners and dependents. Appointments can be made by visiting UHS’s website or by telephone, 412-268-2157.

University Police
http://www.cmu.edu/police/
412-268-2323 (emergency only), 412-268-6232 (non-emergency)
The University Police Department is located at 300 South Craig Street, Room 199 (entrance is on Filmore Street). The department’s services include police patrols and call response, criminal investigations, shuttle and escort services, fixed officer and foot officer patrols, event security, and crime prevention and education programming. Visit the department’s website for additional information about the staff, escort and shuttle, emergency phone locations, crime prevention, lost and found, finger print services, and annual statistic reports.

Shuttle and Escort Services
University Police coordinates the Shuttle Service and Escort Service provided for CMU students, faculty, and community. Full information about these services, stops, routes, tracking and schedules can be found online at: http://www.cmu.edu/police/shuttleandescort/

Carnegie Mellon University publishes an annual campus security and fire safety report describing the university’s security, alcohol and drug, sexual assault, and fire safety policies and containing statistics about the number and type of crimes committed on the campus and the number and cause of fires in campus residence facilities during the preceding three years. Graduate students can obtain a copy by contacting the University Police Department at 412-268-6232. The annual security and fire safety report is also available online at www.cmu.edu/police/annualreports.

The WORD
http://www.cmu.edu/student-affairs/theword/
The WORD is Carnegie Mellon University’s student on-line handbook and is considered a supplement to the department (and sometimes college) handbook. The WORD contains campus resources and opportunities, academic policy information and resources, community standards information and resources. It is designed to provide all students with the tools, guidance, and insights to help you achieve your full potential as a member of the Carnegie Mellon community. Information about the following is included in The WORD (not an exhaustive list) and graduate students are encouraged to bookmark this site and refer to it often. University policies can also be found in full text at: http://www.cmu.edu/policies/.
Carnegie Mellon Vision, Mission
Carnegie Code
Academic Standards, Policies and Procedures
  Educational Goals
  Academic and Individual Freedom
  Statement on Academic Integrity
  Standards for Academic & Creative Life
    Assistance for Individuals with Disabilities
    Master’s Student Statute of Limitations
    Conduct of Classes
    Copyright Policy
Cross-college & University Registration
Doctoral Student Status Policy
Evaluation & Certification of English Fluency for Instructors
Final Exams for Graduate Courses
Grading Policies
Intellectual Property Policy
Privacy Rights of Students
Research
   Human Subjects in Research
   Office of Research Integrity & Compliance
   Office of Sponsored Programs
   Policy for Handling Alleged Misconduct of Research
   Policy on Restricted Research
Student’s Rights
Tax Status of Graduate Student Awards

Campus Resources & Opportunities
   Alumni Relations
   Assistance for Individuals with Disabilities
   Athletics, Physical Fitness & Recreation
   Carnegie Mellon ID Cards and Services
   Cohon University Center
   Copying, Printing & Mailing
   Division of Student Affairs
   Domestic Partner Registration
   Emergency Student Loan Program
   Gender Programs & Resources
   Health Services
   Dining Services
   The HUB Student Services Center
   ID Card Services
   Leonard Gelfand Center
   LGBTQ Resources
   Multicultural and Diversity Initiatives
   Opportunities for Involvement
   Parking and Transportation Services
   SafeWalk
   Survivor Support Network
   Shuttle and Escort Services
   Spiritual Development
   University Police
   Student Activities
   University Stores

Community Standards, Policies and Procedures
   Alcohol and Drugs Policy
   AIDS Policy
   Bicycle/Wheeled Transportation Policy
   Damage to Carnegie Mellon Property
Deadly Weapons
Discriminatory Harassment
Disorderly Conduct
Equal Opportunity/Affirmative Action Policy
Freedom of Expression Policy
Health Insurance Policy
Immunization Policy
Missing Student Protocol
Non-Discrimination Policy
On-Campus Emergencies
Pets
Political Activities
Recycling Policy
Riotous and Disorderly Behavior
Safety Hazards
Scheduling and Use of University Facilities
Sexual Harassment and Sexual Assault Policy
Smoking Policy
Student Accounts Receivable and Collection Policy and Procedures
Student Activities Fee
Student Enterprises
Workplace Threats and Violence Policy
Statement of Assurance
XI) Appendix C. Ethical Job & Internship Search

Carnegie Mellon's Guide to an Ethical Job Search

GUIDELINES & POLICIES

The mission of the Carnegie Mellon Career and Professional Development Center (CPDC) is to maximize the career and life potential of our students. One of the ways we accomplish this is by creating opportunities for our students to connect with employers with whom we have developed relationships. Accordingly, we expect all of our student TartanTRAK users to adhere to the following ethical standards. All students are expected to read and familiarize themselves with these policies. Users (students and alumni) who do not follow the guidelines listed below may have privileges suspended, including:

- Limiting access to TartanTRAK
- Forfeiture of on-campus interviewing
- Forfeiture of resume submission privileges

Students are expected to:

1. **Attend all scheduled campus interviews** - Missing or canceling an interview, without sufficient notification, wastes a time slot that could have been filled by another student (Please see Carnegie Mellon's Interview Cancellation and No-Show Policy below)

2. **Be on time for campus interviews** - Please arrive in the Career Center, 10-15 minutes before your interview. Being late reflects poorly on you the candidate and disrupts the appointment times of other candidates on the schedule. Beyond the third instance of being late the student will be subject to the CPDC offense policy.

   **Interview Cancellation and No-Show Policy:** If you need to cancel an on-campus interview, you can do so in TartanTRAK before the cancellation end date listed for that interview, as found in the job description. Students who fail to cancel their interview before the interview cancellation date found in TartanTRAK will be subject to the offense policy.

