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Undergraduate Handbook
B.S. in Applied Mathematics

Department of Applied Mathematics

Department of Applied Mathematics

(April 2, 2007)

I. General Information

1.1 Introduction

This handbook is intended to be a useful resource for all Applied Mathematics (AM) undergraduates and their advisors. The aim of this document is to provide a dynamic source of information relating to the changes and updates in the AM undergraduate curriculum.

Illinois Institute of Technology was originally founded in 1940, when the Armour Institute (est. 1893) merged with the Lewis Institute (est. 1895). Ever since the inception of this university, degree programs in Mathematics have been awarded at both the undergraduate and the graduate level. The Applied Mathematics department at IIT was only recently formed - in the year 1998. The first undergraduates admitted to the AM program began their studies in the year 2000.

Since the undergraduate advising guidelines contained herein are subject to frequent change, please be certain to always refer to the most current advising publication whenever specific questions arise regarding the undergraduate AM curriculum.

The AM Department takes academic advising very seriously and considers the conscientious, careful advising of its majors to be crucial to both their success at the undergraduate level as well as to their future planning for professional or academic careers. Therefore, it is important for all AM advisors to make time available for sessions with all of their advisees during every advance registration period, and also during each week preceding the start of a new academic term. Academic advisory sessions may be formally scheduled by the student or they may occur without appointment during the advisor's posted office hours. The advance registration period is the month of April for the summer and fall terms, and it is the month of November for the spring semester. If an advisor is on leave or out of the office for some reason, then arrangements must be made through the Department Coordinator for another advisor to assist in the advising process.

1.2 Administration of the AM Undergraduate Programs

The AM faculty is responsible for creating, maintaining and implementing the major curriculum for the Bachelor of Science Degree in Applied Mathematics. A committee of AM faculty, called the Undergraduate Studies Committee (UGSC), is granted authority to assess student performance, recommend program changes, approve course substitutions and to award credit for special projects. IIT's administrative departments, such as the Office of Educational Services, may consult with the UGSC when deciding issues which have implications for the undergraduate curriculum in mathematics. Any changes or deviations to the AM Undergraduate Advising Guidelines and its policies must be approved by the UGSC. The chair of this committee is the associate chair of the department. All other members of the committee serve one-year appointments while the department chair serves as ex-officio member. The department chair and associate chair have executive authority in the day-to-day administration of the undergraduate AM programs.

1.3 Key Contacts

Gladys Collins – Administrative Associate, collinsg@iit.edu
Greg Fasshauer – Associate Chair, fasshauer@iit.edu
Fred Hickernell – Department Chair, hickernell@iit.edu

1.4 Definition of Program of Study

It is especially important for both the advisor and the student to be aware of which edition of the IIT Bulletin (i.e., the university's undergraduate program catalog) will serve as that student's "official bulletin." The degree requirements specified in that particular bulletin are the ones which will form the basis for the contract between the student and the university.

The official bulletin for students who began their careers at IIT as first year freshmen is always that which was current upon their initial enrollment at the university. Therefore, students who began as freshmen between fall 2000 and spring 2001 must follow the program requirements described in the blue bulletin. Those who started between fall 2001 and spring 2004 must follow the program detailed in the green bulletin. Students who were freshmen between fall 2004 and spring 2006 must adhere to the dark gray bulletin, and all freshmen who entered since fall 2006 are bound to the degree requirements contained in the red bulletin.

The official bulletin for transfer students is determined by the Office of Educational Services and is indicated on their Transfer Credit Evaluation form.

It is extremely important for each student to follow precisely all of the provisions that are detailed in his/her official bulletin in order to make certain that all requirements for graduation are met. Since some degree requirements have changed over the years, students who reference two different editions of the bulletin may not necessarily fulfill their specific graduation requirements.

In the rare occurrence of a programming change that has implications for current AM majors, the department advisors or Associate Chair will convey the relevant news to all of the affected students as soon as possible and will also post this information on the department web site.

The Office of Educational Services periodically audits each student's program of study based solely on his/her official bulletin and those specific changes authorized by the UGSC

II. Programs of Study

2.1 Faculty Advising Information

All undergraduate students have advising requirements. An advising hold is a permanent hold placed on the student's record that needs to be cleared each time the student wants to make a change to his/her schedule of classes.

