

SUBCOMMITTEE A – AGENDA

Via Zoom
February 15, 2024
1:30 p.m.

PART I – NEW ACADEMIC PROGRAMS AND PROGRAM CHANGES

COLLEGE OF AGRICULTURE AND NATURAL RESOURCES

1. Request to change the requirements for the **Bachelor of Science** degree in **Forestry** in the Department of Forestry.

- a. Under the heading **Requirements for the Bachelor of Science Degree in Forestry** make the following changes:

(1) In item 3. a. change the total credits from '67' to '68'.

(2) In item 3. a. delete the following course:

FOR 340L Forest Ecology Laboratory 1

Add the following course:

FOR 340L Forest Ecology Laboratory 2

Effective Fall 2024.

COLLEGE OF ENGINEERING

1. Request to change the requirements in the **Bachelor of Science** degree in **Computational Data Science** in the Department of Computer Science and Engineering.

- a. Under the heading **Requirements for the Bachelor of Science Degree in Computational Data Science** make the following change:

(1) In item 3. b. change the total credits from '44' to '47' and add the following course:

CSE 380 Information Management and the Cloud 3

Effective Fall 2024.

2. Request to change the requirements in the **Bachelor of Science** degree in **Computer Science** in the Department of Computer Science and Engineering. The University Committee on Undergraduate Education (UCUE) will consider this request at its February 8, 2024 meeting.

The concentrations in the Bachelor of Science degree in Computer Science are noted on the student's academic record when the requirements for the degree have been completed.

- a. Under the heading **Requirements for the Bachelor of Science Degree in Computer Science** make the following changes:

(1) In item 3. b. change the total credits from '35' to '32' and delete the following courses:

CSE 425 Introduction to Computer Security 3

MTH 314 Matrix Algebra with Computational Applications 3

Add the following course:

CSE 380 Information Management and the Cloud 3

- (2) In item 3. b. add the following note:
 Students must have a minimum grade of 2.0 in each of the following courses: CSE 300, CSE 320, CSE 325, CSE 331, CSE 335, CSE 380.
- (3) Reletter item 3. c. to item 3. d. and item 3. d. to item 3. e. respectively.
- (4) Add the following item 3. c.:
 c. One of the following courses (3 or 4 credits):
 MTH 314 Matrix Algebra with Computational Applications 3
 MTH 317H Honors Linear Algebra 4
- (5) In item 3. d. add the following course:
 CSE 425 Introduction to Computer Security 3
- (6) Add the following transcriptable concentrations:

Concentrations in Computer Science

The Department offers the following concentrations to students wishing an area of specialization in their degree. The concentrations are available to, but not required of, any student enrolled in the Bachelor of Science degree program in Computer Science. NOTE: Completing the Bachelor of Science degree in Computer Science with a concentration may require more than 120 credits. Upon completion of the required courses for a concentration, certification will appear on the student's official transcript. Students may select no more than one concentration.

For any concentration, 3 credits of CSE 499 Undergraduate Research related to the subject area may be applied with approval of the Department of Computer Science and Engineering.

Artificial Intelligence

To complete a Bachelor of Science degree in Computer Science with an artificial intelligence concentration, students must complete the requirements for the bachelor's degree, including the following:

Two of the following courses (6 credits):

CSE 404	Intro to Machine Learning	3
CSE 440	Introduction to Artificial Intelligence	3
CSE 482	Big Data Analysis	3

Three of the following courses not taken above (9 to 12 credits):

CSE 402	Biometrics and Pattern Recognition	3
CSE 404	Intro to Machine Learning	3
CSE 434	Autonomous Vehicles	3
CSE 440	Introduction to Artificial Intelligence	3
CSE 482	Big Data Analysis	3
CSE 803	Computer Vision	3
ADV 401	Neuromarketing and Consumer Decisions	3
LIN 401	Introduction to Linguistics	4
LIN 424	Introduction to Phonetics and Phonology	3
LIN 427	Laboratory Phonetics	3
LIN 431	Introduction to Morphology	3
LIN 434	Introduction to Syntax	3
LIN 437	Introduction to Semantics and Pragmatics	3
LIN 463	Introduction to Cognitive Science	3
LIN 471	Sociolinguistics	3
MI 484	Human Robot Interaction (W)	3
MTH 468	Predictive Analysis	3
NEU 301	Introduction to Neuroscience I	3
NEU 302	Introduction to Neuroscience II	3
PHL 330	Formal Deductive Reasoning	4
PHL 331	Formal Practical Reasoning	4
PHL 432	Logic and its Metatheory	4
PSY 301	Cognitive Neuroscience	3