   If an emergency occurs and you must cancel after TartanTRAK's cancellation end date, please do so by calling Gerry Marnell in the Career Center at 412-268-2064. Students who do not show up for interviews will be subject to the offense policy. In addition, the student will be required to send a letter of apology to the recruiter. The letter must be approved by the student's career consultant.

3. **Present qualifications in a truthful manner** - This applies to information on resumes/cover letters and to responses in interviews. Information provided during the interview process can be verified and a false statement could cost the student the job, even after the company has agreed to hire the student. Any instance of providing false information subjects the student to the offense policy.

4. **Honor all agreements made with recruiters regarding site visits** - When a student accepts a second interview opportunity with a company, he/she sets into motion a series of events: travel arrangements, scheduling, hotel reservations, and a host of other details. If the student subsequently fails to follow through with the site visit without giving the company enough
advance notice, it costs the company a considerable amount of wasted time and money, as well as denies another student the opportunity to interview. Not honoring agreements with recruiters reflects poorly on the university and impacts the organization's actions regarding future recruiting activities at Carnegie Mellon. Students should be aware that employers who incurred expenses related to the interview (i.e. airfare, hotel accommodations, etc.) may require the student to assume those costs. Any occurrence subjects the student to the offense policy.

5. **Accept job/internships in an ethical manner** - The CPDC has developed the following policy regarding the acceptance of job/internship offers. This policy was created in order to protect students while maintaining fairness to employers. Once a student accepts a position, that student is expected to stop using TartanTRAK immediately, and to discontinue interviewing with other employers. Students are expected to notify other employers with whom they have scheduled or pending interviews of their decision to accept. If the CPDC becomes aware of any student continuing to interview after accepting a position he/she will be subject to the offense policy.

**Reneging** - The policy regarding reneging was created in order to protect students while maintaining fairness to employers. Once you accept a position, you are expected to stop using TartanTRAK and discontinue interviewing with other employers. You are expected to notify other employers with whom you have scheduled or pending interviews of your decision. We reserve the right to remove your access to TartanTRAK if this is not done within 48 hours of your job acceptance.

Accepting another job offer after you accepted an offer with a previous employer is defined as ‘reneging’ and is considered dishonest and unethical and carries serious implications. It not only reflects poorly on you but potentially damages Carnegie Mellon's reputation and its relationships with employers. Instances of reneging that are reported by an employer will subject the student to the offense policy. In addition, the student will be required to send a letter of apology to the recruiter. The letter must be approved by the student's career consultant.

**Offense Policy**

**First Offense:** Removal of job search and interviewing access on TartanTRAK for six months.

**Second Offense:** Removal of job search and interviewing access on TartanTRAK for one year.

**Third Offense:** Removal of job search and interviewing access on TartanTRAK for five years.

Note: Depending on the severity of the offense, the CPDC reserves the right to refer the student's case to the Office of the Dean of Student Affairs for further review and judicial proceedings.

**Appeal Process** - Any student wishing to appeal his or her revocation of TartranTrak privileges is entitled to utilize our formal appeal process. To request an appeal contact Judi Mancuso at the CPDC.
Appendix D. EST&P Handbook Acknowledgement Form

The Energy Science, Technology and Policy (EST&P) program Graduate Student Handbook has been prepared to inform you about program policies, philosophies and practices. Please read this document carefully, and give special attention to the section on academic integrity.

To maintain your status as a master’s degree seeking EST&P student you must complete your review of this handbook during the first week of classes and then sign a copy of this acknowledgement statement in the blank below. Please return the signed original to Ashley Lomison, Administrative Coordinator of the EST&P program, in room A-308 Doherty Hall or submit it to the EST&P Blackboard.

By signing, you affirm that you have read a copy of the 2015 EST&P Graduate Student Handbook, that you understand the information contained therein, and that you agree to comply with the policies and procedures contained in the handbook. Note that this handbook is not intended to cover every situation that may arise during your course of study, and is not a contract between you and the EST&P program. Should there be any disagreements between this document and the written policies of the College of Engineering and Carnegie Mellon University, the College and University documents take precedence. However, the handbook should be followed as your general guide to the goals, policies, practices, and expectations of the Energy Science, Technology and Policy Master's Program.

____________________________________  _________________  
(Student Signature)      (Date)  
____________________________________  
(Printed Name)  

Sign & return to EST&P Office (A-308 Doherty Hall) or submit to the EST&P Blackboard before Friday, September 11, 2015.

Master’s Program in Energy Science, Technology and Policy  
Carnegie Mellon University  
5000 Forbes Avenue, Doherty Hall A-307  
Pittsburgh, Pennsylvania 15213  
(412) 268-2947  
Fax: (412) 268-5650  
energy@andrew.cmu.edu  
http://www.cmu.edu/engineering/estp/
## Appendix E. Fall 2015 Checklist

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<th>Item:</th>
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<tr>
<td>Have Professional Headshot Photo Taken</td>
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<tr>
<td>Complete <a href="#">CITI’s Conduct of Research</a> (Master’s project, independent study, and Service Project students)</td>
<td>9/11/15</td>
</tr>
<tr>
<td>Sign &amp; Return EST&amp;P Student Handbook Acknowledgement Form</td>
<td>9/11/15</td>
</tr>
<tr>
<td>Sign &amp; Return Media Consent Form</td>
<td>Orientation or 9/11/15</td>
</tr>
<tr>
<td>Complete <a href="#">Plagiarism Quiz</a> and submit proof of completion via Blackboard</td>
<td>9/11/15</td>
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<tr>
<td>Request CMU/EST&amp;P Business Cards via Blackboard if needed for TOC</td>
<td>9/11/15</td>
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<tr>
<td>Submit Your Resume for the EST&amp;P Fall Semester Resume Book on Blackboard</td>
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