Advisors may clear the hold either through Web for Faculty for their assigned advisees or through the SIS on screen 148.

An advisor must remember to clear this hold each time an advisee is granted permission to make a scheduling change. This clearance will allow the advisee to process the change using the Web for Students system.

2.2 Semester Plans

An eight semester program of study very similar to that outlined in section 2.3 below can be found in each of the IIT Bulletins currently in use. This program plan should be viewed only as a general guide toward fulfilling all the degree requirements in a reasonable and timely manner. Keep in mind that the actual semester that a particular AM major enrolls in any specified course may deviate from this plan due to the individual's specific circumstances and needs. For example, a student may be ahead of the plan because of earned AP credits, transfer credits, or summer school credits. The Curriculum Worksheet found in the Appendix should be used in conjunction with the Projected Course Offerings chart contained in Section VIII to devise a personalized program of study. Underlined items indicate courses that have been affected by recent program changes. Please pay special attention to these courses and the rules for course substitutions cited in section 2.5. Remember to always consult the student's official bulletin for complete guidelines whenever in doubt.

2.3 Freshmen/Transfer Students Admitted in Fall 2007 or later (Red bulletin)

First semester		**Second semester**		**Third semester**		**Fourth semester**	
MATH 100	2	MATH 152	5	MATH 251	4	MATH 252	4
MATH 151	5	MATH 230	3	MATH 332	3	MATH 350	3
CS 115	2	CS 116	2	Science elective	4	Science elective	3
HUM 100-level	3	PHYS 123	4	Minor subject	3	Minor subject	3
Hum. or Soc. Sci. elect.	3	Hum. or Soc. Sci. elect.	3	Free elective	3	Hum. or Soc. Sci. elect.	3
Science elective	3						
	18		17		17		16

Fifth semester		**Sixth semester**		**Seventh semester**		**Eighth semester**	
MATH 430 or 454	3	MATH 402	3	MATH 400	3	Appl. Math. elective	3
MATH 475	3	Appl. Math. elective	3	Appl. Math. elective	3	Appl. Math. elective	3
Appl. Math. elective	3	Appl. Math. elective	3	Hum. or Soc. Sci. elect.	3	IPRO 497	3
Minor subject	3	Minor subject	3	Minor subject	3	Hum. or Soc. Sci. elect.	3
Hum. or Soc. Sci. elect.	3	IPRO 397	3	Free elective	3	Free elective	3
	15		15		15		15

Total credit hours 128

2.4 Program Worksheet

A Curriculum Worksheet is included in the Appendix of this handbook. Because the program of study is dependent upon which semester and year a student matriculated, it is highly recommended that students and advisors use and maintain this worksheet. (Note to advisors: To begin a worksheet, look at screen 136 in SIS to fill in all courses taken to date.) Continue to mark the courses taken during each advising session to ensure that a student is on track to graduate. Keep a copy of this worksheet on file in the student's folder in the department office. The worksheet also comes with notes on the rules and limitations regarding course selection.

In addition, Enrollment Services has posted a Course Schedule Planning Sheet and a Web Registration Worksheet online at http://www.enrollment.iit.edu/forms/. These worksheets can be used by the advisor at each advisory session. They may also be completed directly by the student in case the advisee chooses to register online.

2.5 Course Substitutions

Course substitutions may be allowed if all of the following conditions apply:

- A required course is neither currently being offered nor projected to be offered before the student's anticipated graduation, nor is it available for independent study.
- A substitute course is available that satisfies the objectives of the student's program of study.
- The General Education Requirements of the university are satisfied by the program of study which results once the substitution has been made.
- The substitution is approved by the advisor and the UGSC, and documentation of this approval is sent to Educational Services.

2.6 Students not on Plan

As previously noted, an AM major may have earned additional credits to place him/her ahead of the program of study plan described in the bulletin. It may also happen that an AM major falls behind the program plan in a given semester. In either case, the Program Worksheet and the Course Projections chart included below should serve as a guide for the student and advisor in the selection of appropriate courses each term.