Computer Systems

To complete a Bachelor of Science degree in Computer Science with a computer systems concentration, students must complete the requirements for the bachelor's degree, including the following:

All of the following courses (9 credits):

CSE	410	Operating Systems	3
CSE	422	Computer Networks	3
CSE	450	Translation of Programming Languages	3

Two of the following courses (6 credits):

CSE	415	Introduction to Parallel Programming	3
CSE	420	Computer Architecture	3
CSE	425	Introduction to Computer Security	3
CSE	434	Autonomous Vehicles	3
CSE	472	Computer Graphics	3
CSE	480	Database Systems	3

Cybersecurity

To complete a Bachelor of Science degree in Computer Science with a cybersecurity concentration, students must complete the requirements for the bachelor's degree, including the following:

All of the following courses (6 credits):

CSE	402	Biometrics and Pattern Recognition	3
CSE	425	Introduction to Computer Security	3

Three of the following courses (9 credits):

CSE	410	Operating Systems	3
CSE	422	Computer Networks	3
CSE	431	Algorithm Engineering	3
CSE	434	Autonomous Vehicles	3
CSE	480	Database Systems	3
CSE	482	Big Data Analysis	3
MI	239	Digital Footprints: Privacy and Online Behavior	3
MTH	416	Introduction to Algebraic Coding	3

Multimedia and Graphics

To complete a Bachelor of Science degree in Computer Science with a multimedia and graphics concentration, students must complete the requirements for the bachelor's degree, including the following:

Two of the following courses (6 credits):

CSE	471	Media Processing and Multimedia Computing	3
CSE	472	Computer Graphics	3
CSE	476	Mobile Application Development	3
CSE	477	Web Application Architecture and Development	3

Three of the following courses not taken above (8 or 9 credits):

CSE	471	Media Processing and Multimedia Computing	3
CSE	472	Computer Graphics	3
CSE	476	Mobile Application Development	3
CSE	477	Web Application Architecture and Development	3
CSE	803	Computer Vision	3
CMSE	402	Data Visualization Principles and Techniques	3
FLM	230	Introduction to Film	3
FLM	260	Introduction to Digital Film and Emergent Media	3
MI	231	Game and Interactive Media Development	3
MI	247	Three-Dimensional Graphics and Design	3
MI	337	Compositing and Special Effects	3
MI	347	Advanced Three-Dimensional Computer Animation	3
MI	350	Evaluating Human-Centered Technology	3
MI	377	Advanced 3D Modeling	3
MI	445	Game Design and Development I	3
MI	450	Creating Human-Centered Technology	3
MI	455	Game Design and Development II	3
MI	462	Social Media and Social Computing	3
MI	482	Building Virtual Worlds (W)	3
MI	497	Game Design Studio	3
STA	380	Electronic Art	3

STA	384	Experiments in Digital Video	3
THR	205	Media Acting I	2
THR	419	Projection Design for Live Performance	3

Software Engineering

To complete a Bachelor of Science degree in Computer Science with a software engineering concentration, students must complete the requirements for the bachelor's degree, including the following:

The following course (3 credits):

CSE	435	Software Engineering	3
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Four of the following courses (12 credits):

CSE	431	Algorithm Engineering	3
CSE	476	Mobile Application Development	3
CSE	477	Web Application Architecture and Development	3
CSE	480	Database Systems	3
CSE	870	Advanced Software Engineering	3
MI	350	Evaluating Human-Centered Technology	3
MI	420	Interactive Prototyping	3
MI	450	Creating Human-Centered Technology (W)	3

Theory

To complete a Bachelor of Science degree in Computer Science with a theory concentration, students must complete the requirements for the bachelor's degree, including the following:

The following course (3 credits):

CSE	460	Computability and Formal Language Theory	3
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One of the following courses (3 credits):

CSE	431	Algorithm Engineering	3
CSE	830	Design and Theory of Algorithms	3

Three of the following courses (9 or 10 credits):

CSE	835	Algorithmic Graph Theory	3
CSE	860	Foundations of Computing	3
MTH	299	Transitions	4
MTH	416	Introduction to Algebraic Coding	3
MTH	417	Topics in Number Theory	3
MTH	880	Combinatorics I	3
MTH	882	Combinatorics II	3

Effective Fall 2024.

