Course Catalogue Purdue
Spring 2023

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About the Hoosier STEM Academy
The Hoosier STEM Academy is a partnership among Ball State University, IUPUI, and Purdue University to provide graduate-level STEM courses for current Indiana STEM teachers who wish to be credentialed to teach dual credit courses. Courses are designed specifically to meet the needs of Indiana high school teachers, including courses that use online, blended, and/or distance education instructional designs, as well as traditional face-to-face options. STEM teachers who wish to participate must currently teach in underserved Indiana school corporations and Indiana schools experiencing a shortage of qualified STEM teachers. Participants will also be invited to participate in the Hoosier STEM Academy Mentoring Conference. Upon completion of a course with a grade of C or higher, participants will receive a $1,375 stipend to help cover the cost of tuition, fees, and/or materials.

The Hoosier STEM Academy is now launching the Spring 2021 course catalog. Instructions for how to apply and register for courses at each of the partner institutions follow the list of offerings. Be sure to read carefully as each campus may have slightly different procedures at this time. Participants may take up to two courses per semester, but may only take a total of 15 hours over the four program semesters. Because graduate courses are challenging, it is suggested that participants take only one course per semester during the academic year.

Note: Any participant who registers for a course through the Hoosier STEM Academy is responsible for checking with their dual credit provider institution that the course will count toward the dual credit credentials.

Application Process

1. For those wanting to complete a course or courses at the post-baccalaureate, non-degree status:
   A. Complete the Graduate School online admission application at www.purdue.edu/gradschool/admissions/how/index.html
   B. There is no application fee for non-degree applicants.
   C. Some form of paperwork showing that you have a bachelor’s degree; e.g., copy of teacher’s license, diploma, or official transcripts, is required via the application.
   D. Once you are admitted by the Graduate School and view your admission letter, you will be sent instructions by email for setting up your myPurdue account (https://mypurdue.purdue.edu) in order to register for classes.

For those wanting to complete for a graduate degree:
A. Complete the Graduate School online admission application at www.purdue.edu/gradschool/admissions/how/index.html. View Degrees and Programs on the Office of Graduate Studies web site at http://www.education.purdue.edu/gradoffice/
B. Pay the $60.00 application fee.

C. Required application documents:
   i. official GRE test scores (less than 5 years old) **IF** bachelor’s or master’s overall GPA at time of graduation is below 3.0/4.0
   ii. Official transcripts of grades from all universities attended
   iii. Statement of purpose
   iv. Three letters of recommendation

D. Once you are admitted officially by the Graduate School and view your online admission decision letter, you will be sent instructions by email for setting up your myPurdue account (https://mypurdue.purdue.edu) in order to register for classes. Your registration PIN is 999999 for any session. Complete a Course Request Form 23 (available in Beering 3229) for any courses that are variable credit or require instructor permission to register. Return the form to Beering 3229.

For those who have already been admitted into the College of Education as a post-baccalaureate, non-degree graduate student and have taken a course or courses within the past three sessions, do not submit another application:
   A. Access your myPurdue account (https://mypurdue.purdue.edu) to register for classes. Your registration PIN is 999999. Complete a Course Request Form 23 (available in Beering 3229) for any courses that are variable credit or require instructor permission to register. Return the form to Beering 3229.
   B. Please note up to twelve hours taken at this status may be considered for an advanced degree (subject to approval by your major professor, committee, department, and university).

Beering Hall of Liberal Arts and Education, Room 3229 100 North University Street, West Lafayette, IN 47907-2098
education-gradoffice@purdue.edu; (765) 494-2345, Fax (765) 494-0587
http://www.education.purdue.edu/gr

Questions
Please contact Kizmin M. Jones with questions: kmjones4@bsu.edu.
### CRN  SUBJECT  COURSE  SECTION  CAMPUS  CREDITS  TITLE  DAYS  TIME  ATTRIBUTE

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### CS 50023 - Data Engineering I
Credit Hours: 1.00. The course introduces students to the fundamentals of Data Engineering with a focus on tools and computational techniques to gather, construct, manipulate, summarize, and visualize data sets as a means to extract knowledge from the underlying data. Python and Python libraries are used. Completion of the course will allow learners to perform basic data analysis on data sets. Experience in Python Programming and Linear Algebra is required. The course also prepares learners for additional instruction in the courses Data Engineering II and Foundations of Decision Making. Typically offered Fall Spring Summer. 1.000 Credit hours

### CS 50024 - Data Engineering II
Credit Hours: 1.00. This course introduces students to the fundamentals of database management systems (DBMS) from a user's perspective. The principles of modeling an enterprise using Entity-Relationship diagrams and transforming the model into a relational or NoSQL database are illustrated through a range of examples. The SQL language is used to create, query, aggregate, and update a relational database. NoSQL databases and the related data models (column, graph, and document-based) are introduced. Experience in Python Programming is required. Typically offered Fall Spring Summer. 1.000 Credit hours

### CS 50025 - Foundations of Decision Making
Credit Hours: 1.00. This course provides an overview of data science methods used for data-driven discovery, extraction of knowledge, and informed decision making. The course covers fundamental computational methods and statistical techniques used to correctly reason about uncertainty, conduct hypothesis tests, infer causal relationships, and apply and evaluate
predictive models. The course highlights how sampling biases can impact fairness in decision making. Throughout, students get hands-on experience on how to make correct and explainable inferences from data. Experience in Python Programming, Probability, Statistics and Linear Algebra is required. Typically offered Fall Spring Summer.

