

# DESIGN MODEL MAKING AND RAPID PROTOTYPING

School of Mathematics, Computer Science and Engineering

**Acting Dean:** Dixie Lee Bullock

**Academic Chair:** TBA

**Faculty:** Dennis Campbell, Ivette Chornomud, Andy March, Craig Monroe, Robert Schureman, Leonard Stobar

## CURRICULUM

Rapid model making and prototype design is a valued part of many industries, including transportation, architecture, product and packaging, media, and entertainment. The growth of digital technology has opened up new areas of development in design representation, such as digital simulation and rapid prototyping.

Courses in the program study the elements of creative thinking and interpretation used in the design process, including the techniques and methods used to construct prototypes and models. In advanced courses, students choose a field of specialization to explore methods and materials in a number of options in digital simulation, modeling and rapid prototyping.

## MAJOR

The certificate program is designed to prepare students with the skills necessary for product design with both traditional and emerging technologies. Students will be given a unique insight into both the physical and digital disciplines of design, cultivating technical and art skills based on critical thinking.

## CAREER OPTIONS

Examples of careers for the major include industrial design and model making in the following areas:

- Architecture
- Automotive
- Media and Entertainment
- Product and Packaging

## ASSOCIATE DEGREE

### • Associate in Science Degree in Design Model Making and Rapid Prototyping

Students must complete a minimum of 60 units of credit, including the courses in the major (“Major Requirements”) and general education requirements (pages 36-43), with an overall GPA of 2.0 or better. A minimum of 12 units must be completed at Irvine Valley College. See pages 32-35 for further information.

## CERTIFICATE

### • Certificate of Achievement in Design Model Making and Rapid Prototyping

Students must complete all courses in the certificate program (“Major Requirements”) with a grade of “C” or better. A minimum of 12 units in the certificate program must be completed at Irvine Valley College. See page 33 for further information.

## TRANSFER PREPARATION

Courses that fulfill major requirements for an associate degree at Irvine Valley College may not be the same as those required for completing the major at a transfer institution offering a baccalaureate degree. Students who plan to transfer to a four-year college or university should (1) refer to the University Studies major (page 231) and “Transfer Planning” (page 47); (2) consult the catalog of their prospective transfer institution (see the IVC Transfer Center for assistance); and (3) schedule an appointment with an IVC counselor to develop a plan of study before beginning their program. It may be helpful to meet with the department faculty at IVC.

## MAJOR REQUIREMENTS: DESIGN MODEL MAKING AND RAPID PROTOTYPING Associate in Science Degree or Certificate of Achievement

This program is occupational in nature; the courses in the major are not currently transferable to CSU or UC. Students should consult with their counselors or the Transfer Center to determine the extent to which courses may apply to programs at other four-year institutions.

Complete the following courses:		Units
<b>DMP 200</b>	Introduction to Model Making and Design	1.5
<b>DMP 210</b>	Rapid Visualization	3
<b>DMP 220</b>	Basic Model Making	3
<b>DMP 221</b>	Advanced Model Making I	3
<b>DMP 222</b>	Advanced Model Making II	3
<b>DMP 230</b>	3D Computer Design	3
<b>DMP 240</b>	3D Rapid Model Making and Prototype Development I	3
<b>DMP 241</b>	3D Rapid Model Making and Prototype Development II	3
<b>DMP 260</b>	Modeling and Prototyping Methods and Materials	2
<b>TOTAL UNITS:</b>		<b>24.5</b>

## COURSES

### CWE 168: COOPERATIVE WORK EXPERIENCE: DESIGN MODEL MAKING

**1-4 Units**

**1-4 hours lecture**

**Transfers:** CSU

**Prerequisite:** Student must have taken or must be currently taking a course in college-level design model making.

**Limitation:** Students must be concurrently enrolled in 7 units, including CWE.

Application must be approved by CWE coordinator.

