2015-2016 Informatics Undergraduate Student Handbook

Effective Fall 2015

BA 310
1400 Washington Avenue, Albany, NY 12222
infinfo@albany.edu
(518) 442-3171
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What is Informatics?

Informatics is the bridge between information technology and other fields; from fine arts to physics, from communication to criminal justice.

Why study Informatics?
Learning the effective use of technology helps people to succeed in any field, whether it be art, science, business, education or government. Informatics will prepare students for specific workplace opportunities in today’s competitive global environment and will allow them to more quickly refine their career decisions and life objectives.

Who should study Informatics?
To be successful in the information age, students need a greater technology capability than just using MS Word and Google. Professional jobs depend on acquiring and applying accurate information on a timely basis. Informatics is valuable to anyone interested in applying technology to their field.

What kind of jobs can I get with a minor in Informatics?
Students with a B.A. or B.S. who majored in any subject acquire extra professional clout with an Informatics minor. Informatics teaches students how to think about their fields from a computing and information perspective and prepares them to meet these challenges in their careers.

Am I limited to one career option?
Graduates can look forward to excellent job opportunities, whether directly in the field of computing and information science, or by applying this expertise to positions within business, government, education or nonprofit sectors.

Well, is it more about computing or information?
Actually, it’s about both! Informatics includes hands-on use of computing and technology in fields such as criminal justice, geography, fine arts, and biology.

OK, what about information?
Besides applying technology to a specific field, informatics often includes a focus on social and behavior aspects of information and technology.

How is it applied in other fields?
When you use technology to meet a particular need, whether it’s creating a uniform health record for patients or improving the water supply in a Third World nation, that is Informatics.

What if I want to major in something else, but I like technology?
No matter what your major is, an Informatics minor can make you more productive and valuable in your field.
Informatics Undergraduate Academic Advising

All students meet with an academic advisor prior to registering for classes. The academic advising office is in BA 310. Your academic advisor can be contacted at (518) 442-3142 or through email at isug@albany.edu. All students will be seen on a walk-in basis when the advising office is open. View the current advising schedule by going to http://goo.gl/TIVsVY

Informatics Undergraduate Listserv

In order to stay up to date with the department, all students need to sign up for the INFUG listserv. Through the listserv you will have access to all the latest information regarding the Academic Advisor’s hours, outreach opportunities, departmental events and more.

To subscribe to the Informatics Undergraduate (INFUG) Listserv:

1. Log on to your email account
2. In the to field, type: listserv@listserv.albany.edu
3. Leave the subject field blank
4. In the message field, type: Subscribe INFUG your first name your last name
   (for example: Subscribe INFUG Jane Doe)
5. Send the message
6. You will receive an email confirming your subscription

Internship/Careers Listserv

Through the CEAS-CAREERS listserv you will have access to all the latest information regarding the possible internships, job opportunities and professional development opportunities, and more.

To subscribe to the CEAS-CAREERS Listserv:

1. Log on to your email account
2. In the to field, type: listserv@listserv.albany.edu
3. Leave the subject field blank
4. In the message field, type: Subscribe CEAS-CAREERS your first name your last name
   (for example: Subscribe CEAS-CAREERS Jane Doe)
5. Send the message
6. You will receive an email requesting confirmation
7. Confirm your subscription and then you will receive a second email

Informatics Social Media

Join the Informatics department online. We can be found on:

- Facebook: www.facebook.com/UAlbanyInformatics
- Twitter: twitter.com/UAlbanyINF
- YouTube: www.youtube.com/user/UAlbanyInformatics
- LinkedIn: http://linkd.in/1iadO7y
B.S. in Informatics

The B.S in Informatics is a unique opportunity for students to study the application of technology across disciplines. The degree is a combined major and minor, requiring a total of 54 credits. This includes 33 credits of required core courses that focus on the relationship between technology and society, the use of various technologies across platforms, and programming fundamentals. Emphasis is also placed on providing students with various opportunities to gain real-world experience, which comprises the 9 credits of experiential learning. In addition, students are required to complete 12 credits in a specialization called a concentration. This gives students the opportunity to deepen their experience and knowledge in a particular area of Informatics. The tracks are Interactive User Experience, Cyber-security, Computer Networking (not currently offered), Social Media, Data Analytics, Software Development, Physical Computing (pending approval), and Information Technology. The Information Technology track is offered fully online.