2.7 Students Performing Poorly

IIT requires a minimum cumulative grade point average of 2.00 and a minimum grade point average of 2.00 in the student's major department courses. Students who do not maintain these averages will be placed on academic probation. Attention is called to the fact that Applied Mathematics students whose major grade point averages are less than 2.30 at the end of any academic term may, at the discretion of the department, be refused permission to continue the program of study in this field.

III. Course Projections/Scheduling

A Course Projections chart is included in Section VIII of this handbook to provide the student and the advisor with some insight into when every 100 through 400 level AM class will be taught during the upcoming semesters. *These projections are tentative in nature and are subject to change* but they should clearly indicate to the reader the relative frequency and the periodicity with which each math class intends to be offered. These projections are particularly important when planning a detailed, personalized program of study.

Since upper level AM courses often require prerequisite knowledge gained from lower level course work, the proper sequencing of major courses is critical to the student's ability to successfully complete the degree requirements in eight semesters of work Therefore, to avoid a delay in graduation, students should make every effort to be "on semester" during their sixth, seventh, and eighth semesters of study. This is because many required upper division AM courses are currently taught only once per academic year: during the "on semester" as indicated in the bulletin.

The schedule of classes taught each semester by the AM department is set by the associate chair and the chair of the department. The final version of which is due for submission to the Office of the Registrar by mid-February for the summer and fall terms and by mid-September for the spring term. Advisors are encouraged to inform the associate chair in advance of these due dates whenever an advisee has a specialized

scheduling need. Similarly, any request from a student for a special course offering should be formally made to the associate chair *by the middle of the month which precedes the schedule's due date*. Every attempt will be made to accommodate these special requests - if done so as described above. However, please know that it is extremely difficult for the department heads to make any changes in the course schedule once it has been finalized and submitted to the Registrar.

IV. Electives

4.1 Applied Mathematics Electives

Any applied mathematics course at the 300-level or higher (including MATH 491 and graduate MATH courses) except MATH 333, 425, 426, 474 and 525 may be used as an applied mathematics elective. Courses from other programs may not be used as applied mathematics electives.

4.2 Humanities and Social Science Electives

Humanities and Social Science Electives are required as part of the General Education Requirements. Check each course description in the current Schedule of Classes to ensure that it is marked as a valid humanities (**H**) or social sciences (**S**) elective. The current Schedule of Classes takes authority over the Bulletin in this regard. Foreign language classes can be taken to fulfill the Humanities requirements as long as they are at the 200-level or above. Students should take care in the selection of electives that the communication (**C**) course requirements of IIT's General Education Requirements are satisfied. In particular, at least 6 hours each are required at the 300-level for humanities and social sciences courses. Moreover, for social sciences, at least 6 hours are required in one field and at least 2 different fields need to be covered. A total of 21 hours are required for humanities and social sciences combined.

4.3 Free Electives

The B.S. in applied mathematics allows for 10 hours of free electives. Free elective course material must not substantially duplicate material from other courses in the student's program. The UGSC reviews all proposals for Special Projects or Undergraduate Research whether it is to satisfy a Free Elective requirement or substitute for a required course. A third IPRO can count as a Free Elective for all students except those with a freshman standing. However, an IPRO cannot count as both a free elective and either IPRO I or IPRO II. Students are responsible for satisfaction of any course prerequisites for a free elective before taking the course. Some courses taken for a minor can also count as a free elective (see Minors section).

V. Minors

Every student in the applied mathematics B.S. degree program is required to declare an approved minor. Usually a minor consists of 5 related courses from departments other than applied mathematics. Please refer to the appropriate bulletin for detailed information as well as for the list of available minors. There is no form required for a student to declare a minor. Students need only to notify the Office of Educational Services of their minor when they request an audit of their academic programs (see Miscellaneous, Section VII) and when they fill out an application for graduation form. A student must petition the UGSC for permission to declare a minor not already listed as approved.