This course provides students an opportunity for supervised work experience. Students extend their classroom-based occupational learning by working at a job related to their major and to their occupational goal. Student, instructor, and employer will cooperatively develop a minimum of three learning objectives. One unit of credit will be awarded for each 75 hours of paid or 60 hours of volunteer employment for successful completion of learning objectives, and for attendance at scheduled seminar sessions. A maximum of four units may be applied toward major requirements or a certificate. R-I-3

### DMP 200: INTRODUCTION TO MODEL MAKING AND DESIGN

**1.5 Units**

**1.5 hours lecture**

This course introduces students to career options within the model-making industry. Onsite studio visits, guest speakers and career guides will give students an overview of the job skills and technologies required in the various disciplines of model making. Areas of interest will include entertainment, product design, packaging, transportation, aerospace, medical design and architecture. The goal of the course is to facilitate each student's career path selection. Field trips may be required. NR

### DMP 210: RAPID VISUALIZATION

**3 Units**

**2 hours lecture, 3 hours lab**

This course introduces the principles of three-dimensional design as they relate to model making. Students work with a variety of materials and techniques, exploring three-dimensional description elements: value, texture, lighting, shade, shadow, composition, and perspective. Emphasis is placed on manual skill and dexterity. The course also introduces the fundamentals and techniques of ideational sketching. NR

### DMP 220: BASIC MODEL MAKING

**3 Units**

**2 hours lecture, 3 hours lab**

This course focuses on developing forms and shapes using a variety of basic model-making materials and hand fabrication techniques, with an emphasis on wood, plastic and metal processes. In addition to modeling with basic materials, students begin to develop skills using quick, visual model-development materials, including foam core, cardboard and clay. NR

### DMP 221: ADVANCED MODEL MAKING I

**3 Units**

**2 hours lecture, 3 hours lab**

**Prerequisite:** DMP 220

This course focuses on more advanced and complex methods used throughout the model-making industry. The course covers thermoforming, reinforced plastics, two-dimensional routing and engraving, and a variety of flexible tooling techniques used to make complex molds and parts. Students learn techniques for working with advanced casting materials, and surface preparation with textures, plating and painting. NR

### DMP 222: ADVANCED MODEL MAKING II

**3 Units**

**2 hours lecture, 3 hours lab**

**Prerequisite:** DMP 221

This course develops skills in using computer-aided design and manufacturing equipment and software to fabricate models. Designs will be created on three-dimensional solid modeling software and transferred to a three-dimensional computer aided manufacturing software for coding and post processing. Students will fabricate parts on a variety of equipment including CNC mills and lathes, laser cutters, and two and three-dimensional rapid modeling equipment. NR

### DMP 230: 3D COMPUTER DESIGN

**3 Units**

**2 hours lecture, 3 hours lab**

A beginning level Computer-Aided Design course that provides basic techniques and applications utilized in the model making industry. Students will learn to create basic 2D drawings and 3D solid models incorporating state of the art PC based software. Graphic creation and control will be learned using a variety of common software. NR

### DMP 240: 3D RAPID MODEL MAKING AND PROTOTYPE DEVELOPMENT I

**3 Units**

**2 hours lecture, 3 hours lab**

**Prerequisite:** DMP 222

In this project development course students fabricate a variety of complex models within their selected discipline using advanced model-making equipment. Students use CNC milling, laser cutting, water jet cutting and 3D machining equipment to fabricate models. Field trips may be required. NR

### DMP 241: 3D RAPID MODEL MAKING AND PROTOTYPE DEVELOPMENT II

**3 Units**

**2 hours lecture, 3 hours lab**

**Prerequisite:** DMP 240

This is an advanced project development course in rapid prototyping. Students program, set up and operate a variety of 3-D modeling machines, including CNC machining and turning centers, water jet cutters, conventional lasers and metal lasers. Students will fabricate a variety of complex high tolerance parts within their selected discipline. Field trips may be required. NR

### DMP 260: MODELING AND PROTOTYPING METHODS AND MATERIALS

**2 Units**

**1 hour lecture, 3 hours lab**

This course introduces the many universal plastic materials and fabrication processes currently used in design and modeling. Emphasis is on the applications, fabrication techniques, and properties of many common plastic materials used today as well as emerging materials and their processes. NR