The B.S in Informatics prepares students for a wide array of careers. Some potential career options for each concentration are:

- **Interactive User Experience**: Web Designer, User Experience Analyst, and Information Architect
- **Cyber-security**: Information Security Analyst, Data Security Administrator, Data Security Administrator, and Computer Security Specialist
- **Social Media**: Social Media Community Manager, Social Media Strategist, and Public Information Officer
- **Computer Networking**: System Administrator, Network Administrator, and Computer Network Architect (not currently offered)
- **Data Analytics**: Data Analyst, Data Mining Specialist, and Data Visualization Specialist
- **Software Development**: Application Developer, Software Architect, Software Design Analyst, Systems Programmer
- **Information Technology**: IT Project Manager, Computer Support Specialist, and Technical Support Specialist.
- **Physical Computing**: Actual job titles currently not available (pending approval)

Requirements include:

- Information and Society
- Practical Applications, including computer programming, web design and development, data and databases, networks and systems, and project management
- Research Methods and Statistics
- Additional Math
- Concentration
- Experiential Learning

Students who complete a B.S. in Informatics are NOT required to have a minor, are required to complete 60 liberal arts credits and 30 general education credits.
Degree Requirements for the B.S. in Informatics

Informatics is a combined major/minor, consisting of a minimum of 33 core credits, selection of a 12-credit concentration, and 9 credits of experiential learning (54 credit total).

Core (30 credits)

Information & Society (9 credits)
I INF 100X Information in the 21st Century (3)
I INF 301 Emerging Trends in Information and Technology (3)
I INF 499 Senior Seminar in Informatics (3)

Practical Applications (15 credits)
I INF 108 Programming for Problem Solving (3) *(with exception)* or I CSI 105 Computing & Information (3)
(or substitute I CSI 201 Introduction to Computer Science)
I INF 201 Introduction to Web Technologies (3)
I INF 202 Introduction to Data & Databases (3)
I INF 203 Introduction to Networks and Systems (3)
I INF 305 Digital Project Management (3)

Math (3 credits)
Any A MAT course between 100-299 (except A MAT 108)

Research (6 credits)
I INF 200 Research Methods for Informatics (3) *(or substitute A SOC 220)*
A MAT 108 Statistics (3) *(or substitute A SOC 221 or RCRJ281, AECO320 with exception)*

Experiential Learning (9 credits)
Students will be advised into experiences that complement their chosen concentration. Classes may be repeated twice for a total of 6 credits. Students must do at least two different courses. Online IT students only may complete INF 469 (9 credits) to fulfill this requirement.

I INF 463 Professional Inventions I (3)
I INF 464 Professional Inventions II (3)
I INF 465 Senior Capstone Project (3)
I INF 466 Undergraduate Research (3)
I INF 467 Technology-based Community Support (3)
I INF 468 Undergraduate Internship (3)
I INF 469 Undergraduate Internship for Online IT Students (9)
E APS 487 or E APS 456 Introduction to Peer Mentoring (3)
E APS 457 Advanced Peer Education (3)

Concentrations (at least 12 credits)
Students select one concentration.

Interactive User Experience
I INF 302 Human-Computer Interactive Design (3)
I INF 362 Intermediate Interactive Design (3)

Select two from:
I INF 308 Programming for Informatics (3)
I INF 363 Digital Design (3)
I INF 370 Wearable Computing (3)
I INF 371 Rapid Prototyping and Design (3)
I INF 401 Case Studies in Digital Citizenship (3)
I INF 462 Current Technologies in Web Design (3)
I INF 470 Interfaces for Human-Machine Collaboration (3) (new title)
I INF 496 Special Topics (3) (as appropriate, repeatable)
I CSI 107 Web Programming (3)
I CSI 124X Computer Security Basics (3)