VI. Double Degrees

While AM students frequently obtain a double degree in AM and PHYS, or AM and CS, other combinations are also possible. These double degrees can generally be obtained with one extra semester or two summer semesters of coursework if students make an appropriate selection of free electives. Students who enter with AP credit will need less additional time to complete the requirements. A student who wishes to receive a double degree must complete all the required courses for each major as listed in the appropriate bulletin. Note that the IIT requirement of a minimum of 15 additional credit hours of work for the second degree will be met for any of these combinations if the second major coincides with the declared AM minor. No additional general education courses or IPROs are required. Required courses in one major may be used to satisfy electives in the second major. Students wishing to pursue double degrees must consult with the department's associate chair.

VII. Miscellaneous Information

7.1 Closed Courses

When a course enrollment capacity is reached, the course will become closed to other students. Students who take advantage of advance registration have a much better chance of avoiding such a situation. Whenever possible, the AM department will try (admission not guaranteed) to accommodate all students and admit them into a closed class using the following guidelines:

- There is a legitimate need to get into the closed section
- There is enough physical space in the classroom
- There is enough equipment to accommodate all students
- The additional headcount will not create a burden to the instructor.

Admission to a closed section of a departmental course requires the approval of both the course instructor and the associate chair. Admission to a closed section of a course outside of the department requires the approval of that department. Before attempting to admit a student into a closed class, the advisor should make every effort to help the student construct an alternative schedule. Not wishing to take class at a particular time or with a particular instructor is not a sufficient reason to get into a closed course. Every effort will be made to put those students with credible time conflicts into closed courses. Such students have priority.

Signatures from the instructor will not be accepted in the Registrar's Office for clearance. The student must contact the designated individual in the department and receive electronic permission (see http://www.enrollment.iit.edu/facstaff/closed-crs-cont/).

7.2 ROTC

The three ROTC programs are treated as minors. Each ROTC student has an ROTC advisor in his or her unit, and communication with that person can be helpful in resolving problems. The ROTC unit may require an AM signature on the student's "4-year plan," which advisors are authorized to provide after carefully checking the plan for AM requirements. ROTC courses do not count toward the maximum of 18 credit hours a student may carry (i.e., no course overload signature is needed from the Dean of the College of Science and Letters). ROTC individual study programs are developed with the assistance of the Associate Chair. ROTC students are exempt from one IPRO

requirement so long as they remain in the ROTC program. If a student drops out of the ROTC program for any reason, he or she is required to make up that IPRO.

7.3 Co-op Program

Students seek permission to register for Co-op from the Career Management Center in the Galvin Library. Students interested in the co-op program should see the associate chair of the department for advice. Co-op experience does not count for academic credit, but students on co-op are considered to be in full-time status for the duration of their coop for student visa purposes (international students) and student loan purposes. Students receiving scholarships are not supported during a co-op semester unless they are also taking regular courses. Students receiving financial aid are recommended to consult with their financial aid advisor to determine if any special rules apply during their co-op. If a student wishes to take courses during a co-op, the maximum recommended course load is 6 credit hours (full time co-op) or 12 credit hours (part-time co-op).

7.4 Internships

An internship is generally a full-time summer employment opportunity. Applications are available in the Career Management Center. The Career Management Center sends applications to participating companies and administers the program.

7.5 Academic Audits

All students should request an academic audit in their junior year (after completing about 60 credit hours) from Educational Services. The Minor needs to be noted on the Academic Program Audit Request form. Audits can be compared to curriculum worksheets to confirm accuracy.

7.6 Courses from Another School

To obtain credit for a course taken at another school, a student must submit a petition (see Forms section) describing the request and obtain approval before starting the course. This process may take several weeks. The final 45 hours of course work must be completed in residence at IIT.

7.7 Study Abroad

Students wishing to study abroad should contact the International Center for information on universities with study abroad relationships with IIT. The application process should be initiated the year before the student wishes to study abroad. Students must verify their eligibility with their Associate Chair and the International Center.

7.8 Graduate Study

Students wishing to pursue advanced degrees at IIT are encouraged to contact the Director of Graduate Studies, Professor Xiaofan Li (lix@iit.edu).

7.8 Math Club

The Math Club promotes interest in the field of mathematics and provides fun and educational group activities that promote logical thinking and mathematical challenges. Interested students should contact the Math Club at mathclub@iit.edu, or visit the club's web pages at http://math.iit.edu/interest/mathclub.html. The current faculty advisor is Professor Michael Pelsmajer (pelsmajer@iit.edu).