3. Request to change the requirements in the **Minor in Computer Science** in the Department of Computer Science and Engineering.

- a. Under the heading **Requirements for the Minor in Computer Science** make the following changes:

- (1) In item 1., add the following course:

CSE	300	Social, Ethical, and Professional Issues in Computing	1
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- (2) In item 1., change the total credits from '12' to '13'.

- (3) In item 2 add the following courses:

CSE	380	Information Management and the Cloud	3
CSE	434	Autonomous Vehicles	3

Effective Fall 2024.

COLLEGE OF NATURAL SCIENCE

1. Request to change the requirements for the **Bachelor of Science** degree in **Environmental Biology/Zoology** in the Department of Integrative Biology.
 - a. Under the heading **Requirements for the Bachelor of Science Degree in Environmental Biology/Zoology** make the following changes:

- (1) In item 1., replace paragraph two with the following:

The University's Tier II writing requirement for the Environmental Biology/Zoology major is met by completing both of the following courses: Zoology 355L and 445. Those courses are referenced in item 3. below.

- (2) Replace item 3. d. with the following:

One of the following groups of courses (8 or 10 credits):

(1)	PHY	221	Studio Physics for Life Scientists I	4
	PHY	222	Studio Physics for Life Scientists II	4
(2)	PHY	231	Introductory Physics I	3
	PHY	232	Introductory Physics II	3
	PHY	251	Introductory Physics Laboratory I	1
	PHY	252	Introductory Physics Laboratory II	1
(3)	PHY	183	Physics for Scientists and Engineers I	4
	PHY	184	Physics for Scientists and Engineers II	4
	PHY	191	Physics Laboratory for Scientists, I	1
	PHY	192	Physics Laboratory for Scientists, II	1
(4)	LB	273	Physics I	4
	LB	274	Physics II	4
(5)	PHY	193H	Honors Physics I-Mechanics	4
	PHY	294H	Honors Physics II-Electromagnetism	4
	PHY	191	Physics Laboratory for Scientists, I	1
	PHY	192	Physics Laboratory for Scientists, II	1

- (3) In item 3. g. delete the following courses:

IBIO	306	Invertebrate Biology	4
IBIO	483	Environmental Physiology (W)	4

Add the following courses:

GEO	221	Introduction to Geographic Information	3
GEO	221L	Introduction to Geographic Information Laboratory	1

Replace the note with the following:

Both Geography 221 and 221L must be completed to satisfy this requirement. Forestry 419 may be substituted for GEO 221/221L. Forestry 340 may be substituted for Plant Biology 441.

- (4) Replace item 3. h. with the following:

At least one course from each of the following three groups of courses totaling at least 13 credits:

(1)	FW	471	Ichthyology	4
	IBIO	306	Invertebrate Biology	4
	IBIO	328	Comparative Anatomy and Biology of Vertebrates	4
	IBIO	360	Biology of Birds	4
	IBIO	365	Biology of Mammals	4
	IBIO	384	Biology of Amphibians and Reptiles (W)	4
(2)	PLB	218	Plants of Michigan	3
	PLB	418	Plant Systematics	3

(3)	FW	416	Marine Ecology and Management	3
	FW	420	Stream Ecology	3
	FW	444	Conservation Biology	3
	FW	472	Limnology	3
	GEO	324	Remote Sensing of the Environment	4
	GLG	421	Environmental Geochemistry	4
	IBIO	353	Marine Biology (W)	4
	IBIO	357	Global Change Biology (W)	3
	IBIO	446	Environmental Issues and Public Policy	3
	IBIO	483	Environmental Physiology	3
	IBIO	485	Tropical Biology	3
	PLB	424	Algal Biology	3

Effective Fall 2024.

