Summer 2024 Potential Tech Electives

> By utilizing this list, I acknowledge that:
> - This list is *not* all-inclusive.
> - Just because I *can* take a class, does not mean I *should* take a class.
> - I am responsible for ensuring I meet pre-requisites.
>   - Pre-reqs are enforced by the department offering the course.
> - Class schedules and offerings may change; classes may not be available when I register.

AGRON 3420: World Food Issues: Past and Present:
(Cross-listed with ENV S, FS HN). (3-0) Cr. 3. F.S.SS.
Prereq: Junior classification
Issues associated with global agricultural and food systems including ethical, social, economic, environmental, and policy contexts. Investigation of various causes and consequences of overnutrition/undernutrition, global health, poverty, hunger, access, and distribution.
Meets International Perspectives Requirement.

C E 3320: Structural Analysis I
(2-2) Cr. 3. F.S.
Prereq: E M 3240
Loads, shear, moment, and deflected shape diagrams for beams and framed structures. Deformation calculations. Approximate methods. Application of consistent deformation methods to continuous beams and frames. Application of displacement or slope deflection methods to continuous beams and frames without sway. Influence lines for determinate and indeterminate structures. Computer applications to analyze beams and frames. Validation of computer results.

CON E 3800: Engineering Law
(3-0) Cr. 3. F.S.
Prereq: Junior classification
Introduction to law and judicial procedure as they relate to the practicing engineer. Contracts, professional liability, professional ethics, licensing, bidding procedures, intellectual property, products liability, risk analysis. Emphasis on development of critical thinking process, abstract problem analysis and evaluation.

DSN S 5460: Interdisciplinary Design Studio
(0-12) Cr. 4-6. Repeatable, maximum of 18 credits. *NOTE: 3 credits max for M E Tech Elective Credit* *Prereq: Graduate or senior standing in the College of Design and permission of instructor*
Advanced interdisciplinary design projects.

E E 3110: Electromagnetic Fields and Waves
(4-0) Cr. 4. F.S.
Prereq: E E 2010, MATH 2650, PHYS 2320, credit or enrollment in MATH 2670
Fundamentals and applications of electric and magnetic fields and materials. Electrostatics and magentostatics, potentials, capacitance and inductance, energy, force, torque. Uniform plane electromagnetic waves, Poynting vector. Transmission lines: transient and sinusoidal steady-state conditions, reflection coefficient.

ENGR 3960: Summer Internship
Cr. R. Repeatable. SS.
Prereq: Permission of Engineering Career Services
Professional work period of at least 10 weeks during the summer. Students must register for the course prior to commencing work. Offered on a satisfactory-fail basis only.

FIN 3710: Real Estate Principles
(3-0) Cr. 3. SS.
Prereq: ECON 1010

Legal, economic, social and financial aspects of real estate, including property rights, contracts, mortgage instruments, tax factors, brokerage, valuation, risk and return analysis, financing techniques, and investments.

I E 3050: Engineering Economic Analysis

(3-0) Cr. 3. F.S.SS.
Prereq: MATH 1660
Economic analysis of engineering decisions under uncertainty. Financial engineering basics including time value of money, cash flow estimation, and asset evaluation. Make versus buy decisions. Comparison of project alternatives accounting for taxation, depreciation, inflation, and risk.

I E 4520: Introduction To Systems Engineering And Analysis

(Cross-listed with AER E). Cr. 3. SS.
Prereq: Junior classification in an Engineering major
Principles of systems engineering to include problem statement formulation, stakeholder analysis, requirements definition, system architecture and concept generation, system integration and interface management, verification and validation, and system commissioning and decommissioning operations. Introduction to discrete event simulation processes. Students will work in groups to propose, research, and present findings for a systems engineering topic of current relevance.

IND D 5300: Design Thinking

(3-0) Cr. 3.
Prereq: Senior or graduate standing in any ISU program
Exploration of design thinking process, toolkits, and mindsets as creative problem solving approaches for systems, products, and processes, across diverse contexts. Strategies for problem-framing, creative solutions and co-evolution process, with a focus on collaborative and interdisciplinary design to investigate real-world problems and opportunities.

KIN 3550: Biomechanics

(3-0) Cr. 3. F.S.SS.
Prereq: PHYS 1110 or PHYS 1150
Mechanical basis of human performance; application of mechanical principles to exercise, sport and other physical activities.