7.9 Numbers You Should Know

Science and Letters Dean's Office	567-3800
Academic Resource Center (ARC)	567-5216
Career Management Center	567-6800
Counseling Services	808-7132
Health Services	808-7100
Educational Services	567-3300
Residence Life	808-6400
Student Loan Office	567-5952
Student Service Center	567-3100
Student Records & Registration	567-3784

7.10 Advising Codes

Students registering for undergraduate research, special topics, or reading courses use the faculty advising code below in place of a course section number.

Abarji	190		Kaul	189
Adler	155		Li	158
Bielecki	160		Lubin	150
Duan	133		Lyashenko	101
Edelstein	152		Maslanka	186
Ellis	188		McMorris	199
Fasshauer	159		Miranda	196
Frank	153		Pelsmajer	198
Heller	147		Sitton	151
Hickernell	115			

The advisor code for faculty with joint appointments in AM can be found by contacting their main departments:
Bernstein (CHE), Erber, (PHYS), Reingold (CS), Nair and Rempfer (MMAE).

VIII. Forms
8.1 Forms and Responsible Parties

FORM	AVAILABLE FROM	APPROVAL/ SUBMISSION
Registration	Web for Students (online at https://webforsun.cns.iit.edu/ahomepg.htm), or paper form from Student Services	Advisor (Dean if >18 hours and not ROTC)
Add and Drop/Withdrawal	Student Services (also available online at http://www.enrollment.iit.edu/pdf_files/change_reg_form.pdf)	Advisor, course instructor if late registration
Course Repeat/Audit	Student Services (also available online at http://www.enrollment.iit.edu/pdf_files/ug_course_repeat.pdf)	Advisor/Dean (if received passing grade in original course). Submit at time of registration for course.
Change of Grade	Student Services	Course instructor/Chair/Dean
Academic Audit Request	Educational Services (online form at http://department.iit.edu/edserve/audits/students/)	Educational Services after completing 60 credit hours
Application for Graduation	Educational Services (more info at http://www.iit.edu/~edserve/grad_apps/)	Educational Services (submit by 2nd week of semester)
Change of Major or Double Major	Educational services (online form at http://www.iit.edu/~edserve/change%20of%20major.pdf)	Dept. Chair, submit to Educational Services
Petition for summer course transfer credit	Educational Services (also available online at http://www.iit.edu/~edserve/summer%20petition.pdf)	Educational Services (before the course begins)
Credit by Proficiency Examination	Student Services	Instructor, Dean, Dept. Chair of course requested
Application for Reinstatement	Educational Services (online at http://www.iit.edu/~edserve/services.html#reinstate)	Educational Services
Petition for Reinstatement of Financial Aid	Student Services	Advisor
Co-op schedule	Career Management Center (http://www.cmc.iit.edu/home.html)	Co-op advisor/Company
Leave of Absence	File Withdrawal Form with Educational Services	Educational Services
Withdrawal from University	Educational Services (online info at http://www.iit.edu/~edserve/services.html#withdraw)	Educational Services

8.2 Course Dependencies

The **required** AM courses have the following pre-requisites:

MATH 100: none
MATH 151: placement
MATH 152: MATH 151
MATH 230: none
MATH 251: MATH 152
MATH 252: MATH 152
MATH 332: MATH 251
MATH 350: MATH 251, 252, basic linear algebra as in MATH 332/333, CS 105/115
MATH 400: MATH 251
MATH 402: MATH 251
MATH 430: MATH 230 or 332
MATH 454: MATH 230 or 251 or 252
MATH 475: MATH 251

For AM electives the situation is as follows:

MATH 300: MATH 251, 252
MATH 405: MATH 251, 252, and 332/333
MATH 410: MATH 230
MATH 420: instructor's consent
MATH 435: MATH 332
MATH 453: MATH 230
MATH 461: MATH 251, 252
MATH 476: MATH 475 or MATH 474
MATH 477: MATH 350
MATH 478: MATH 350
MATH 481: MATH 332/333, MATH 475
MATH 483: MATH 476 or MATH 474
MATH 485: MATH 475
MATH 486: MATH 461 and 475
MATH 488: MATH 251, 252
MATH 489: MATH 461