A DOC 324 (= A JRL 324) Introduction to Documentary Photography (3)
A DOC 330 (= A HIS 330) Foundations of Documentary Web/Hypermedia Production (3)
A DOC 406 (= A HIS 406) Practicum in Historical Documentary Filmmaking (4)
A DOC 407 (= A HIS 407) Readings and Practicum in Digital History and Hypermedia (4)
**Cyber-security**
- CSI 124X Computer Security Basics (3)
- INF 306 Information Security & Assurance (3)

Pick two:
- INF 401 Case Studies in Digital Citizenship (3)
- INF 452 Computer and Network Security (3)
- INF 453 Information Security and Privacy (3)
- INF 454 Human Aspects of Cyber-security (3)
- INF 455 Prevention and Protection Strategies in Cyber-security (3)
- INF 496 Special Topics (3) (as appropriate, repeatable)
- CSI 300Z Social, Security and Privacy Implications of Computing (3)
- CSI 424 Information Security (3)
- CSI 426 Cryptography (3)

**Social Media**
- INF 307 Current Topics in Social Media (3)
- CSI 131 Introduction to Data Analytics: Seeking Information in Data with Computation (3)

Pick two from:
- INF 308 Programming for Informatics (3)
- INF 363 Digital Design (3)
- INF 401 Case Studies in Digital Citizenship (3)
- INF 496 Special Topics (3) (as appropriate, repeatable)
- CSI 432 Network Science (3)
- A SOC 210 Sociology of Culture (3)
- A SOC 255 Mass Media (3)
- A SOC 270 Social and Demographic Change (3)
- A DOC 224 (= A HIS 224) Nonfiction Media Storytelling (3)
Data Analytics
I CSI 131 Introduction to Data Analytics: Seeking Information in Data with Computation (3)
I INF 300 Probability and Statistics for Data Analytics (3)
Pick two from:
I INF 407 Modern Issues in Databases (3)
I INF 428 Analysis, Visualization, and Prediction in Analytics (3)(new number)
I INF 451 Bayesian Data Analysis and Signal Processing (3)
I IST 433 Information Storage and Retrieval (3)
I CSI 431 Data Mining (3)
I CSI 432 Network Science (3)
I CSI 436 Machine Learning (3)

Software Development
I CSI 201 Introduction to Computer Science (4)
I CSI 310 Data Structures (3)
I CSI 418Y Software Engineering (3)
Pick one from:
I INF 455 Prevention and Protection Strategies in Cyber-security (3)
I CSI 405 Object Oriented Programming Principles and Practice (3)

Information Technology (online only)
I INF 302 Human-Computer Interactive Design (3)
I INF 303 Intermediate Networking (3)
I INF 306 Information Security & Assurance (3)
I INF 308 Programming for Informatics (3)
**Self-Designed Concentration (with Departmental Approval only)**

It is possible for students to create a self-designed concentration with approval of an Informatics review committee. Students must petition the self-designed concentration committee for approval of such concentrations. It is essential that such petitions demonstrate that:

- The proposed concentration fits within the Informatics field,
- The proposed concentration is an emerging area in Informatics that is not already being offered,
- The student has support from a faculty/mentor, and
- The student has access to courses in their proposed area on campus.

**Proposal and Approval Process for Self-Designed Concentration**

- Student must write a rationale for their desired self-designed concentration and explain why current program-defined concentrations are not adequate options.
- Student must provide a proposal of courses to take to support the proposed self-designed concentration. Concentrations should consist of a minimum of four (4) courses. At least 9 credits of a self-designed concentration should be taken while enrolled in the INF BS program.
- Student must have at least one University at Albany faculty member approve this rationale and proposal in writing.
- The appointed faculty committee on self-designed concentrations must approve the request in order for the student to pursue that concentration.

Proposal must be approved by INF faculty before the student can declare it.
B.A. in Informatics

This degree is open to UAlbany students who matriculated before Spring 2015 and already have declared this major only. As of April 2015, no one will be admitted to this option.

Information Science is an interdisciplinary major that allows students to explore their interest in the creation, search and spread of information. From databases to social networking, our students study the user end of the technology spectrum to understand how it is being utilized and how it is evolving.

