



8799

LOST WAX CASTING (11A)

30S/30E/30M

A Jewellery/Metalsmithing Course



# 8799: LOST WAX CASTING (11A)

## 30S/30E/30M

### Course Description

This course is intended for students considering specialization in jewellery and metalsmithing. The curriculum content focuses on an understanding of wax carving, casting, and finishing. Students use this process to create rings, pendants, and other jewellery.

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**Goal 1:** Describe and apply appropriate **safety and health** practices as they apply to the jewellery/metalsmithing trade.

**GLO 1.1:** Create and maintain a **safe workplace**.

- SLO 11A.1.1.1: Follow safe practices and procedures related to facilities, processes, materials, tools, and equipment used in the jewellery studio.
  - SLO 11A.1.1.2: Apply the principles of Workplace Hazardous Materials Information Systems (WHMIS) as they apply to the jewellery studio.
  - SLO 11A.1.1.3: Describe hazards related to processes, materials, tools, and equipment used in the jewellery studio.
  - SLO 11A.1.1.4: Follow the directions of the teacher/supervisor/employer in regard to safe work procedures.
  - SLO 11A.1.1.5: Comply with the laws, regulations, and standards of regulatory agencies and industry associations regarding safety.
  - SLO 11A.1.1.6: Locate first aid kit, eyewash station, fire extinguisher, fire blanket, and emergency power shut off switch.
  - SLO 11A.1.1.7: Demonstrate ventilation procedures, and dust and smoke reduction procedures.
  - SLO 11A.1.1.8: Demonstrate fire prevention and control strategies.
  - SLO 11A.1.1.9: Describe emergency evacuation and response procedures.
  - SLO 11A.1.1.10: Demonstrate safety zone markings and procedures.
  - SLO 11A.1.1.11: Discuss hazards related to compressed gas.
  - SLO 11A.1.1.12: Identify and report hazards (e.g., chemicals, electrical, ergonomics, material handling, spills, and equipment damage) related to tools, equipment, processes, and materials in studio.
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**GLO 1.2:** Create and maintain **safe and healthy workplace practices.**

- SLO 11A.1.2.1: Explain the chemical points of entry into the body.
  - SLO 11A.1.2.2: Describe and demonstrate appropriate personal protection (e.g., safety goggles/facemask, gloves, respirator mask, hair ties, apron, hearing protection).
  - SLO 11A.1.2.3: Describe the injury reporting process.
  - SLO 11A.1.2.4: Describe the use of fire blankets and fire extinguishers.
  - SLO 11A.1.2.5: Describe the use of an eyewash station.
  - SLO 11A.1.2.6: Demonstrate the ergonomic use of equipment and tools as it relates to bench tools and equipment operation.
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**Goal 2:** Demonstrate knowledge of the identification, and the safe and appropriate **operation, cleaning, maintenance, and management of equipment, tools, and materials.**

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

- SLO 11A.2.1.1: Describe hand tools, power tools, equipment, and materials used in lost wax casting.
  - SLO 11A.2.1.2: Demonstrate the safe and appropriate operation of hand tools and equipment used in lost wax casting.
  - SLO 11A.2.1.3: Demonstrate the safe and appropriate use of the flex-shaft.
  - SLO 11A.2.1.4: Demonstrate the safe and appropriate use of the polishing/buffing machines as it pertains to lost wax casting.
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**GLO 2.2:** Demonstrate the appropriate cleaning, maintenance, and management of equipment and tools.

- SLO 11A.2.2.1: Demonstrate the daily cleaning, maintenance, and management of equipment and tools used in lost wax casting.
  - SLO 11A.2.2.2: Discuss the scheduled cleaning, maintenance, and management of equipment and tools as they pertain to lost wax casting.
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**GLO 2.3:** Demonstrate the appropriate **handling, storage, and management of materials.**

- SLO 11A.2.3.1: Demonstrate the appropriate disposal and/or recycling of materials and supplies as it pertains to lost wax casting.
  - SLO 11A.2.3.2: Demonstrate the appropriate storage of materials and supplies as it pertains to lost wax casting.
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**Goal 3:** Demonstrate an understanding of **metallurgy, gemmology, and the characteristics of jewellery materials.**

**GLO 3.1:** Demonstrate an understanding of **metallurgy.**

- SLO 11A.3.1.1: Demonstrate an understanding of metallurgy as it pertains to lost wax casting.
  - SLO 11A.3.1.2: Define the terminology for descriptive characteristics and properties of metals as it pertains to lost wax casting.
  - SLO 11A.3.1.3: Define the characteristics of metals as they pertain to lost wax casting.
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**GLO 3.2:** Demonstrate an understanding of **gemmology.**

No applicable SLOs.