8.3 Frequency of Course Offering

Students may expect courses to be offered according to the following algorithm:

<u>Required courses:</u>

- MATH 151, 152, 251, and 252 are offered **every semester** (MATH 152 and 252 are also usually offered in the summer)
- MATH 100, 332, 400, (430 or 454) and 475 are offered **every fall semester**
- MATH 230, 350, and 402 are offered **every spring semester**
- Many students view MATH 400 as a "hard" course and wait until their last year to take it. MATH 300 may serve as preparation for MATH 400.
- MATH 350 is now equivalent to MMAE 350. Students may choose to take either of these courses. However, enrollment in MATH 350 is encouraged.

Elective courses:
Electives are not offered on any specific schedule. MATH 405, 453, 477, 478, 481, 485 have been offered most frequently in recent history.
Students wishing to request that a specific elective be offered should contact the associate chair *at least* one semester in advance.

Sometimes students wonder how our upper-level courses fit into the four main focus areas of the department. The following list provides a rough guide:

Focus area	Required courses	Elective courses
Applied Analysis	MATH 400	MATH 405
	MATH 402	MATH 461
		MATH 478
		MATH 486
		MATH 488
		MATH 489
Computational Mathematics	MATH 350	MATH 435
		MATH 477
		MATH 478
		MATH 488
Discrete Methods	MATH 332	MATH 405
	MATH 430 or MATH 454	MATH 410
		MATH 430*
		MATH 435
		MATH 453
		MATH 454*
Stochastic Analysis	MATH 475	MATH 453
		MATH 476
		MATH 481
		MATH 483
		MATH 485
		MATH 486

*if not used as required course

The following table provides a **tentative** schedule of courses for AM majors through Fall of 2010. Changes are possible subject to staffing and enrollment constraints. The most recent version can be found on the department website (http://math.iit.edu/).

	2007 S	2007 F	2008 S	2008 F	2009 S	2009 F	2010 S	2010 F
MATH 100		X		X		X		X
MATH 151	X	X	X	X	X	X	X	X
MATH 152	X	X	X	X	X	X	X	X
MATH 230	X		X		X		X	
MATH 251	X	X	X	X	X	X	X	X
MATH 252	X	X	X	X	X	X	X	X
MATH 332		X		X		X		X
MATH 350	X		X		X		X	
MATH 400		X		X		X		X
MATH 402	X		X		X		X	
MATH 405	X							
MATH 410	X				X			
MATH 430				X				X
MATH 435			X				X	
MATH 453			X		X			
MATH 454		X		X		X		X
MATH 461	X		X				X	
MATH 475		X		X		X		X
MATH 476	X		X		X			
MATH 477		X		X		X		X
MATH 478	X		X		X			
MATH 481		X		X		X		X
MATH 483			X					
MATH 485		X		X		X		X
MATH 486				X				X
MATH 488	X				X			
MATH 489			X				X	

B.S. in Applied Mathematics Requirements Worksheet

Student _____ ID _____ Full/Part-time

Applied Mathematics

Course	Hrs.	Semester
MATH 100 (**C**)	2	
MATH 151 (**C**)	5	
MATH 152 (**C**)	5	
MATH 230 (**C**)	3	
MATH 251	4	
MATH 252	4	
MATH 332	3	
MATH 400	3	
MATH 402	3	
MATH 430/454	3	
MATH 471	3	
MATH 475	3	
MATH	3	
MATH	3	
MATH	3	
MATH	3	
MATH	3	
MATH	3	
Total hours (*59 hours minimum*)		

This includes 18 hours of required electives.

Humanities

Course	Hrs.	Semester
HUM 100-level (**C**)	3	
(**C**)	3	
(**C**)	3	
Total hours (*9 hours minimum*)		

At least 6 hours at 300-level.

Social Sciences

Course	Hrs.	Semester
(**C**)	3	
(**C**)	3	
(**C**)	3	
Total hours (*9 hours minimum*)		

At least 6 hours at 300-level. At least 6 hours in one field and at least 2 different fields.
Note: A total of **21 hours** are required for **humanities and social sciences combined**.