To prepare our students for this fast-paced field, we have a foundation of classes on which they can begin this well-rounded and interdisciplinary major. Our core requirements include:

- Computer programming
- Web design and development
- Data and databases
- Study of emerging trends in information and technology
- Networking and systems theory
- Psychology, communication, and sociology
- Statistics and calculus

Students have a choice of electives, which allow them to explore and solidify their interest in the field, such as additional computer science or social informatics topics.

Their study concludes with a Senior Seminar that prepares them for their next step in Information Science.

Students who complete a B.A. in Information Science ARE required to have a minor. They are also required to complete 90 liberal arts credits, and 30 general education credits.

Extra-Curricular Activities

In addition to challenging course work, our students have opportunities to put their knowledge to the test. All of our students gain real world experience from experiential learning opportunities such as internships. Our students also volunteer in our community programs such as our Social Robotics Workshop and the Junior FIRST LEGO League Expo.

The department hosts various social activities, such as Talk Like a Pirate Day and Pi Day parties. Informatics is also home to the University’s Innovation in Informatics (in)3 Makerspace. Details can be found at http://in3.ninja/.

In and out of the classroom, our students are preparing to be information and innovation leaders.
Informatics Minor

For students who wish to pursue a major in another field but want to add a dose of technology to their degree there is also a minor in Informatics.

**Informatics:** A minimum of 18 graduation credits including I INF 100; I INF 201; I INF 202; any one course from among I INF 108, I CSI 101, 105, 201; and any two courses from one of the following Informatics cognate minor options, as follows:

**General:** any two courses from among I CSI 203, 204, 205, 300, 410, I INF 203, 303 or 423, 304 or 424, 362, 403, 404, 470, 496. I IST 402, 433. *This option is open to students with any major EXCEPT an Interdisciplinary Studies major with a concentration in Information Science or the INF BS (i.e., the INF major).*

**Art:** any two courses from among A ART 244, 280 (or A ARH 283), 281 (or A ARH 268), 344, and 348. *This option is only open to students with an Art major.*

**Communication:** any two courses from among A COM 369, 375, 430Z, and 465. *This option is only open to students with a Communication major.*

**Computer Science:** any two courses between CSI 300 and CSI 479 or between INF 400 and 496, excluding INF 460 through 469. *This option is only open to students with a Computer Science major.*

**Criminal Justice:** I INF 306, R CRJ 393, R CRJ 399 (GIS only), R CRJ 418, R CRJ 592 (only available to BA/MA students), A GOG 496, B FOR 201, or B FOR 202. Only B FOR 201 OR B FOR 202 may be taken. *This option is only open to students with a Criminal Justice major.*

**Economics:** any two courses from among A ECO 401, 427, 466, 480/580, A MAT 363, 369, A SOC 370, B ITM 322, 330. *This option is only open to students with an Economics major.*

**Geography:** any two courses from among A GOG 406, 414, 484 and 485. *This option is only open to students with a Geography major.*

**Journalism:** any two courses from among A JRL 330, A JRL 363, A JRL 420, A DOC 442 (or A WSS 442), A JRL 460Z, A JRL 487Z. *This option is only open to students with a Journalism major.*

**Physics:** A PHY 451 (or I CSI 451 or I INF 451) and either 353 or 415. *This option is only open to students with a Physics major.*

**Sociology:** any two courses from among A SOC 270, A SOC 370, and selected sections of A SOC 420W/420Z, A SOC 475W/475Z, A SOC 481W/481Z as determined by department. *This option is only open to students with a Sociology major.*

**Women’s Studies:** A WSS 342X and 442 (or A DOC 442). *This option is only open to students with a Women’s Studies major.*

1. Choose an option – You may choose either the **General option**, which is open to any student with any major, or you may **choose one of the Cognates**, which are only open to students in each of those majors. For example, only an Art major may choose the Art cognate, etc.

2. Complete the Core – The same four courses (or types) must be taken by students in any of the options: Information in the 21st Century (INF 100X); Programming (INF 108, CSI 101, 105, or 201); Introduction to Web Technologies (INF 201); and Intro to Data & Databases (INF 202).

