



8627

DESIGN AND FABRICATION OF
ORTHODONTIC APPLIANCES (11D)

30S/30E/30M

A Dental Technology Course

8627: DESIGN AND FABRICATION OF ORTHODONTIC APPLIANCES (11D) 30S/30E/30M

Course Description

This course focuses on anatomy and the science of dental materials at an advanced level, as well as on the design and fabrication of functional orthodontic appliances, bruxism appliances, bleaching trays, and apnea devices.

Goal 1: Describe and apply appropriate **health and safety** practices as they relate to dental technology.

GLO 1.1: Create and maintain a **safe working environment** in a dental laboratory.

- SLO 11D.1.1.1: Demonstrate safe work procedures related to equipment, tools, and materials associated with the fabrication of orthodontic appliances.
 - SLO 11D.1.1.2: Demonstrate the ability to identify and report potential hazards in the fabrication of orthodontic appliances.
 - SLO 11D.1.1.3: Demonstrate the appropriate use of personal protective equipment (PPE), such as goggles, face masks, vinyl gloves, and laboratory coats.
 - SLO 11D.1.1.4: Demonstrate the ability to identify worn, defective, and expired PPE and safety equipment.
 - SLO 11D.1.1.5: Describe knowledge of safety equipment, such as a fire extinguisher, a first aid kit, and an eyewash station.
 - SLO 11D.1.1.6: Demonstrate the safe use of rotary tools and lathes in the fabrication of orthodontic appliances.
 - SLO 11D.1.1.7: Demonstrate the safe use of sharp tools, such as scalpels and carving instruments.
 - SLO 11D.1.1.8: Demonstrate and use infection-control techniques and apply universal safety precautions to prevent cross-contamination in a laboratory environment.
 - SLO 11D.1.1.9: Demonstrate the safe use of Bunsen burners and alcohol torches.
 - SLO 11D.1.1.10: Discuss workplace health and safety.
 - SLO 11D.1.1.11: Describe *The Workers Compensation Act*.
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Goal 2: Demonstrate the safe and appropriate **operation, cleaning, maintenance, management, handling, and storage** of **equipment, tools, and materials**.

GLO 2.1: Demonstrate the safe and appropriate **operation** of **equipment and tools**.

SLO 11D.2.1.1: Demonstrate safe work procedures and the appropriate operation of equipment and tools associated with the design and fabrication of orthodontic appliances.

GLO 2.2: Demonstrate the safe and appropriate **cleaning, maintenance, and management** of **equipment and tools**.

SLO 11D.2.2.1: Demonstrate the appropriate cleaning, maintenance, and management of equipment and tools associated with the design and fabrication of orthodontic appliances.

GLO 2.3: Demonstrate the safe and appropriate **handling and storage** of restorative dental **materials**.

SLO 11D.2.3.1: Demonstrate the appropriate handling and storage of restorative dental materials associated with the design and fabrication of orthodontic appliances.

Goal 3: Demonstrate an understanding of the **science and characteristics** of various **restorative dental materials**.

GLO 3.1: Demonstrate an understanding of the **science and characteristics** of various **restorative dental materials**.

SLO 11D.3.1.1: Demonstrate an understanding of the physical characteristics and appropriate use of various orthodontic wires, expansion screws, and acrylic materials associated with orthodontic appliances.

SLO 11D.3.1.2: Demonstrate an understanding of the chemical characteristics and appropriate use of various orthodontic wires, expansion screws, and acrylic materials associated with orthodontic appliances.

SLO 11D.3.1.3: Demonstrate an understanding of the mechanical characteristics and appropriate use of various orthodontic wires, expansion screws, and acrylic materials associated with orthodontic appliances.

GLO 3.2: Demonstrate an understanding of **metallurgy and the characteristics of acrylics** used in dental appliances.

- SLO 11D.3.2.1: Demonstrate the handling and manipulation of wires and acrylics used in the design and fabrication of orthodontic appliances.
- SLO 11D.3.2.2: Demonstrate an understanding of heat treatment, annealing, deformation, the molecular and crystalline behaviour of metals, melting points, and the specific gravity of various alloys associated with orthodontic prostheses.
- SLO 11D.3.2.3: Demonstrate an understanding of organic and inorganic compounds, chemical change, and chemical reaction.
- SLO 11D.3.2.4: Demonstrate an understanding of tension and tensile strength, shear strength, yield strength, and chemical and mechanical cohesion.
- SLO 11D.3.2.5: Demonstrate and describe galvanic action and corrosion as they apply to orthodontics.

Goal 4: Demonstrate the **functional design** of dental appliances.

GLO 4.1: Demonstrate the **functional design** of dental appliances.

- SLO 11D.4.1.1: Demonstrate an understanding of the application of acrylic designs and clasp constructions of orthodontic appliances.
- SLO 11D.4.1.2: Demonstrate an understanding of the application of proper functional design in the fabrication of removable and fixed orthodontic appliances.
- SLO 11D.4.1.3: Demonstrate an understanding of and incorporate the principles of functional design for orthodontic appliances that use expansion screws.

Goal 5: Demonstrate the **fabrication** of dental appliances.

GLO 5.1: Demonstrate the **fabrication of the components** used in dental appliances.