2. Request to change the requirements for the **Bachelor of Science** degree in **Integrative Biology** in the Department of Integrative Biology.
 - a. Under the heading **Requirements for the Bachelor of Science Degree in Integrative Biology** make the following changes:
 - (1) In item 1., replace paragraph two with the following:

The University's Tier II writing requirement for the Zoology major is met by completing both of the following courses: Zoology 355L and 445. Those courses are referenced in item 3. below.
 - (2) Replace item 3. d. with the following:

One of the following groups of courses (8 or 10 credits):

(1)	PHY	221	Studio Physics for Life Scientists I	4
	PHY	222	Studio Physics for Life Scientists II	4
(2)	PHY	231	Introductory Physics I	3
	PHY	232	Introductory Physics II	3
	PHY	251	Introductory Physics Laboratory I	1
	PHY	252	Introductory Physics Laboratory II	1
(3)	PHY	183	Physics for Scientists and Engineers I	4
	PHY	184	Physics for Scientists and Engineers II	4
	PHY	191	Physics Laboratory for Scientists, I	1
	PHY	192	Physics Laboratory for Scientists, II	1
(4)	LB	273	Physics I	4
	LB	274	Physics II	4
(5)	PHY	193H	Honors Physics I-Mechanics	4
	PHY	294H	Honors Physics II-Electromagnetism	4
	PHY	191	Physics Laboratory for Scientists, I	1
	PHY	192	Physics Laboratory for Scientists, II	1
 - (3) In item 3. j. delete the following course:

IBIO	483	Environmental Physiology (W)	4
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Add the following course:

IBIO	483	Environmental Physiology	3
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Effective Fall 2024.

3. Request to change the requirements for the **Bachelor of Arts** degree in **Zoology** in the Department of Integrative Biology.

a. Under the heading **Requirements for the Bachelor of Arts Degree in Zoology** make the following changes:

(1) In item 1., replace paragraph two with the following:

The University's Tier II writing requirement for the Zoology major is met by completing both of the following courses: Zoology 355L and 445. Those courses are referenced in item 3. below.

(2) In item 3. d., add the following course:

PHY	221	Studio Physics for Life Scientists I	4
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(3) In item 3. i. (1) **Writing**, delete the following course:

WRA	341	Nature, Environmental, and Travel Writing	3
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(4) In item 3. i. (2) **Communications**, delete the following courses:

CSUS	325	Study and Practice of Communication for Sustainability (W)	3
FW	435	Integrated Communications for the Fisheries and Wildlife Professional	3

(5) In item 3. i. (3) **Computer Systems**, delete the following courses:

CSE	101	Computing Concepts and Competencies	3
CSE	201	Fundamentals of Information Technology	3
NSC	204	Introduction to Computational Modeling	4

Add the following course:

CMSE	201	Computational Modeling and Data Analysis I	4
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Effective Fall 2024.

4. Request to change the requirements for the **Bachelor of Science** degree in **Zoology** in the Department of Integrative Biology.

The concentrations in the Bachelor of Science degree in Zoology are noted on the student's academic record when the requirements for the degree have been completed.

a. Under the heading **Requirements for the Bachelor of Science Degree in Zoology** make the following changes:

(1) Replace item 3. d. with the following:

One of the following groups of courses (8 or 10 credits):

(1)	PHY	221	Studio Physics for Life Scientists I	4
	PHY	222	Studio Physics for Life Scientists II	4
(2)	PHY	231	Introductory Physics I	3
	PHY	232	Introductory Physics II	3
	PHY	251	Introductory Physics Laboratory I	1
	PHY	252	Introductory Physics Laboratory II	1
(3)	PHY	183	Physics for Scientists and Engineers I	4
	PHY	184	Physics for Scientists and Engineers II	4
(4)	LB	273	Physics I	4
	LB	274	Physics II	4

(5)	PHY	193H	Honors Physics I-Mechanics	4
	PHY	294H	Honors Physics II-Electromagnetism	4
	PHY	191	Physics Laboratory for Scientists, I	1
	PHY	192	Physics Laboratory for Scientists, II	1

(2) In item 3. g. **Animal Behavior and Neurobiology** concentration, make the following changes:

(a) In item (2), delete the following course:

IBIO	402	Neurobiology	3
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Add the following course:

IBIO	300	Neurobiology	3
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(b) Replace item (3) with the following:

One of the following, either (a) or (b) (4 or 8 credits):

(a) One of the following courses (4 credits):

IBIO	306	Invertebrate Biology	4
IBIO	328	Comparative Anatomy and Biology of Vertebrates	4

(b) Two of the following courses (8 credits):

FW	471	Ichthyology	4
IBIO	360	Biology of Birds	4
IBIO	365	Biology of Mammals	4
IBIO	384	Biology of Amphibians and Reptiles (W)	4

(c) In item (4) delete the following courses:

ANS	405	Endocrinology of Reproduction	4
FW	419	Applications of Geographic Information Systems to Natural Resource Management	4
GEO	324	Remote Sensing of the Environment	4
GEO	325	Geographic Information Systems	3
IBIO	483	Environmental Physiology (W)	4
PSY	402	Sensation and Perception (W)	3

Add the following courses:

FW	419	Applications of Geographic Information Systems to Natural Resource Management	4
IBIO	483	Environmental Physiology	3
NEU	310	Psychology and Biology of Human Sexuality	3
NEU	416	Development of the Nervous System Through the Lifespan	3

(3) Delete the **Cell and Developmental Biology** concentration.