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**GLO 3.3:** Demonstrate an understanding of the **characteristics of jewellery materials.**

- SLO 11A.3.3.1: Demonstrate the principles of material characteristics in construction processes as they pertain to lost wax castings.
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**Goal 4:** Demonstrate knowledge of the creative **design** of jewellery.

**GLO 4.1:** Demonstrate knowledge of the creative **design** of jewellery.

- SLO 11A.4.1.1: Identify the design problems related to lost wax casting.
  - SLO 11A.4.1.2: Research the factors that influence design as they pertain to lost wax casting.
  - SLO 11A.4.1.3: Recognize and apply the elements of design as they pertain to lost wax casting.
  - SLO 11A.4.1.4: Identify the function of the design as it pertains to lost wax casting.
  - SLO 11A.4.1.5: Identify the limitations of the materials used in lost wax casting.
  - SLO 11A.4.1.6: Develop concept drawings for construction based on design criteria related to lost wax casting.
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**Goal 5:** Demonstrate an understanding of the **construction, casting, incorporation of components and gemstones, and production techniques** of jewellery creations.

**GLO 5.1:** Demonstrate the **construction techniques** used in creating jewellery from **sheet and wire**.

- SLO 11A.5.1.1: Demonstrate the safe and appropriate operation of the flex-shaft.
  - SLO 11A.5.1.2: Demonstrate the application of integral rivets.
  - SLO 11A.5.1.3: Demonstrate the safe and appropriate use of the pickle pot.
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**GLO 5.2:** Demonstrate the **lost wax casting techniques** used in creating jewellery.

- SLO 11A.5.2.1: Demonstrate the lost wax casting process.
  - SLO 11A.5.2.2: Demonstrate an understanding of the terminology related to tools, equipment, and techniques.
  - SLO 11A.5.2.3: Demonstrate wax carving techniques to produce wax models of rings and pendants for casting.
  - SLO 11A.5.2.4: Demonstrate an understanding of sprue arrangement for flasks.
  - SLO 11A.5.2.5: Demonstrate the ability to use vacuum investing flasks for casting.
  - SLO 11A.5.2.6: Demonstrate an understanding of the burnout schedule for flasks in a burnout oven.
  - SLO 11A.5.2.7: Demonstrate the guided practice of the safe and appropriate use of the centrifugal casting machine.
  - SLO 11A.5.2.8: Demonstrate torch set-up and the melting of metal.
  - SLO 11A.5.2.9: Demonstrate the post-casting procedure with flasks and castings.
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**GLO 5.3:** Demonstrate the **construction** of jewellery incorporating components such as **handmade and commercial findings**.

- SLO 11A.5.3.1: Define terminology for findings and jewellery items as it pertains to lost wax casting.
  - SLO 11A.5.3.2: Incorporate findings into construction as they pertain to lost wax casting.
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**GLO 5.4:** Demonstrate **stone-setting techniques**.

No applicable SLOs.

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**GLO 5.5:** Demonstrate **production techniques** in the construction of jewellery.

SLO 11A.5.5.1: Define the production and benefits to trade as they pertain to lost wax casting.

SLO 11A.5.5.2: Demonstrate the production process when cutting multiples of pattern pieces as it pertains to lost wax casting.

SLO 11A.5.5.3: Demonstrate the organization of work for the finishing process as it pertains to lost wax casting.

SLO 11A.5.5.4: Demonstrate the use of wax injection for rubber molds.

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**Goal 6:** Demonstrate an understanding of the **finishing, polishing, and textural techniques** of jewellery creation.

**GLO 6.1:** Demonstrate the **finishing techniques** of jewellery creation.

SLO 11A.6.1.1: Identify the sequence of the finishing steps leading up to polishing as they pertain to lost wax casting.

SLO 11A.6.1.2: Identify the tools and equipment used in finishing jewellery as they pertain to lost wax casting.

