Riley High School

Informational Technology And Engineering Magnet Program

Riley High School
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South Bend, IN 46613
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Nov. 18, 2004

Home of the Wildcats
Informational Technology And Engineering Magnet Program

RHS
First on the web in 1994

www.cs.iusb.edu
What do Computer Scientists do?

- Solve Problems!
  - Write Programs
  - Design Systems
  - Design Databases
  - Design Computer Networks
  - Consult (Help others solve their problems)
  - Teach
  - Research

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Typical Work Day

For a Programmer:

• Learn about specific programming languages, computer hardware components and operating systems

• Communicate with Systems Analysts and other programmers (work in a team)

• Write, Test and Document programs

• Eat Pizza and Drink Coke….
Typical Work Day

For a Systems Analyst:

- Interview users and **collect facts**
  - Identify and understand their problems
  - Develop solutions for their problems

- **Communicate** with customers and programmers

- **Analyze and Design** computer systems

- Read trade magazines and **keep up with new information**

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Typical Work Day

For a Network and Security Engineer:

- Design Networks
- Trouble-shoot problems
- Prevent security breaches
- Interact with users

Go Wildcats ...
Typical Work Day

For a Professor:

- Preparation for class:
  - Read books, papers, journals
  - Prepare lectures
  - Develop good examples to explain the concepts
  - Grade assignments
  - Create new assignments and tests
- Meet with students (office hours, class and laboratory)
- Meet with other professors and administrators (team work)
- Do research (investigate interesting ideas)
Computer Scientist’s Tools…

• **Computers** (Workstations or powerful PC’s)

• **Programming Languages** (Basic, C++, Java, etc.)

• **A Toolbox Full of Stuff!**
  - Set of pre-fabricated algorithms & data structures
  - Building Blocks for developing systems

• **4GL’s** (Powerful and easy to use tools for designing new applications)

• **CASE Tools** (Computer Aided Software Engineering)

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How Long Do I Have to Study?

**Formal Education:**
- Associate of Science (2 years)
- Bachelor of Science (4 years)
- Master of Science (6 or 7 years)
- Ph.D. (10 or 12 years)

**Informal Education:**
- Attend seminars and conferences
- Study on your own
- Obtain professional certifications

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The Good Life…

- Excellent opportunities for **travel**
- Excellent opportunities for **promotion**
- **Phenomenal job growth** (According to BLS, Information Technology jobs will double in the next 10 years)

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How can I prepare myself?

• Take as many **Computer Science**, **Mathematics**, **Science** and **English** classes as you can before starting college.

• Play as many **video games** as your parents allow you to play, however think about the following:
  • How do graphical objects move on the screen?
  • How do the scenes change so fast?
  • How does the joystick or the game console work?
  • How does the video game keep track of your score?
  • How would you improve the game?

• Improve your **language** and **communication** skills

• Learn to **work in teams** (Learn to lead and to follow)
Mathematics Preparation:

• **Pre-Calculus Honors** (Riley web site)
  
  Pre-Calculus blends together all of the concepts and skills that must be mastered prior to enrollment in a college-level calculus course. A functional approach provides for the integration of all the concepts listed for a course in Trigonometry (trigonometric relationships, circular functions and their properties and graphs, inverse trig functions, trig equations and identities, vectors, Law of Sines and Law of Cosines, applications of trig functions, polar coordinates) plus: relationship of equations and graphs of linear, quadratic, and parametric equations; translations of axes; and locus and vectors. This course includes the theory of equations, exponential and logarithmic functions, matrices, and determinants. This course provides a more in-depth study of Pre-calculus and moves at a faster pace. Much of the second semester will consist of the beginning topics in Calculus.

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Science Preparation:

• AP Physics (Riley web site)

  • This is a laboratory course that provides an important opportunity to apply mathematics through the level of trigonometry. AP Physics I&II will meet the needs of students planning careers in mathematics, science or engineering.

  • PREREQUISITE: Algebra I, Geometry I&II, Intermediate Algebra II/Trigonometry. The latter may be taken concurrently.
  • GRADES 11-12
Science Preparation:

Chemistry 1&2 (H) 4431-4432 (Riley web site)
• This course is designed for the above average science student who has demonstrated outstanding performance in Biology and Algebra 1. Chemistry 1&2 involves both laboratory and non-laboratory work concerning the properties and use of matter, the changes which matter undergoes, and the conditions which influence these changes.
• PREREQUISITE: Algebra 1 and recommendation of science teacher.
• GRADES 10-12

AP Chemistry 3&4 4433-4434 (Riley web site)
• This course is for the above average student who has demonstrated outstanding performance in Chemistry 1&2. The course covers the same topics as Chemistry 3&4 (H) plus additional enrichment topics. Advanced Placement students will investigate topics to a greater depth. Emphasis will be placed on solving problems of greater difficulty.
• PREREQUISITE: Chemistry 1&2 with grades of A or B, and recommendation of chemistry teacher.
• GRADES 11-12
Science Preparation:

Biology: (Riley web site)

- This course is for the above average student who has demonstrated outstanding performance in science. It includes both the concepts of life science and the processes related to them. This course is primarily a laboratory course with emphasis on investigation rather than illustrative work.
- **PREREQUISITE:** 9th graders selecting this course must be reading above grade level and have A or B grades in 8th grade math and science. Students in grades 10-12 must have A or B grades in the last science course they have taken.
- Grades 9-12

AP Biology: (Riley web site)

- This course is for the student who has demonstrated outstanding performance in Biology 1 & 2 (Honors). AP Biology is a continuation of Biology 1 & 2 (Honors) and is designed to help the highly motivated science students.

- **PREREQUISITE:** Biology 1 & 2 (Honors) with grades of B or better and teacher recommendation.
- Grades 11-12

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English Preparation:

**English Literature and Composition College Credit: (1129) (Riley Web Site)**

- English Literature and Composition College Credit is any English course offered for credit by an accredited postsecondary institution through and adjunct agreement with a secondary school, or any other post secondary English course offered for dual credit under the provisions of 511 1AC 22-10.1-22.2-2.6. Writing assignments will be frequent, including weekly in-class essays and periodic fully in class discussions and to make presentations. Students should make use of technological resources both in researching and in producing their papers.

**Speech: (1211-1218) (Riley Web Site)**

- Speech provides the study of and practice into eh basic principles and techniques of effective oral communication. This course includes instruction in adapting speech to different audiences and purposes. Students have opportunities to make different types of oral presentations including: (1) viewpoint, (2) instructional, (3) demonstration, (4) informative, (5) persuasive, and (6) impromptu. Students are given opportunities to express subject matter knowledge and content through creative, analytical, and expository writing, as well as reading a variety of literary genre related to course content and speaking assignments. This course emphasizes research using technology and careful organization and preparation. Students also practice and develop critical listening skills.

[www.cs.iusb.edu](http://www.cs.iusb.edu)
Computer Science Preparation:

C101 - Computer Programming I (4 cr.)
Fundamental concepts of computer programming, algorithm development, and data structuring. The programming language used will be C++. Not open to students who have taken C201.

C151 Multiuser Operating Systems (2 cr.)
Survey of the operating system facilities and commands. Installation and maintenance of operating systems such as Linux. Understanding process management, file systems, memory and virtual memory management issues. Understanding networking and its role in modern computing environment. Operating system security. Writing shell scripts and batch files.

C201 - Computer Programming II (4 cr.)
P: C101. Fundamental forms and concepts of computer science, including top-down design, data structures, structured control flow, modular programming, recursion, and standard algorithms. Programming language concepts will be illustrated with C++.
Computer Applications Preparation:

A106 - Introduction to Computing (3 cr.)
Fundamentals of computer hardware and software; use of packaged programs in areas such as word processing, spreadsheets, database management, communications, graphics; the role and impact of computers in society. Course is designed for people with little or no computer experience. One class per week is spent in the microcomputer teaching laboratory. This course is not intended for computer science majors.

A150 Understanding Operating Systems (1 cr.)
Study of the basic concepts of operating systems, understanding the role of operating systems in providing a virtual machine interface. Understanding the relationship between the hardware and operating system. Survey of the user level operating system facilities and commands. This course is not intended for computer science majors.

A201 - Introduction to Programming I - Visual Basic .Net (4 cr.)
Fundamental programming constructs, including loops, arrays, classes, and files. General problem-solving techniques. Emphasis on modular programming, user-interface design, and developing good programming style. Not intended for computer science majors. (VB or Java). This course is not intended for computer science majors.
Can I get involved with Faculty Projects?

Absolutely…..
Can I get involved with Faculty Projects?
Can I get involved with Faculty Projects?

Computer Graphics

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Can I get involved with Faculty Projects?
Can I get involved with Faculty Projects?

Parallel Processing and Networking
IUSB is the only public institution in the region (60 miles radius) equipped to offer quality undergraduate and graduate programs in computer science, information systems and informatics.

Over 175 undergraduate students majoring in computer science.

Over 50 graduate students in computer science.

Small class sizes (around 20 to 30 students).

9 full time faculty with Ph.D. degrees in computer science or closely related areas.

Curriculum is based on the recommendations of the ACM and IEEE.

Faculty conduct research in artificial intelligence, computer graphics, computer networks, algorithms, software engineering, natural language processing and database systems.

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What is the typical salary?

- The average *income* in the state of Indiana is $28,240
  - State of Indiana web site: [http://www.in.gov/dwd/inews/lmi.asp](http://www.in.gov/dwd/inews/lmi.asp)

- The typical *salary* for our new computer science graduates in the region is approximately $45,000.
Where can I find more information?

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