Students currently enrolled in the major have until US28 to complete the requirements for this concentration and have it noted on the student's academic record.

(4) In item 3. g. **Ecology, Evolution, and Organismal Biology** concentration make the following changes:

(a) Replace item (2) with the following:

Two of the following courses (8 credits):

FW	471	Ichthyology	4
IBIO	306	Invertebrate Biology	4

IBIO	328	Comparative Anatomy and Biology of Vertebrates	4
IBIO	360	Biology of Birds	4
IBIO	365	Biology of Mammals	4
IBIO	384	Biology of Amphibians and Reptiles (W)	4

(b) In item (3) delete the following courses:

IBIO	316	General Parasitology	3
IBIO	483	Environmental Physiology (W)	4

Add the following course:

IBIO	483	Environmental Physiology	3
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(c) In item (4) delete the following courses:

GEO	324	Remote Sensing of the Environment	4
GEO	325	Geographic Information Systems	3

(5) Delete the **Genetics** concentration.

Students currently enrolled in the major have until US28 to complete the requirements for this concentration and have it noted on the student's academic record.

(6) Delete the **General Zoology** concentration.

Students currently enrolled in the major have until US28 to complete the requirements for this concentration and have it noted on the student's academic record.

(7) In item 3. g. **Marine Biology** concentration, make the following changes:

(a) In item (1) change the total credits from '23' to '21'.

(b) In item (1) delete the following courses:

IBIO	303	Oceanography	4
IBIO	483	Environmental Physiology (W)	4

Add the following courses:

GLG	303	Oceanography	3
IBIO	483	Environmental Physiology	3

(c) Replace item (2) with the following:

One course from each of the following groups of courses (7 or 8 credits):

(a)	FW	471	Ichthyology	4
	IBIO	306	Invertebrate Biology	4
	IBIO	360	Biology of Birds	4
	IBIO	365	Biology of Mammals	4
	IBIO	384	Biology of Amphibians and Reptiles (W)	4
(b)	BMB	401	Comprehensive Biochemistry	4
	CEM	383	Introductory Physical Chemistry I	3
	FW	416	Marine Ecology and Management	3
	FW	424	Wildlife Population Analysis and Management	3
	GEO	221	Introduction to Geographic Information	3
	And			
	GEO	221L	Introduction to Geographic Information Laboratory	1
	IBIO	357	Global Change Biology (W)	3
	MMG	425	Microbial Ecology	3

Both GEO 221 and 221L must be completed to satisfy this requirement.

(d) In item (3) delete the following courses:

ENT	469	Biomonitoring of Streams and Rivers	3
IBIO	440	Field Ecology and Evolution	4
PLB	424	Algal Biology	4

Add the following course:

PLB	424	Algal Biology	3
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(8) Replace the **Zoo and Aquarium Science** concentration with the following:

(1) All of the following courses (25 credits):

IBIO	313	Animal Behavior	3
IBIO	341	Fundamental Genetics	4
IBIO	355	Ecology	3
IBIO	355L	Ecology Laboratory (W)	1
IBIO	369	Zoo Animal Biology and Conservation	3
IBIO	369	Introduction to Zoo and Aquarium Science	3
IBIO	445	Evolution (W)	3
IBIO	489	Seminar in Zoo and Aquarium Science	1
IBIO	498	Internship in Zoo and Aquarium Science	4

(2) Two of the following courses (8 credits):

FW	471	Ichthyology	4
IBIO	306	Invertebrate Biology	4
IBIO	328	Comparative Anatomy and Biology of Vertebrates	4
IBIO	360	Biology of Birds	4
IBIO	365	Biology of Mammals	4
IBIO	384	Biology of Amphibians and Reptiles (W)	4

(3) Three additional courses of at least 3 credits selected from a list of approved courses that is available from the Department of Integrative Biology.