3. Complete two upper division courses – Choose from the choices in the General Option or from the list for each of the cognate options, if your major qualifies.
Informatics Undergraduate Courses

I INF 100X (formerly I IST 100X) Information in the 21st Century (3)
Introduction to information and technology in the 21st Century. Different resources, including the Internet, libraries, news sources and other sources of information, hardware, and Web 2.0 technologies will be explored. The primary emphasis of the class is on discovering reliable information sources for any and all subjects so that a student's future research and other pursuits are supported by the methods developed in this course. Each student is called upon to fortify their own individual communication and reasoning skills and will demonstrate the use of those skills through course assignments, class presentations and group activities.

I INF 108 Programming for Problem Solving (3)
Ever thought about a problem and said “There should be an app for that”? This course provides an introduction to computer programming using modern programming languages as a way to solve problems. It focuses on programming concepts and fundamentals within the context of solving real world problems.

I INF 196 Beginning Special Topics in Informatics (3)
The contents of this course will vary from semester to semester. Each offering will cover an introductory topic in Informatics. May be repeated for credit when content varies.

I INF 197 Beginning Mini Special Topics in Informatics (1)
The contents of this course will vary from semester to semester. Each offering will cover an introductory topic in Informatics. May be repeated for credit when content varies.

I INF 200 Research Methods for Informatics (3)
In this course students will gain an understanding of key methods and techniques in research and will prepare to critically evaluate and engage in research. Topics covered will include: identifying and articulating research problems, posing research questions, research design, data collection strategies, quantitative and qualitative analyses, interpreting results of analyses, and concerns in human subject research. Prerequisite(s): I INF 100.

I INF 201 Introduction to Web Technologies (3)
A technique-oriented introduction to client-based Web design and development technologies, including HTML/XHTML, CSS, JavaScript, digital imaging, file formats, etc.; also the elements of UNIX and networks necessary to understand and implement basic information management and transfer. Prerequisite(s): I INF 100X; not open to students who are taking or have completed I IST 361.

I INF 202 Introduction to Data and Databases (3)
This course introduces students to data and databases. It covers both long-standing relational (SQL) databases and newly emerging non-relational (NoSQL) data stores. The nature of data, Big Data, intellectual property, system lifecycle, and development collaboration are also explored. Team-based activities alternate with hands-on exercises. Prerequisite(s): I CSI 101, 105, 110 or 201 or B ITM 215; not open to students who are taking or have completed I CSI 410 or 411 or B ITM 331.
I INF 203 Introduction to Networks and Systems (3)
This course provides an introduction to computer networking and computer systems. The course covers the fundamentals of networked computing systems with an emphasis placed on the basics of network protocols and how they operate at all layers of the networking models. The course also introduces students to personal computer internal system components, storage systems, peripheral devices, and operating systems from an introductory computer architecture perspective. Prerequisite(s): I CSI 105 or 201.

I INF 270 Internet of Things (3)
This course examines both the societal impact and development of hands-on technological skills of the Internet of Things (IoT) - a massive network connecting objects (such as toasters, watches and vehicles) to the Internet, people and each other. In this course, students add a computational dimension to everyday objects, by constructing both the software and hardware in parallel to connect devices to the Internet. Students examine the impact of these emerging trends from social and product development perspectives. Prerequisite(s): I INF 108.

I INF 300 Probability and Statistics for Data Analytics (3)
Probability and statistical methods applied to the analysis of various kinds of data. Includes underlying theoretical justification and appropriateness for different models and analyses. Conceptual and implemented approaches to data analysis. Prerequisite(s): A MAT 108, I CSI 131.

I INF 301 (formerly I IST 301X) Emerging Trends in Information and Technology (3)
This course is designed to address challenges of the 21st century from the information science framework. We will explore emerging technologies and discuss how they alter and create new information environments. Examples of these technologies include Big Data, 3D Printing, Social Media, Wearable Computing, etc. Attention will be paid to real world uses of these technologies, emphasizing how they are changing business, government, education, and a number of other industries. This course also focuses on career paths for digital citizens in the 21st century. Prerequisite(s): I INF 100X or I IST 100X.

