



8629

DESIGN AND FABRICATION OF  
FIXED PROSTHESES: CROWN AND  
BRIDGE TECHNOLOGY (12B)

40S/40E/40M

A Dental Technology Course



# 8629: DESIGN AND FABRICATION OF FIXED PROSTHESES: CROWN AND BRIDGE TECHNOLOGY (12B) 40S/40E/40M

## Course Description

This course focuses on the topics of safety, anatomy, physiology, and the design, fabrication, and repair of fixed dental appliances. It also includes the study of long-span bridge fabrication and advanced substructure design.

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**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 12B.1.1.1: Demonstrate safe work procedures related to equipment, tools, and materials associated with the fabrication of fixed prostheses.
  - SLO 12B.1.1.2: Demonstrate the ability to identify and report potential hazards in the fabrication of fixed prostheses.
  - SLO 12B.1.1.3: Demonstrate the appropriate use of personal protective equipment (PPE), such as goggles, face masks, vinyl gloves, and laboratory coats.
  - SLO 12B.1.1.4: Demonstrate the ability to identify worn, defective, and expired PPE and safety equipment.
  - SLO 12B.1.1.5: Describe knowledge of safety equipment, such as a fire extinguisher, a first aid kit, and an eyewash station.
  - SLO 12B.1.1.6: Demonstrate the safe use of rotary tools and lathes in the fabrication of fixed dental appliances.
  - SLO 12B.1.1.7: Demonstrate the safe use of sharp tools, such as scalpels and carving instruments.
  - SLO 12B.1.1.8: Demonstrate and use infection-control techniques and apply universal safety precautions to prevent cross-contamination in a laboratory environment.
  - SLO 12B.1.1.9: Demonstrate the safe use of Bunsen burners and alcohol torches.
  - SLO 12B.1.1.10: Discuss workplace health and safety.
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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 12B.2.1.1: Demonstrate safe work procedures and the appropriate operation of equipment and tools associated with the design and fabrication of crown and bridge appliances.

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

SLO 12B.2.2.1: Demonstrate the appropriate cleaning, maintenance, and management of equipment and tools associated with the design and fabrication of fixed prostheses.

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

SLO 12B.2.3.1: Demonstrate the appropriate handling and storage of restorative dental materials associated with the design and fabrication of fixed prostheses.

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**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 12B.3.1.1: Demonstrate an understanding of the physical characteristics and appropriate use of various alloys, waxes, and gypsum materials associated with the design and fabrication of fixed prostheses.

SLO 12B.3.1.2: Demonstrate an understanding of the chemical characteristics and appropriate use of various gypsum and investment materials associated with the design and fabrication of fixed prostheses.

SLO 12B.3.1.3: Demonstrate an understanding of the mechanical characteristics and appropriate use of various alloys and gypsum materials associated with the design and fabrication of fixed prostheses.

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

- SLO 12B.3.2.1: Demonstrate the handling and manipulation of alloys used in the design and fabrication of crowns, bridges, and substructures, and in osseointegration.
- SLO 12B.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 fixed prosthetic dentistry.
- SLO 12B.3.2.3: Demonstrate an understanding of organic and inorganic compounds, chemical change, and chemical reaction.
- SLO 12B.3.2.4: Demonstrate an understanding of tension and tensile strength, shear strength, yield strength, and chemical and mechanical cohesion.
- SLO 12B.3.2.5: Demonstrate and describe galvanic action and corrosion as they apply to the design and fabrication of crown and bridge technology.

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

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

- SLO 12B.4.1.1: Demonstrate an understanding of the application of functional and aesthetic design in full crown wax-ups, including lateral and protrusive excursions.
  - SLO 12B.4.1.2: Demonstrate an understanding of the principles of design and their application to the morphology and function of posterior full metal crowns.
  - SLO 12B.4.1.3: Demonstrate an understanding of shape and contour in substructure designs for porcelain-fused-to-metal restorations.
  - SLO 12B.4.1.4: Demonstrate an understanding of the design of dental attachments and implants.
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**Goal 5:** Demonstrate the **fabrication** of dental appliances.