- SLO 11D.5.1.1: Demonstrate the design and fabrication of Adams clasps for a Hawley retainer appliance.
- SLO 11D.5.1.2: Demonstrate the fabrication of a labial bow for a Hawley retainer appliance.
- SLO 11D.5.1.3: Demonstrate the fabrication of various clasps and the placement of the expansion screw for a Swartz appliance.
- SLO 11D.5.1.4: Demonstrate the preparation of wires for spot welding.

GLO 5.2: Demonstrate the **fabrication** of dental appliances from their various components.

SLO 11D.5.2.1: Demonstrate the placement of clasps and labial bows for a Hawley retainer on prepared orthodontic models.

SLO 11D.5.2.2: Demonstrate the fabrication of an athletic mouthguard.

SLO 11D.5.2.3: Demonstrate the fabrication of a functional and removable orthodontic appliance.

SLO 11D.5.2.4: Demonstrate the fabrication of an appliance that advances the mandible.

SLO 11D.5.2.5: Demonstrate the fabrication of a bruxism appliance.

SLO 11D.5.2.6: Demonstrate an orthodontic appliance that functions in harmony with opposing dentition.

Goal 6: Demonstrate the **repair and adjustment** of dental appliances.

GLO 6.1: Demonstrate an awareness of **problems** associated with dental appliances.

SLO 11D.6.1.1: Demonstrate knowledge of oral health and tooth movement, and of how to accommodate these aspects in making adjustments to dental appliances.

GLO 6.2: Repair dental appliances.

SLO 11D.6.2.1: Demonstrate the replacement of clasps in orthodontic appliances.

SLO 11D.6.2.2: Demonstrate the replacement or addition of acrylic in an orthodontic appliance.

GLO 6.3: Adjust dental appliances.

SLO 11D.6.3.1: Demonstrate the adjustment and replacement of clasps in a dental appliance.

Goal 7: Describe and demonstrate transferable **cross-curricular knowledge and skills** as they relate to dental technology.

GLO 7.1: Read, interpret, and communicate information related to dental technology.

SLO 11D.7.1.1: Read, interpret, and communicate anatomy, physiology, and prescription terminology related to dental technology and orthodontics.

GLO 7.2: Apply knowledge and skills related to dental technology from **mathematics**.

SLO 11D.7.2.1: Convert between imperial and metric systems of measurement.

SLO 11D.7.2.2: Calculate and apply volume, weights, measurements, temperatures, and ratios.

GLO 7.3: Apply knowledge and skills related to dental technology from **anatomy and physiology**.

SLO 11D.7.3.1: Identify and describe mixed dentition, odontoblastic and odontoclastic processes, and the principles of the tipping, pushing, and pulling aspects of tooth repositioning, periodontal ligaments, and associated structures.

SLO 11D.7.3.2: Locate the temporomandibular joint, describe its function, and identify disorders associated with this area.

GLO 7.4: Apply knowledge and skills related to dental technology from **physics**.

SLO 11D.7.4.1: Demonstrate an awareness of muscle reprogramming associated with a variety of orthodontic appliances.

SLO 11D.7.4.2: Demonstrate knowledge of retention and bracing principles in the fabrication of various orthodontic appliances.

GLO 7.5: Apply knowledge and skills related to dental technology from **other subject areas** (art, physical education/health education, information and communication technology, social studies).

SLO 11D.7.5.1: Demonstrate an understanding of the psychological factors associated with bruxism (teeth clenching and grinding).

Goal 8: Demonstrate an understanding of **career opportunities** in dental technology.

GLO 8.1: Describe **education and career opportunities** and **professional organizations** in dental technology and associated fields.

SLO 11D.8.1.1: Demonstrate knowledge of and discuss the range of career opportunities in the dental and health professions and the post-secondary education and advanced training required for these professions.

Goal 9: Demonstrate an awareness of **sustainability** as it pertains to dental technology.

GLO 9.1: Describe the impact of **sustainability** on the **health and well-being** of dental technologists and their clients.

SLO 11D.9.1.1: Discuss the positive influence of orthodontics on people's sense of well-being, health, and enjoyment of quality of life.

GLO 9.2: Describe the dental technology industry's **sustainability practices** and their impact on the **environment**.

No applicable SLOs.

GLO 9.3: Describe **sustainable business practices** within dental technology.

SLO 11D.9.3.1: Discuss the need for affordable dental appliances, alternative materials, and adaptability to changing markets and economic trends.

Goal 10: Demonstrate an awareness of **ethical and legal standards** as they pertain to dental technology.

GLO 10.1: Practise **ethical and legal standards** as they pertain to dental technology.

No applicable SLOs.

Goal 11: Demonstrate **employability skills** related to dental technology.

GLO 11.1: Demonstrate **fundamental employability skills**.

SLO 11D.11.1.1: Demonstrate initiative in performing and completing tasks.

GLO 11.2: Demonstrate an understanding of the **business operation** of a dental laboratory.

No applicable SLOs.

Goal 12: Demonstrate an understanding of the **evolution** of dental technology, including its **progression** and **emerging trends**.

GLO 12.1: Describe the **evolution** of dental technology, including its **progression** and **emerging trends**.

No applicable SLOs.