I INF 302 Human-Computer Interactive Design (3)
This course examines human factors, Human-Computer Interaction aspects of application domains, human-centered evaluation, developing effective interfaces, accessibility, emerging technologies, and human-centered computing. Students learn several techniques for rapid prototyping and evaluating multiple interface alternatives and principles of visual design. Information visualization, user-interface software architecture, and formal methods in HCI will be explored. Prerequisite(s): I INF 301.

I INF 303 Intermediate Networking (3)
This course is designed to convey the essentials of data communication networks. It will cover concepts, technologies and architectures. There will be practical lessons built into the semester's topics and assignments whenever possible. This course will build on the networking knowledge gained in I INF 203, covering the major conceptual areas balanced with practical discussions and exercises. It will also discuss important network management topics such as domain management and security. Prerequisite(s): I INF 203. Students who have taken I INF/IST 423 may not take I INF 303 for credit.
I INF 304 Intermediate Hardware and Operating Systems (3)
The primary objective of this course is to provide the student with a detailed understanding of computer systems from an architectural perspective. The material covered in this course, which builds on that learned in I INF 203, is intended to form a foundation of technical knowledge for systems analysis, design, configuration, selection, and management. The primary emphasis is expanding students' technical knowledge of hardware and system software, with topics including advanced digital circuits, integrated circuits, application development, operating systems, file systems, and systems security. Prerequisite(s): I INF 203. Students who have taken I INF/I IST 424 may not take I INF 304 for credit.

I INF 305 Digital Project Management (3)
This course provides an introduction to current practices in project management with a focus on the management of digital projects. It is intended to provide a broad overview of the concepts, issues, tools and techniques related to the management of digital projects from concept to completion. Topics covered include project manager role/responsibilities, project team structure, project documentation, project phases/SDLC, project management methodologies, troubled projects, digital analytics and more. Prerequisite(s): I INF 201 and I INF 202.

I INF 306 Information Security and Assurance (3)
Technical aspects of cybersecurity in computer and network systems. The nature of attacks and defense in digital systems; models of vulnerabilities, threats and security; cryptography; forensics; security policies and procedures; software and network security. Prerequisite(s): I INF 202.

I INF 307 Current Topics in Social Media (3)
In this course students will explore current topics and trends in social media. An emphasis will be placed on investigating and evaluating multiple social media outlets, writing across social media platforms, and current trends in managing social media programs. Prerequisite(s): I INF 301.

I INF 308 Programming for Informatics (3)
Computer programming in an Informatics environment. The fundamentals of programming, including introduction to algorithms, object-oriented design, and data structures. Additional topics include basic interface design, security, networking, use of data bases, and mobile and other non-traditional computing platforms. Prerequisite(s): I CSI 105 and I INF 100.

I INF 362 Intermediate Interactive Design (3)
A technique-oriented intermediate exploration of client-based and server-based Web design and development technologies, using current and emerging technologies. Design, planning, security and management of websites will also be examined. Prerequisite(s): I INF 302.

I INF 363 Digital Design (3)
Students apply design theory to the development and delivery of digital media with emphasis on digital imagery, video, and music. Topics may include consumption of digital media on a variety of devices, creation, acquisition, editing, and processing of digital content. Students will develop an appreciation for the role that each media element may contribute to the final user experience. Students will cultivate an understanding of how public policy issues apply to technology, in particular copyright, privacy and freedom of expression. Prerequisite(s): I INF 201.
I INF 370 Wearable Computing (3)
Wearable computing is the term for miniature electronic devices worn by the user, such as smart watches, glasses, clothing or even prosthetics. Students will prototype solutions through software programming and design of electronic circuits. In addition, students will examine the usability, design and business opportunities of wearable computing. Various integration patterns will be examined through connecting wearables to other systems or devices. Examples include integration to custom mobile applications and systems in the cloud. Prerequisite: INF 270

I INF 371 Rapid Prototyping and Design (3)
This course integrates knowledge of users, software, hardware and design, and applies these concepts in the context of making prototypes. Students undergo and evaluate rapid prototyping processes while immersed in a collaborative design process. Students learn processes and applied skills required for rapid prototyping, including integrating electronics, microcontrollers, sensors, actuators and 3D printed models. Prerequisite: INF 270

I INF 401 Case Studies in Digital Citizenship (3)
The purpose of this course is for students to explore topics related to digital citizenship through the close examination of case studies. Students will be asked to look to current issues and cases involving digital citizenship and apply themes, such as the ethical use of information, in their examination and discussion of them. Prerequisite(s): I INF 301.