Minor

Course	Hrs.	Semester
	3	
	3	
	3	
	3	
	3	
Total hours (*15 hours minimum*)		

5 related courses from departments other than applied mathematics.

IPRO

Course	Hrs.	Semester
IPRO 397 (**C**)	3	
IPRO 497 (**C**)	3	
Total hours (*6 hours minimum*)		

Computer Science

Course	Hrs.	Semester
CS 115	2	
CS 116	2	
Total hours (*4 hours minimum*)		

Science

Course	Hrs.	Semester
PHYS 123	4	
	3	
	3	
	3	
Total hours (*13 hours minimum*)		

Free Electives

Course	Hrs.	Semester
	4	
	3	
	3	
Total hours (*10 hours minimum*)		

Communications Requirement:
Minimum 42 hours of **C** courses, at least 15 in major courses and at least 15 in non-major courses. Place a **C** next to the courses used for Comm. Gen. Ed. Req.

Notes on the B.S. in Applied Mathematics

General note: Courses marked in the IIT Bulletin as not applying to graduation for degrees in "engineering and the physical sciences" may not be used toward the B.S. in Applied Mathematics - this includes their use as free electives.

Applied mathematics electives: Any applied mathematics course at the 300-level or higher (including graduate MATH courses) except MATH 333, 425, 426, 474 and 525 may be used as an applied mathematics elective. Courses from other programs may not be used as applied mathematics electives.

Minor: A minor may be chosen from the specialized minors listed in the IIT Bulletin or may be formed from 15 hours of course work in one department. The latter option requires written approval from both the student's faculty advisor and the minor department.

Humanities electives: (AAH, some COM, HIST, LIT, PHIL) Humanities course work (courses marked with an (**H**) in the IIT Bulletin) must include at least 6 hours at the 300-level or above. Note that foreign language courses at the 200-level may be used to satisfy the 300-level requirement. This substitution requires written approval from the student's faculty advisor. All humanities courses carry the (**C**) for communications.

Social sciences electives: (ANTH, ECON (but not BUS), PS, PSYC, SOC) Social sciences course work (courses marked with an (**S**) in the IIT Bulletin) must include at least 6 hours at the 300-level or above. At least 6 hours of social sciences course work must be taken in one field and at least 3 hours in another field. All PS courses numbered above 300 require as prerequisites successful completion of at least one other course marked with an (**S**) and satisfaction of IIT's Basic Writing Proficiency Requirement (placement test or COM 101/111 – which does not count toward any degree). Most (**S**) courses also carry the (**C**).

Science electives: Science electives may be chosen from engineering, the natural sciences (BIOL, CHEM (both ok without lab), and PHYS), or PSYC (limited to courses marked with an (**N**) in the IIT Bulletin). At least one course must be in a field other than physics. At least two sequential courses in a single field (CHEM124 followed by MS 201 also qualifies).

IPROs: One of the two required Inter-Professional Projects may be replaced for ROTC students (replaced with ROTC junior and senior required courses). Both of the two required Inter-Professional Projects might be replaced for full-time working students who can document interdisciplinary project work (replaced with applied mathematics elective and free elective). Co-Op cannot be used. A petition must be filed through the Undergraduate Dean.

Free electives: The B.S. in applied mathematics allows for 10 hours of free electives.

ROTC programs: ROTC programs are considered to be minors and satisfy the requirements for minors listed above.

Graduate and short courses: Undergraduates may enroll in a 500-level graduate course with permission from the student's faculty advisor. Undergraduates cannot enroll in short courses.

Communications General Education Requirement: Minimum 42 hours of (**C**) courses as marked in IIT Bulletin of Undergraduate Programs, at least 15 hours in major courses (automatically satisfied by MATH100, MATH151, MATH152, and MATH230) and at least 15 hours in non-major courses. Almost all Humanities and Social Science electives will count towards the communications requirement.

Academic Audits: All students should request an academic audit in their junior year (after completing 60 credit hours) from Educational Services. Minors should be noted on the Academic Program Audit Request form. Audits can be compared to degree requirements worksheet to confirm accuracy.