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

- SLO 12B.5.1.1: Demonstrate the functional wax-ups of various full gold crowns.
  - SLO 12B.5.1.2: Demonstrate the fabrication of a variety of posterior bridge restorations.
  - SLO 12B.5.1.3: Demonstrate the application of pontic design on waxed bridges.
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**GLO 5.2:** Demonstrate the **fabrication** of dental appliances from their various components.

- SLO 12B.5.2.1: Demonstrate the wax fabrication of maxillary and mandibular functional molars.
  - SLO 12B.5.2.2: Demonstrate the wax fabrication of full metal posterior bridges.
  - SLO 12B.5.2.3: Demonstrate the fabrication of single posterior and anterior substructures, using burnout, induction, and centrifugal casting techniques.
  - SLO 12B.5.2.4: Demonstrate the use of burs and stones for trimming and preparing substructures.
  - SLO 12B.5.2.5: Demonstrate the fabrication of multiple-unit substructures.
  - SLO 12B.5.2.6: Demonstrate the application of a semi-precision attachment in a restoration.
  - SLO 12B.5.2.7: Demonstrate implant (osseointegration) substructure design.
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**Goal 6:** Demonstrate the **repair and adjustment** of dental appliances.

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

- SLO 12B.6.1.1: Demonstrate knowledge of limitations associated with various long-span bridge designs and of how to overcome them.
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**GLO 6.2:** **Repair** dental appliances.

- SLO 12B.6.2.1: Demonstrate knowledge of soldering bridgework.
  - SLO 12B.6.2.2: Demonstrate knowledge of soldering occlusal pinholes, using platinum foil techniques.
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**GLO 6.3: Adjust** dental appliances.

SLO 12B.6.3.1: Demonstrate the adjustment and spot grinding of substructures.

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**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 12B.7.1.1: Read, interpret, and communicate information and terminology related to advanced fixed dental technology.

SLO 12B.7.1.2: Read, interpret, and demonstrate an understanding of information about dental metals associated with dental technology.

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

SLO 12B.7.2.1: Convert between imperial and metric systems of measurement.

SLO 12B.7.2.2: Calculate and apply volume, weights, measurements, temperatures, and ratios.

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

SLO 12B.7.3.1: Locate and identify anatomical landmarks of anterior and posterior teeth, and describe the morphology of a tooth.

SLO 12B.7.3.2: Demonstrate the location and function of excursive pathways.

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

SLO 12B.7.4.1: Apply and demonstrate excursive pathways on a semi-adjustable articulator.

SLO 12B.7.4.2: Demonstrate an awareness of centric stops and occlusion.

SLO 12B.7.4.3: Demonstrate an awareness of fulcrum application to long-span bridge design.

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**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 12B.7.5.1: Demonstrate an understanding of tooth loss due to improper hygiene, disease, nutrition, decay, and accident.

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**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 12B.8.1.1: Demonstrate knowledge of and discuss the various provincial guidelines, regulations, and acts pertaining to labour mobility in the dental technology industry.

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**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 12B.9.1.1: Discuss ergonomic practices as they pertain to dental technology.

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

SLO 12B.9.2.1: Discuss recycling within the laboratory environment.

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

SLO 12B.9.3.1: Discuss the cost of dental materials.

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**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.

SLO 12B.10.1.1: Discuss the importance of using certified dental materials (e.g., metals certified by the International Organization for Standardization).

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

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

SLO 12B.11.1.1: Demonstrate an understanding of the importance of a professional dress code.

SLO 12B.11.1.2: Demonstrate the ability to communicate effectively with supervisors/teachers, co-workers, and customers.

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

No applicable SLOs.

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**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**.

SLO 12B.12.1.1: Demonstrate an understanding of historical and cultural perspectives of fixed dental appliances.

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