I INF 407 Modern Issues in Databases (3)
This is an advanced undergraduate course to introduce the students to emerging topics in database systems. This course is especially designed for junior/senior students with emphasis on advanced concepts and algorithms in database systems, topics that are state-of-the-art research, or recent seminal contributions in the broad field of database and information systems. Prerequisite(s): I INF 202 and I CSI 131.

I INF 428 Analysis, Visualization, and Prediction in Analytics (3)
Principles of data analysis, emphasizing modern statistical and machine-learning based approaches. Also, the important role of simple analyses and visualization to gain an overall understanding of data sets, regardless of size. The role of analytics in creating predictive models of phenomena. The importance of understanding the nature of the data and other methodological considerations. Prerequisite(s): I INF 300 and I INF 407.

I INF 451 (= A PHY 451 & I CSI 451) Bayesian Data Analysis and Signal Processing (3)
This course will introduce both the principles and practice of Bayesian and maximum entropy methods for data analysis, signal processing, and machine learning. This is a hands-on course that will introduce the use of the MATLAB computing language for software development. Students will learn to write their own Bayesian computer programs to solve problems relevant to physics, chemistry, biology, earth science, and signal processing, as well as hypothesis testing and error analysis. Optimization techniques to be covered include gradient ascent, fixed-point methods, and Markov chain Monte Carlo sampling techniques. Only one version of I INF 451 may be taken for credit. Prerequisite(s): A MAT 214 (or equivalent) and I CSI 101 or 201.
I INF 452 Computer and Network Security (3)
Theoretical, conceptual and practical aspects of computer and network security. The role of algorithms, systems, humans, software and hardware in computer and network vulnerabilities and defense. The two primary focuses of the course will be on the computer and networks, as centers of vulnerability and defense. The course will emphasize hands on analysis of security issues. Prerequisite(s): I INF 306.

I INF 453 Information Security and Privacy (3)
Security and privacy issues in computer and networked systems. The role of systems, design, implementation, etc. on data security in digital systems. Case studies of these roles and how they affect both data security and vulnerability. The legal and ethical aspects of data security and privacy. Prerequisite(s): I INF 306.

I INF 454 Human Aspects of Cyber-Security (3)
The roles of individuals, groups, organizations and governments in computer and network security. How the interactions of these with the technical nature of digital systems in many cases forms the core of vulnerabilities. The trade-offs between security and various measures of utility. Conflicting definitions of security at different levels (e.g. governmental v. individual). Societal measures and values of security. The course will feature case studies to explore many of these issues. Prerequisite(s): I INF 306.

I INF 455 Prevention and Protection Strategies in Cyber-Security (3)
The role of security policies and design strategies to minimize security vulnerabilities in computer and networked systems. The affected areas range from the overall design of systems, networking protocols, operating systems and applications software on individual computers to the role of coding standards and end user education in security. Prerequisite(s): I INF 306.

I INF 462 Current Technologies in Interactive Design (3)
Provides an advanced coverage of web design and development, with a focus on current technologies and processes. Students will develop skills on the use of software development practices such as agile development and test-driven development. Develop familiarity with current technologies in particular web-based and mobile applications. Prerequisite(s): I INF 362 and I INF 363.

I INF 463 Professional Innovations I (3)
Students from particular INF concentrations will represent their area of expertise on an individual or group project. The projects will either be real-life problems as presented by partnering external organizations or real-life problems as posed and solved by the group itself. A culminating paper, application, or presentation will be produced. The Instructor of INF 463 will act as a mentor to the student teams and help to guide them through their projects. This is the first of a two-course series.