SLO 11A.6.1.3: Demonstrate the sequence of finishing steps as they pertain to metal type, technique, and jewellery design as it relates to lost wax casting.

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**GLO 6.2:** Demonstrate the **polishing techniques** of jewellery creation.

SLO 11A.6.2.1: Identify the sequence of polishing techniques as it pertains to lost wax casting.

SLO 11A.6.2.2: Select the sequence of polishing techniques as they pertain to metal type, technique, and jewellery design as it relates to lost wax casting.

SLO 11A.6.2.3: Demonstrate the safe and appropriate operation of the cleaning equipment (e.g., ultra-sonic cleaner, steam cleaner).

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**GLO 6.3:** Demonstrate the **textural finishing techniques** of jewellery creation.

SLO 11A.6.3.1: Identify hand tools and techniques for texturing used in lost wax casting.

SLO 11A.6.3.2: Demonstrate the use of burs/flex-shafts to engrave and texture metal as it pertains to lost wax casting.

SLO 11A.6.3.3: Demonstrate the use of burs/flex-shafts to carve and texture wax.

SLO 11A.6.3.4: Demonstrate the use of patinas as it pertains to lost wax casting.

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**Goal 7:** Demonstrate knowledge of the **adjustment, modification, and repair** of jewellery.

**GLO 7.1:** Demonstrate an awareness of situations which require jewellery to be **adjusted, modified, or repaired**.

SLO 11A.7.1.1: Identify situations in which jewellery would require adjustments, modifications, or repairs as they pertain to lost wax casting.

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**GLO 7.2: Adjust** jewellery.

SLO 11A.7.2.1: Recognize and apply simple adjustments to the design and function of jewellery creations as they pertain to lost wax casting.

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**GLO 7.3: Modify** jewellery.

SLO 11A.7.3.1: Demonstrate an understanding of lost wax casting when performing modifications to jewellery creations.

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**GLO 7.4: Repair** jewellery.

SLO 11A.7.4.1: Demonstrate an understanding of lost wax casting when applying repair techniques to jewellery creations.

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**Goal 8:** Demonstrate an understanding of the transferable, **cross-curricular** knowledge and skills as they pertain to the jewellery trade.

**GLO 8.1: Read, interpret, and communicate.**

- SLO 11A.8.1.1: Read and identify project specifications as they pertain to lost wax casting.
  - SLO 11A.8.1.2: Read and identify technical information as it pertains to lost wax casting.
  - SLO 11A.8.1.3: Demonstrate the ability to read charts for mixing investment.
  - SLO 11A.8.1.4: Demonstrate the ability to read an alloy chart as it pertains to lost wax casting.
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**GLO 8.2:** Apply **mathematics** knowledge and skills relevant to jewellery/metalsmithing.

- SLO 11A.8.2.1: Define units of measurement and tools relevant to the jewellery trade (e.g., metric and imperial measurements, weights and volumes, gauges) as they pertain to lost wax casting.
  - SLO 11A.8.2.2: Demonstrate an understanding of formulas for determining weights of casting materials.
  - SLO 11A.8.2.3: Demonstrate an understanding of formulas for material costs.
  - SLO 11A.8.2.4: Demonstrate the use of basic geometry as it pertains to lost wax casting.
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**GLO 8.3:** Apply **science** knowledge and skills relevant to jewellery/metalsmithing.

- SLO 11A.8.3.1: Demonstrate an understanding of specific gravities of metal.
  - SLO 11A.8.3.2: Demonstrate an understanding of the alloy chart for metals.
  - SLO 11A.8.3.3: Demonstrate an understanding of metal expansion and contraction as related to annealing, melting, and porosity of cast metal.
  - SLO 11A.8.3.4: Demonstrate an understanding of oxides as it pertains to lost wax casting.
  - SLO 11A.8.3.5: Demonstrate the prevention and removal of oxides related to lost wax casting.
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**GLO 8.4:** Apply **art** knowledge and skills relevant to jewellery/metalsmithing.

SLO 11A.8.4.1: Demonstrate the creation of a design for project use in lost wax casting.

SLO 11A.8.4.2: Discuss and apply design elements as they pertain to lost wax casting.

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**GLO 8.5:** Apply **other subject areas** knowledge and skills relevant to jewellery/metalsmithing (art, physical education/health education, information communication and technology, social studies).