(4) Integrative Biology courses that are not listed above must be approved in advance by the student's academic advisor. Courses offered by other departments may be substituted if approved in advance by the student's academic advisor.

Effective Fall 2024.

PART II - NEW COURSES AND CHANGES

COLLEGE OF AGRICULTURE AND NATURAL RESOURCES

- CSS 865 Environmental Organic Chemistry
~~Spring of even years. Fall of odd years.~~ 3(3-0) RB: Students with an environmental science background and course training in general or organic chemistry
Fate and transformation of organic contaminants in the environment
Effective Fall Semester 2025
- CSS 880 Scientific Communication and Professional Development
~~Spring of every year. Fall of every year.~~ 1(0-2) 2(2-0) RB: Recommended for graduate students in CSS
Interactive professional experiences including grant preproposal preparation and presentation, scientific presentations, mock position interviews, and resume preparation. Career management and pathways, scientific communication, and leadership skills designed to prepare students to become successful professionals in STEM.
~~Request the use of the Pass-No Grade (P-N) system.~~
Effective Fall Semester 2025
- FOR 340L Forest Ecology Laboratory
Fall of every year. ~~1(0-3)~~ 2(0-6) P: ((CSS 210) and completion of Tier I writing requirement) and (FOR 340 or concurrently) and (PLB 105 or BS 162 or LB 144) RB: IBIO 355
~~Field studies and data analysis of ecological processes central to the sustainable management of forest ecosystems. Field exercises cover primary production, community structure, soil resources, biodiversity, succession, nutrient cycling, critiques of primary literature. Weekend field trips required.~~ Field studies and data analysis of ecological processes central to the sustainable management of forest ecosystems. Field exercises cover primary production, community structure, soil resources, biodiversity, succession, nutrient cycling, critiques of primary literature. Pre-semester field camp required.
SA: FOR 404L
Effective Fall Semester 2023

COLLEGE OF ENGINEERING

- CE 840 Introduction to Transportation Engineering
Fall of every year. Spring of every year. 3(3-0) A student may earn a maximum of 3 credits in all enrollments for this course. R: Open to graduate students in the College of Engineering or in the Department of Civil and Environmental Engineering or in the Civil Engineering Major. A student may earn a maximum of 3 credits Not open to students with credit in CE 341.
- NEW Introduction to transportation engineering, including: transportation planning, traffic engineering, geometric design, traffic flow and highway capacity, queuing theory, traffic control, and highway safety
Effective Fall Semester 2024
- CSE 380 Information Management and the Cloud
Fall of every year. Spring of every year. 3(3-0) P: CSE 232 R: Open to students in the College of Engineering or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major.
- NEW Introduction to information management and cloud computing
Effective Fall Semester 2024

- CSE 415 Introduction to Parallel Computing
Spring of every year.3(3-0)-P: (CSE 320 or ECE 331) and (MTH 314 or ECE 280) and CSE 331 P: (MTH 314 or MTH 317H or ECE 280) and CSE 331 R: Open to juniors or seniors in the College of Engineering or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Data Science Major. Not open to students with credit in CMSE 401.
Principles and techniques of parallel computing including architectures, programming models, and algorithm design.
Effective Fall Semester 2024
- CSE 425 Introduction to Computer Security
~~Fall of every year.~~ Spring of every year. Spring of every year.3(3-0)-P: CSE 325 P: CSE 325 and CSE 380 R: Open to juniors or seniors in the College of Engineering or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major.
Theory and practice of computer security engineering.
Effective Fall Semester 2025
- CSE 476 Mobile Application Development
Spring of every year.3(3-0)-P: CSE 320 or CSE 331 or CSE 335 P: CSE 380 R: Open to juniors or seniors in the College of Engineering or in the Computer Science Minor or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major.
Software development techniques for mobile devices such as smart phones and tablet computers.
Effective Fall Semester 2025
- CSE 477 Web Application Architecture and Development
Spring of every year.3(3-0)-P: CSE 320 or CSE 331 or CSE 335 P: CSE 380 R: Open to juniors or seniors in the College of Engineering or in the Computer Science Minor or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major.
~~Fundamentals of World Wide Web (WWW) programming, including protocols, client-server interaction, markup languages, client and server side programming, databases, and remote procedure calls. Development of a WWW server and WWW sites with browser-based interfaces to remote databases. Students will incorporate scaling, throughput, and latency considerations in the development of widely distributed systems.~~ Fundamentals of World Wide Web (WWW) programming, including protocols, client-server interaction, markup languages, client- and server-side programming, databases, and remote procedure calls. Development of a WWW server and WWW sites with browser-based interfaces to remote databases.
Effective Fall Semester 2025
- CSE 480 Database Systems
Spring of every year.3(3-0)-P: CSE 331 or CSE 335 P: CSE 380 R: Open to juniors or seniors in the College of Engineering or in the Computer Science Minor or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Data Science Major.
Principles and technologies for database systems, algorithms, languages, and applications.
SA: CPS 480
Effective Fall Semester 2025
- CSE 482 Big Data Analysis
Spring of every year.3(3-0)-P: (CSE 331) and (STT 351 or STT 380 or STT 430 or STT 441) and MTH 314 and (MTH 234 or MTH 254H or LB 220) P: (CSE 331 and CSE 380) and (STT 351 or STT 380 or STT 430 or STT 441) and (MTH 314 or MTH 317H) and (MTH 234 or MTH 254H or LB 220) R: Open to juniors or seniors in the College of Engineering or in the Lyman Briggs Computer Science Coordinate Major or in the Lyman Briggs Computer Science Major or in the Data Science Major.
Principles and techniques for large-scale data analysis and applications.
Effective Fall Semester 2025