I INF 464 Professional Innovations II (3)
Students from particular INF concentrations will represent their area of expertise on an individual or group project. The projects will either be real-life problems as presented by partnering external organizations or real-life problems as posed and solved by the group itself. A culminating paper, application, or presentation will be produced. The Instructor of INF 464 will act as a mentor to the student teams and help to guide them through their projects. This is the second of a two-course series.
I INF 465 Senior Capstone in Informatics (3)
Students create teams, each representing their specialization, to solve a current technology challenge. The purpose of this course is for students from all the different Informatics tracks to come together and work on a real world Informatics related problem. This course will require completion of 100 hours in a field placement. During their field placement students will work as part of a team comprised of their peers from other Informatics tracks to complete a capstone project. The project itself will be dictated by the individual needs of the placement and the strengths of the team. The Instructor of I INF 465 will act as a mentor to the student teams and help to guide them through their projects. May be repeated for credit up to a total of 6 credits with permission of department. Prerequisite(s): Informatics seniors only and instructor permission.

I INF 466 Independent Research (3)
Student-initiated research project under faculty guidance. Students will present their research as appropriate. May be repeated for credit up to a total of 6 credits with permission of department.

I INF 467 Technology-Based Community Support (3)
Students work on-site with a non-profit to provide technology support. Possible projects could include website creation and development, computer lab support, or networking. At least 100 hours/semester are required. Students will also meet with a faculty supervisor throughout the semester and complete a final presentation of their work. May be repeated for credit up to a total of 6 credits with permission of department. Prerequisite(s): Informatics juniors and seniors only.

I INF 468 Undergraduate Internship (3)
The internship has two components. (1) work experience in position related to student's interests in computing and information. Interns are expected to spend eight (8) hours per week during the semester at their internship location. (2) Academic seminar where students and faculty mentor meet together monthly to discuss their experiences and general career preparation topics. Assignments may include preparing a resume and cover letter, career development, assessing skills for and barriers to career development, and planning for graduate or professional school. Students are expected to research, identify and find their own possible internship opportunities. This activity will help student to identify their own career goals and manner in which they may best be achieved, and it will also help students to learn career preparation skills that will be useful after graduation. All internship opportunities must be reviewed and approved by appropriate faculty prior to course registration. May be repeated for up to 6 credits. Prerequisite(s): junior or senior status and a minimum GPA of 2.50.

I INF 469 Internship for Fully Online Students (9)
The internship has two components: (1) work experience in position related to the Information technology track. Interns are expected to spend at least 24 hours per week during the semester at their internship location; (2) online academic seminar where students and faculty mentor discuss their experiences and general career preparation topics. Assignments may include preparing a resume and cover letter, career development, assessing skills for and barriers to career development, and planning for graduate or professional school. Students are expected to research, identify and find their own internship opportunities. This activity will help student to identify their own career goals and manner in which they may best be achieved, and it will also help students to learn career preparation skills that will be useful after graduation. All internship opportunities must be reviewed and approved by appropriate faculty prior to course registration.
appropriate faculty prior to course registration. Prerequisite(s): Informatics juniors and seniors only, IT online track only, fully online students.

I INF 470 Interfaces for Human-Machine Collaboration (3)
For many decades, computer users have become accustomed to the traditional keyboard and mouse interface for interacting with their machines. However, the growth in touchscreen technology, speech-recognition and gesture recognition has changed the interfaces for collaboration. In this course, students examine different emerging interfaces. Skills are developed that allow students to design and build solutions using a variety of interfaces to control a wide range of devices. Simultaneously students will examine the functionality and usability of their designs. Prerequisites: INF 108 and INF 270

I INF 496 Intermediate Special Topics in Informatics (3)
The contents of this course will vary from semester to semester. Each offering will cover an intermediate topic in Informatics. May be repeated for credit when content varies. Prerequisite(s): permission of instructor, and junior or senior standing.

I INF 497 Intermediate Mini Special Topics in Informatics (1)
The contents of this course will vary from semester to semester. Each offering will cover an intermediate topic in Informatics. May be repeated for credit when content varies. Prerequisite(s): permission of instructor, and junior or senior standing.

I INF 499W Senior Seminar in Informatics (3)
This course helps students develop integral professional skills, including presentation of ideas through written and verbal communication, within an Informatics framework. Students will focus on a particular technology company or issue as a mechanism for developing critical thinking and teamwork skills. Prerequisite(s): Informatics seniors only.