SLO 11A.8.5.1: Demonstrate the use of Internet for design development and technical information as it pertains to lost wax casting.

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**Goal 9:** Understand **career opportunities** in the jewellery trade and associated professions.

**GLO 9.1:** Describe education and **career opportunities, and professional organizations** in the jewellery trade and associated professions.

SLO 11A.9.1.1: Discuss career opportunities and further education in jewellery trade and associated professions.

SLO 11A.9.1.2: Discuss professional organizations and benefits, locally and globally.

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**Goal 10:** Demonstrate awareness of **sustainability** as it pertains to the jewellery trade.

**GLO 10.1:** Describe the impact of **sustainability** on the health and well-being of metalsmiths and their clients.

SLO 11A.10.1.1: Identify ergonomics and repetitive movement strains as they pertain to lost wax casting.

SLO 11A.10.1.2: Discuss sustainability as it relates to the human health and well-being of jewellers/metalsmiths and their clients as it pertains to lost wax casting.

SLO 11A.10.1.3: Discuss the impact on health of metal and material allergies, dust, and toxicities as it pertains to lost wax casting.

SLO 11A.10.1.4: Demonstrate the proper use of equipment and tools to prevent repetitive strain injuries—ergonomics, as it pertains to lost wax casting.

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**GLO 10.2:** Describe the trade's **sustainability practices** and impact on the environment.

SLO 11A.10.2.1: Discuss the trade's sustainability practices and impact on the environment.

SLO 11A.10.2.2: Describe and apply the efficient use and disposal of materials as it pertains to lost wax casting.

SLO 11A.10.2.3: Discuss chemical hazards on the environment as they pertain to lost wax casting.

SLO 11A.10.2.4: Demonstrate a basic knowledge of efficient material usage to reduce waste and its impact on the environment.

SLO 11A.10.2.5: Identify the recycling processes for materials related to the jewellery trade.

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**GLO 10.3:** Describe **sustainable business practices** within the jewellery trade.

No applicable SLOs.

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**Goal 11:** Demonstrate **awareness of the ethical and legal standards** as they pertain to the jewellery trade.

**GLO 11.1:** Practise the **ethical and legal standards** as they pertain to the jewellery trade.

SLO 11A.11.1.1: Practise the ethical and legal standards as they pertain to the jewellery trade.

SLO 11A.11.1.2: Discuss legal standards of hallmarking for metal content.

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**Goal 12:** Demonstrate knowledge of the **employability skills** related to the jewellery trade.

**GLO 12.1:** Demonstrate the **fundamental employability skills**.

- SLO 11A.12.1.1: Demonstrate problem-solving skills.
  - SLO 11A.12.1.2: Demonstrate critical-thinking skills.
  - SLO 11A.12.1.3: Demonstrate regular attendance and punctuality.
  - SLO 11A.12.1.4: Demonstrate accountability by taking responsibility for one's actions.
  - SLO 11A.12.1.5: Demonstrate adaptability, initiative, and effort.
  - SLO 11A.12.1.6: Demonstrate the ability to accept and follow direction and feedback.
  - SLO 11A.12.1.7: Demonstrate teamwork skills.
  - SLO 11A.12.1.8: Demonstrate the ability to stay on task and use class and studio time effectively.
  - SLO 11A.12.1.9: Demonstrate the ability to communicate respectfully and effectively with co-workers and customers.
  - SLO 11A.12.1.10: Demonstrate the ability to maintain an organized work area and use equipment, tools, and materials respectfully.
  - SLO 11A.12.1.11: Demonstrate appropriate dress for safe work with equipment and tools.
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**GLO 12.2:** Demonstrate an understanding of the **business operation** of a jewellery/metalsmithing trade.

- SLO 11A.12.2.1: Demonstrate the calculations of metal costs for projects.
  - SLO 11A.12.2.2: Discuss the market cost of metals and influences.
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**Goal 13:** Understand the **evolution and technological progression of, and the emerging trends in** the jewellery/metalsmithing trade.

**GLO 13.1:** Describe the **evolution and technological progression of, and the emerging trends in** the jewellery trade.

- SLO 11A.13.1.1: Discuss the evolution and technological progression of, and the emerging trends in the jewellery trade as they pertain to lost wax casting.
  - SLO 11A.13.1.2: Demonstrate the use of new technology as it pertains to lost wax casting.
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