



**JOHN D. O'BRYANT  
SCHOOL OF  
MATHEMATICS AND  
SCIENCE**

**COURSE DESCRIPTIONS**

# **COMPUTER TECHNOLOGY**

## **C 51 TECHNOLOGY LITERACY**

### **Semester/Half-Year Course**

Technology Literacy is an introductory computer course. It is designed to give all students the skills they need to support their learning in core curriculum areas. This project-based course provides an overview of basic technology skills in a Windows or Mac environment. Microsoft Office, including Word, Excel, and PowerPoint, is the primary instructional software used. In addition, Inspiration, and Internet research techniques will give students the opportunity to apply their skills to their own academic and personal research, personal problem solving, and communication. Students will also develop an understanding of the responsible use of technology and an understanding of ethics and safety issues in the use of electronic media. Students will use these skills to develop unit-based mini-projects as well as one major final project to demonstrate their understanding of the use of technology to support their curriculum work.

## **C61 IT Foundations**

### **Spring 2010 Semester/Half-Year Course/3 Credits from UMass/Boston**

The IT Foundations course will provide students with the skills they need to use computers as an effective information technology tool. The course will provide an introduction to programming and animation and provide instruction in how to resolve numerous technology glitches/issues. No prior technology course is required.

## **C84 Java Programming**

### **Fall 2009 Semester /Half-Year Course/3 Credits from UMass/Boston**

The Java Programming course will provide an introduction to the fundamental concepts of computer programming. This course will provide the basic skills for computational problem solving that are applicable in many modern computing environments. The course is presented in an interdisciplinary manner and emphasizes how computing is used in mathematics, science and engineering. No prior programming experience is required

## **C5C CISCO NETWORK 1**

### **Full-Year Course**

Computer Technology is a growing field and offers numerous opportunities. The Cisco Networking 1 course emphasizes decision-making and problem-solving techniques in the application of science, mathematics, communication and social studies concepts to solve computer-networking problems. Students will learn how to install and configure Cisco switches and routers in multi-protocol networks using local and wide-area networks (LANs and WANs), provide Level 1 troubleshooting service, and improve network performance and security. Additionally, instruction and training are provided in the proper care, maintenance, and use of networking software tools and equipment, as well as all local, state, and federal safety, building, and environmental codes and regulations.

#### **Specific Learning Objectives:**

- Computer hardware and software, electricity, networking terminology, and protocols
- LANs and WANs, Open Systems Interconnection (OSI) model, Ethernet, and Internet Protocol (IP) addressing
- Design and documentation of a basic network and structured cabling
- Network-to-network communications
- Router user interfaces, components and configurations
- Basics of IOS versions, naming and software backup
- TCP/IP Protocol Suite and IP addressing and submitting
- Interior routing protocols—RIP, IGRP

## **Piano 2:**

A more advanced continuation of piano 1 which will include more intricate music reading, understanding of complex rhythms, and playing music that is more involved requiring both hands to play simultaneously. This will bring the student closer to selecting exactly what kind of pianist they would like to be; such as classical, jazz, pop rock etc.

## **Chorus 1:**

This course is designed to train beginning seventh grade students in the art of choral singing. Emphasis is placed on the development of tone production, posture, and articulation, breathing techniques and unison or two part repertoire acquisitions. An introduction to sight singing and music fundamentals will be presented. Attendance at concerts not during school hours may be required which will affect the grade given. Ample notice of such performances will be provided.

## **Chorus 2:**

This course is designed to train beginning and advanced eighth grade students in the art of choral singing. Emphasis is placed on the development of tone production, posture, articulation, breathing techniques and two or three part repertoire acquisition. An introduction to sight singing and music fundamentals will be presented. Attendance at concerts not during school hours may be required which will affect the grade given. Ample notice of such performances will be provided.

## **Music Technology:**

The music technology course is an introduction to computer-based music technology as used in the professional music world. Students will be assigned projects that they will create on industry-standard music software, while learning music fundamentals.

## SCIENCE

### **55I PRINCIPLES OF ENGINEERING**

**Grade 9: – Engineering Pathway Students**

**Prerequisite: Acceptance into the Engineering Pathway Program**

**Full-Year Course**

Principles of Engineering is the first in a sequence of high-school, engineering courses that will prepare students for entry into a university/college engineering program. This *9<sup>th</sup> grade* course is only open to students participating in the Engineering Pathway program. This course will engage students in a series of hands-on, project-based experiences and will be coupled with Physics to form a double-period class. Students will learn Physics concepts and apply them to real-life, engineering projects. Students will be engaged in designing and building the following: robots, model bridges, underwater submersibles, water bottle rockets, science exhibits/artwork, and several digital electronic devices.