CSE 493	Selected Topics in Computing Fall of every year. Spring of every year. 1 to 4 credits. A student may earn a maximum of 9 credit in all enrollments for this course. R: Approval of department; application required.
NEW	Topics selected to supplement and enrich existing courses and lead to the development of new courses. Effective Fall Semester 2024
CSE 494	Independent Study in Data Science Fall of every year. Spring of every year. Summer of every year. 1 to 3 credits. Interdepartmental with Computational Mathematics, Science, & Engineering, Computational Mathematics, Science, & Engineering, Computational Mathematics, Science, & Engineering, Computational Mathematics, Science, & Engineering A student may earn a maximum of 3 credit in all enrollments for this course. R: Open to students in the Computational Data Science Major or in the Computer Engineering Major or in the Computer Science Major or in the Data Science Major. Approval of department; application required.
NEW	Supervised individual study in an area of Data Science Effective Fall Semester 2024
CSE 498	Collaborative Design (W) Fall of every year. Spring of every year. 4(2-4) P: (CSE 402 or CSE 415 or CSE 422 or CSE 431 or CSE 440 or CSE 450 or CSE 471 or CSE 476 or CSE 477 or CSE 482) and (CSE 402 or CSE 420 or CSE 425 or CSE 435 or CSE 440 or CSE 460 or CSE 472 or CSE 477 or CSE 480 or CSE 482) and ((CSE 300 and CSE 325 and CSE 335) and completion of Tier I writing requirement) P: (CSE 402 or CSE 415 or CSE 422 or CSE 431 or CSE 440 or CSE 450 or CSE 471 or CSE 476 or CSE 477 or CSE 482) and (CSE 402 or CSE 420 or CSE 425 or CSE 435 or CSE 440 or CSE 460 or CSE 472 or CSE 477 or CSE 480 or CSE 482) and ((CSE 300 and CSE 325 and CSE 335 and CSE 380) and completion of Tier I writing requirement) R: Open to students in the Computer Science Major or in the Lyman Briggs Computer Science Coordinate Major. Development of a comprehensive software and/or hardware solution to a problem in a team setting with emphasis on working with a client. Participation in a design cycle including specification, design, implementation, testing, maintenance, and documentation. Issues of professionalism, ethics, and communication. Students may be asked to sign a non-disclosure agreement ("NDA") or an assignment of intellectual property rights ("IP Assignment") to work with some project sponsors. SA: CSE 449, CSE 478, CSE 479 Effective Fall Semester 2025

COLLEGE OF NATURAL SCIENCE

ISE 800	Problems in Science or Mathematics for Teachers Fall of every year. Spring of every year. Summer of every year. 1 to 5 credits. A student may earn a maximum of 15 credit in all enrollments for this course. RB: Secondary certification in biological sciences, physical sciences or chemistry; secondary certification in Mathematics or Mathematics Education. R: Approval of college.
REINSTATEMENT	Supervised study of problems or issues in biological science, or physical sciences, or mathematical sciences. SA: NSC 800, SME 800 Effective Fall Semester 2024