MGMT 3710: Organizational Behavior

(3-0) Cr. 3. F.S.
Prereq: Sophomore classification
The study of individual attributes, interpersonal relations, and employee attitudes in organizations. Instructional emphasis is placed on how management concepts such as reward systems, job design, leadership, teams, etc., can be used to manage employee attitudes and behavior.

MGMT 3720: Responsible Management and Leadership in Business

(3-0) Cr. 3. F.S.
Prereq: PHIL 2300; Restricted to undergrads Sophomore and above classification
Professional responsibilities of executives in terms of personal conduct and individual integrity, executive leadership style and values, formal organizational ethics policies, board and chief executive leadership roles, governance reform and ethics, corporate social responsibility, stakeholder management, strategies for sustainable development, pursuit of societal and corporate goals, and the manager as architect of corporate values and culture.

MIS 3010: Management Information Systems

(3-0) Cr. 3.
Prereq: COM S 1130; Restricted to undergrads Sophomore and above classification
The role of information technology in organizations. Overview of methodologies for design and development of systems including decision support systems, expert systems, data bases, end-user computing, etc. Computer applications relate concepts to practice. Lecture and laboratory work emphasizes the enabling role of IT in contemporary organizations.

MKT 3400: Principles of Marketing

(3-0) Cr. 3. F.S.SS.

Prereq: credit or current enrollment in ECON 1010

The role of marketing in society. Markets, marketing institutions, and marketing functions with emphases on product, price, marketing communication, and marketing channel decisions.

MATH 2070: Matrices and Linear Algebra

(3-0) Cr. 3. F.S.SS.

Prereq: 2 semesters of calculus

Systems of linear equations, determinants, vector spaces, linear transformations, orthogonality, least-squares methods, eigenvalues and eigenvectors. Emphasis on applications and techniques. Only one of MATH 207 and MATH 317 may be counted toward graduation.

MATH 3980: Cooperative Education

Cr. R. Repeatable, maximum of 2 times. F.S.SS.

Prereq: Junior classification; Permission of Department Cooperative Education Coordinator

Required of all cooperative education students. Students must register for this course prior to commencing each work period.

MATH 4140: Analysis I

(3-0) Cr. 3. F.S.SS.

Prereq: Minimum of C- in MATH 2010 or COM S 2300 or CPR E 3100

A rigorous development of calculus of functions of one real variable: real number properties and topology, limits, continuity, differentiation, integration, series.

MICRO 3020: Biology of Microorganisms

(3-0) Cr. 3. F.S.SS.

Prereq: BIOL 2110, credit or enrollment in BIOL 2120; 1 semester of chemistry

Basic cell biology, physiology, metabolism, genetics and ecology of microorganisms, with an emphasis on prokaryotes and viruses, as well as the roles of microorganisms in the environment, disease, agriculture, and industry.

SCM 3010: Supply Chain Management

(3-0) Cr. 3.

Prereq: ECON 1010 and STAT 2260

Various supply chain activities and integration of supply chain management with supply and demand, both within and between firms. Exposure to a wide range of supply chain management terminology, analytical tools, and theories related to four key elements of supply chain management: purchasing, operations, distribution, and integration. Specific topics include strategic sourcing, supply management, demand forecasting, resource planning, inventory management, process management, logistics, location analysis, process integration, and performance measurement.

S E 3170: Introduction to Software Testing

Cr. 3.

Prereq: COM S 2300 or CPR E 3100; COM S 3090; ENGL 2500; SP CM 2120.

Basic principles and techniques for software testing. Test requirements and management. Test design techniques, evaluation metrics, model-based testing, unit testing, system and integration testing. Software testing tools and programming projects.

STAT 5870: Statistical Methods for Research Workers

(3-2) Cr. 4. F.S.SS.

Prereq: An applied statistics course at the undergraduate level, such as STAT 1010, 1040, 1050, 2010, or 2260. Students without an equivalent course should contact the department.

A first course in statistics for graduate students from the applied sciences. Principles of data analysis and scientific inference, including estimation, hypothesis testing, and the construction of interval estimates. Statistical concepts and models, including group comparison, blocking, and linear regression. Different sections are designed for

students in various disciplines, and additional methods covered may depend on the target audience. Topics covered may include basic experimental designs and analysis of variance for those designs, analysis of categorical data, logistic and log-linear regression, likelihood-based inference, and the use of simulation. Equivalent to STAT 401 in previous catalogs. May not be used for graduate credit in the Statistics MS and PhD degree programs. Credit in STAT 4010 or STAT 5870, but not both, may be applied toward graduation.