### **55A ADVANCED TOPICS IN SCIENCE - ROBOTICS**

**Grade 10 – Engineering Pathway students**

**Prerequisite: Principles of Engineering Course**

**Full-Year Course**

This is the second course in a sequence of high-school, engineering courses that will prepare students for entry into a university/college engineering program. This *10<sup>th</sup> grade* course is currently only open to students participating in the Engineering Pathway program. This course will engage students in the theory and practice of building robots. Students will be engaged in designing and building many different robots and will learn electronics, computer programming in C, and Computer Aided Design skills.

### **55C PRE-ENGINEERING**

**Grade 11 and 12**

This course provides students with an introduction to engineering design principles and exposes students to various engineering career opportunities. Students will design and build numerous projects during the course and will also learn how to use Computer Aided Design (CAD) software.

### **566 BIOLOGY 2**

**Grade: 11 and 12**

**Prerequisite: Biology 1**

This course provides an introduction to the biology of animals, the tissues and organ systems of humans, the theory of evolution and the types and classifications of animals. Students will be prepared to devise controlled multivariable experiments as well as apply biology principals and procedures to real life.

## **567 CHEMISTRY 2**

**Grade: 11 and 12**

**Prerequisite: Chemistry 1**

This is an accelerated course in Chemistry that explores the laws of matter including chemical and physical properties and changes. Matter is further viewed as solutions with densities, acids and bases relative to PH and atomic molecular structure. Relationships existing within the periodic table are used to explain this interaction via types of bonding. Using a variety of instructional tools, students will be prepared to devise controlled experiments as well as to appreciate and apply the principles of chemistry to real life situations.

## **571 ADVANCED PLACEMENT BIOLOGY**

**Grade: 11 and 12**

**Prerequisite: See AP Protocol Sheet**

This course follows the standards set by the College Board for Advanced Placement Biology. It is designed for those students who wish a challenging college level of biology class. Students will cover, in depth, all the major concepts and processes of biology with an emphasis on problem solving strategies and college level experiments. **All students are required to take the AP Exam in May.**

## **572 ADVANCED PLACEMENT CHEMISTRY**

**Grade: 11 and 12**

**Prerequisite: See AP Protocol Sheet**

**Full-Year Course**

This course follows the standards set by the College Boards for Advanced Placement courses. It introduces topics similar to those in a chemistry I college level program. Students are expected to spend extensive time studying in groups and doing extensive lab work. The course aims to provide students with the framework, factual knowledge, and analytical skills necessary to deal critically with the theoretical aspects of chemistry. Students will develop facility in dealing with chemical problems and develop their ability to express their ideas clearly, with clarity and logic.

The course will include the study of atomic theory and atomic structure, chemical bonding, nuclear chemistry, laws of ideal gases, kinetic molecular theory, liquids and solids, solutions, reaction types, stoichiometry, equilibrium, kinetics, thermodynamics and several descriptive aspects of chemistry. **All students must take the AP Exam in May.**

### **573 ADVANCED PLACEMENT PHYSICS B**

**Grade: 11 and 12**

**Prerequisite: See AP Protocol Sheet**

**Full-Year Course**

This course will develop the student's abilities to read, understand, and interpret physical information – verbal, mathematical, and graphical. To describe and explain the sequence of step in the analysis of a particular physical phenomenon or problem; that is, to describe the idealized model to be used in the analysis, including simplifying assumptions where necessary; state the principles or definitions that are applicable; specify relevant limitations on applications of these principles; carry out and describe the steps of the analysis, verbally or mathematically; and interpret the results or conclusions, including discussion of particular cases of special interest. Use basic mathematical reasoning – arithmetic, algebraic, geometric, trigonometric, or calculus, where appropriate – in a physical situation or problem. Perform experiments and interpret the results of observations, including making an assessment of experimental uncertainties.

**All students are required to take the AP Exam in May.**

### **574 ADVANCED PLACEMENT ENVIRONMENTAL SCIENCE**

**Grade: 11 and 12**

**Prerequisite: See AP Protocol Sheet**

The goal of the AP Environmental Science course is to provide students with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world, to identify and analyze environmental problems both natural and human-made, to evaluate the relative risks associated with these problems, and to examine alternative solutions for resolving and/or preventing them.

**All students are required to take the AP Exam in May.**

### **557 ANATOMY&PHYSIOLOGY (formerly Med Tech)**

**Grade: 11 and 12**

**Prerequisite: Biology and Chemistry**

This course applies the principles students learned in biology, health, and chemistry towards the function of the body in normal and abnormal conditions. The course explores the relationship between anatomy and physiology and the disease process.

**This is a laboratory-based course.**

### **55E BOITECHNOLOGY 1**

**Grade 11 and 12**

**Prerequisite: B- or better in Biology and Chemistry**

This course applies the general principles from cell biology and molecular biology to solve problems in the natural world. This course explores the basic relationships between living organisms and their uses. Molecular biology and cell structure will be emphasized.

**This is a laboratory-based course.**