1.000 Credit hours

**CS 59000 – Foundations of CS**
Credit Hours: 1.00 to 5.00. Directed study for students who wish to undertake individual reading and study on approved topics. Permission of instructor required. Typically offered Fall Spring.

0.000 TO 5.000 Credit hours

**CS 59000 – Topics In Computer Sciences**
Credit Hours: 1.00 to 5.00 credits. Directed study for students who wish to undertake individual reading and study on approved topics. Permission of instructor required. Typically offered Fall Spring.

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**Earth, Atmospheric, and Planetary Sciences**

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**EAPS 43200 – Synoptic Laboratory II**
Credit Hours: 3.00. Specialized study offered on an individual basis or through specially arranged courses. Permission of instructor required. Typically offered Fall Spring Summer.

3.0 Credit hours

**EAPS 59100 – Advanced Topics In Earth And Atmospheric Sciences**
Credit Hours: 0-18. Specialized study offered on an individual basis or through specially arranged courses. Permission of instructor required. Typically offered Fall Spring Summer.

0-18 Credit hours

**Engineering Education**

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**ENE 50600 – Content, Assessment and Pedagogy: An Integrated Engineering Design Approach**

Credit Hours: 3.00. The course is explicitly identified in the ENE-PhD requirements as a "foundation course" required for all students. This course is intended to be taken early in a graduate student's curriculum and therefore is designed to be a bridge between the student's previous experience with engineering (education, work, and teaching) and new engineering education research-based approaches. It is intended as an entryway to help students apply an engineering design approach to the design of instruction. To meet this aim, the course involves an iterative project-based approach in a context (design site) that is chosen by the student for its relevance, interest and potential application. Typically offered Spring.

3.000 Credit hours

**ENE 68700 – Mentored Teaching In Engineering**

Credit Hours: 1.00-3.00. Mentored experience in the teaching of engineering, with structured opportunities for individual reflection. All students create a scholarly teaching portfolio. Students who register for three credits conduct a scholarship of teaching and learning project. Prerequisites: Significant concurrent responsibility for teaching an engineering course. Registration in or completion of ENE 50600 (Content, Assessment And Pedagogy) or ENE 68500 (Educational Methods In Engineering); or instructor permission required. Typically offered Fall Spring.

1.000 OR 3.000 Credit hours

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**Mathematics**

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</table>
MA 51100- Linear Algebra with Applications
Credit Hours: 3.00. Real and complex vector spaces; linear transformations; Gram-Schmidt process and projections; least squares; QR and LU factorization; diagonalization, real and complex spectral theorem; Schur triangular form; Jordan canonical form; quadratic forms. Typically offered Summer.
3.000 Credit hours

MA 52700- Advanced Mathematics for Engineers and Physicists I
Credit Hours: 3.00. MA 52700 is not a prerequisite for MA 52800; these courses can be taken independently. Topics in MA 52700 include linear algebra, systems of ordinary differential equations, Laplace transforms, Fourier series and transforms, and partial differential equations. MA 51100 is recommended. Typically offered Fall.

MA 52800- Advanced Mathematics for Engineers and Physicists II
Credit Hours: 3.00. MA 52700 is not a prerequisite for MA 52800; these courses can be taken independently. Topics in MA 52800 include divergence theorem, Stokes theorem, complex variables, contour integration, calculus of residues and applications, conformal mapping, and potential theory. MA 51000 is recommended. Typically offered Spring.
3.000 Credit hours

Statistics

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STAT 50300 - Statistical Methods for Biology
Credit Hours: 3.00. Descriptive statistics; elementary probability; sampling distributions; inference, testing hypotheses, and estimation; normal, binomial, Poisson, hypergeometric distributions; one-way analysis of variance; contingency tables;
regression. For statistics majors and minors, credit should be allowed in no more than one of STAT 30100, STAT 35000, STAT 50100, and in no more than one of STAT 50300 and STAT 51100. Prerequisite: Two semesters of college calculus. Typically offered Fall Spring.

3.000 Credit hours

**STAT 51700 – Statistical Inference**

Credit Hours: 3.00. A basic course in statistical theory covering standard statistical methods and their application. Estimation including unbiased, maximum likelihood and moment estimation; testing hypotheses for standard distributions and contingency tables; confidence intervals and regions; introduction to nonparametric tests and linear regression. Typically offered Fall Spring.

3.000 Credit hours