# SUBJECT OUTLINE

**Subject Name:** Herbal Botany and Manufacturing  
**Subject Code:** WHMF121

## SECTION 1 – GENERAL INFORMATION

<table>
<thead>
<tr>
<th>Award/s:</th>
<th>Total Course Credit Points:</th>
<th>Level:</th>
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</thead>
<tbody>
<tr>
<td>Bachelor of Health Science (Naturopathy)</td>
<td>128</td>
<td>Core</td>
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<tr>
<td>Diploma of Health Science</td>
<td>32</td>
<td>Elective</td>
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</table>

**Duration:** 1 Semester  
**Subject Administrator:** Julie Wilkinson-Flores (Gold Coast Campus)

**Subject is:** Core or Elective as noted  
**Subject Credit Points:** 4

### Student Workload:

<table>
<thead>
<tr>
<th>No. timetabled hours per week:</th>
<th>No. personal study hours per week:</th>
<th>Total hours per week:</th>
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<tbody>
<tr>
<td>6</td>
<td>4</td>
<td>10</td>
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</table>

**Delivery Mode**:  
- ☒ On campus  
- ☐ Online / Digital  
- ☒ Blended  
- ☐ Intensive

**Weekly Session^ Format/s - 2 sessions per week:**

- ☒ eLearning modules: Tutorials: can include asynchronous tutor moderated discussion forum and activities, learning journal activities or other web-based resources  
  - 2 x 1 hour tutorials activities / workshops per week

- ☒ Livestream lectures:  
  - ☒ 2 hours  
  - ☐ 3 hours  
  - 2 x 2 hour lectures per week

*All modes are supported by the online learning management system which will include subject documents such as handouts, readings and assessment guides.

^A ‘session’ is made up of 3 hours of timetabled / online study time per week unless otherwise specified. Each subject has a set number of sessions as outlined above.

**Note:** As they are aware, international students on a Student Visa (500) must attend livestream classes on their local campus, using the Virtual Classrooms provided.

**Study Pattern:**  
- ☒ Full Time  
- ☒ Part Time

**Pre-requisites:** BIOB111

**Co-requisites:** Nil
SECTION 2 – ACADEMIC DETAILS

Subject Rationale

This foundational herbal medicine subject introduces students to the study of plant medicine via an exploration of botany and herbal manufacturing. Through an understanding of basic plant morphology, botanical terminology, taxonomy, and nomenclature, students learn to recognise micro and macroscopic physical characteristics of plants, identify plant specimens and describe relationships between plants and their environments. Students learn the theory and practice of herbal manufacturing and gain experience in the preparation of plants used in the practice of herbal medicine. Additionally, students are introduced to the legislative and regulatory frameworks that govern the manufacture and sale of botanical medicines in Australia. This subject serves as a foundation for the study of herbal pharmacy and pharmacology, materia medica and therapeutics.

Learning Outcomes

1. Identify plant specimens based on plant morphology and botanical taxonomy.
2. Describe the environmental and regional influences on medicinal plants and plant constituents.
3. Produce various herbal medicine preparations for topical and internal administration.
4. Classify and explain various herbal medicine preparations for appropriate administration.
5. Discuss current Australian legislation as it relates to the growing, manufacture, dispensing and dosage of herbs for therapeutic administration.

Assessment Tasks

<table>
<thead>
<tr>
<th>Type</th>
<th>Learning Outcomes Assessed</th>
<th>Session Content Delivered</th>
<th>Due</th>
<th>Weighting</th>
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<tbody>
<tr>
<td>Botany Project</td>
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</tr>
<tr>
<td>Part A: Plant Morphology</td>
<td>1-2</td>
<td>1-12</td>
<td>Week 7</td>
<td>20%</td>
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<tr>
<td>(500 words)</td>
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<tr>
<td>Part B: Plant Classification</td>
<td>1-2</td>
<td>1-22</td>
<td>Week 12</td>
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<tr>
<td>(700 words)</td>
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<tr>
<td>Manufacturing Project</td>
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<tr>
<td>Part A: Manufacturing Preparation</td>
<td>3-5</td>
<td>1-14</td>
<td>Week 8</td>
<td>20%</td>
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<tr>
<td>(600 words)</td>
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<tr>
<td>Part B: Manufacturing Product</td>
<td>3-5</td>
<td>1-26</td>
<td>Week 13</td>
<td>30%</td>
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<tr>
<td>(700 words)</td>
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All written assessments and online quizzes are due at 11:55 p.m. Sunday and submitted through the LMS.
Prescribed Readings:

Recommended Readings:

### Subject Content

<table>
<thead>
<tr>
<th>Week</th>
<th>Lectures</th>
<th>Tutorials / Practicals / Workshops</th>
</tr>
</thead>
</table>
| 1.   | **Session 1**  
**Introduction** (Subject Outline / Subject Aims / Assessment / Teaching Resources)  
**Introduction to Botany: Plant Taxonomy, Phylogeny and Botanical Nomenclature**  
- Plant classifications, 5 kingdoms and 10 plant divisions  
- Nomenclature  
| Pre lecture |  
- Botany, plant classifications, 5 kingdoms & 10 plant divisions: why this is relevant to your study  
| Post lecture |  
- Botany, taxonomy & phylogeny  
- Plant classifications, 5 kingdoms & 10 plant divisions  
- Nomenclature  
| 2.   | **Session 2**  
**Introduction to Manufacturing**  
**Legislative Considerations – TGA**  
- Therapeutic Goods Administration (TGA)  
- Levels of Evidence  
- Assessment Methods  
| Pre lecture |  
- Library resources search activity for herbal botany & manufacturing  
- Introduction to GA resources  
| Post Lecture |  

### Session 3
**Plant Morphology - Cells & Seeds**
- Plant cell structure
- Introduction to Monocotyledons
- Introduction to Dicotyledons
- Seeds used in herbal medicine

**Practical**
- Seeds: structure & function
- Germination of seeds

**Pre lecture**
- Environmental considerations and introduction to plant cells

**Post lecture**
- Environmental considerations - seasons
- Differentiation between monocots & dicots
- Seeds used in herbal medicine

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### Session 4
**Herbal manufacturing – Legislation**
- Advertising
- Poisons schedule
- Qualitative and quantitative assessment

**Practical**
- Aust L, Aust L(A) and Aust R

**Pre lecture**
- TGA advertising and the herbal medicine industry in Australia
- Difference between practitioner only and over-the-counter products

**Post lecture**
- Differentiating between analytical technique
- Label comparisons

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### Session 5
**Plant Morphology - Roots**
- Gravitropism and geotropism
- Roots used in herbal medicine

**Practical**
- Roots: structure, functions and modifications
- Propagation: root division

**Pre lecture**
- Roots: botanical structure and function

**Post lecture**
- Consolidating root differentiation, common herbal examples

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### Session 6
**Manufacturing: Pills, Tablets and Capsules**
- Advantages and disadvantages
- Therapeutic manufacturing calculations: Dried Herb Equivalent (DHE) and Drug Extract Ratio (DER)
- Herbs suitable for tablets and capsules

**Practical**
- Making pills and capsules

**Pre lecture**
- Pills, tablets and capsules: historical and contemporary context
- Introduction to formulation

**Post lecture**
- Formulation and recording manufacturing process
- Practicing with DHE/DER
- Herbs suitable for tablets and capsules

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### Session 7
**Plant Morphology - Stems**
- Phototropism and apical dominance
- Stems used in herbal medicine

**Pre lecture**
- Botanical structure and function of stems

**Post lecture**
<table>
<thead>
<tr>
<th>Session 8</th>
<th>Manufacturing: Succi, Infusions and Decoctions</th>
</tr>
</thead>
</table>
| **Practical** | Stems: structure, function and modification  
Propagation: stem cuttings |
| **Session 8** | Propagation: stem cuttings |
| **Pre lecture** |  ⚪ Succi, infusions and decoctions: historical and contemporary context  
⚪ Further methods for calculations herbal content for therapeutic effects |
| **Post lecture** |  ⚪ Formulation and recording manufacturing process  
⚪ Herbs suitable for succi, infusions and decoctions |

5. **Session 9**

**Plant Morphology - Leaves**
- Photosynthesis
- Leaves used in herbal medicine

**Practical**
- Leaves: structure, function and modifications  
- Microscopic examination of leaf cells

**Pre lecture**
- Leaves: botanical structure and function  
- Library activity: microscopic examination of leaf cells

**Post lecture**
- Consolidating leaves differentiation and common herbal examples

Session 10

**Manufacturing: Tinctures and Fluid Extracts**
- Solvents: ethanol and alcohols
- Advantages and disadvantages
- Considerations when using fresh and dried plants: constituents and solvent ratios
- Standardisation

**Practical**
- Preparing a fresh and dried plant tincture (used in manufacturing products later in the course)

**Pre lecture**
- Alcohol extracts: tinctures and fluid extracts: historical and contemporary context  
- Different manufacturing methods used in commercial and private settings  
- Introduction to constituent and solvent ratios

**Post lecture**
- Formulation and recording manufacturing process  
- Constituents and solvent ratios

6. **Session 11**

**Plant Morphology - Flowers**
- Inflorescences
- Pollination and reproduction
- Flowers used in herbal medicine

**Practical**
- Flowers: structure, function and modifications

**Pre lecture**
- Flowers: botanical structure and function

**Post lecture**
- Consolidating flowers differentiation and common herbal examples
### Session 13
#### Manufacturing: Infused Oils
- Solvents: oil
- Advantages and disadvantages
- Shelf life and preservatives
- Aromatherapy in herbal manufacturing

**Practical**
- Preparing warm and cold infused oils (used in manufacturing products later in the course)
- Inhalers

### Session 14
#### Manufacturing: Glycetracts and Oxymels
- Solvents: glycerine and vinegar
- Advantages and disadvantages
- Therapeutics of honey

**Practical**
- Preparing a therapeutic glycetract and oxymel

### NON-TEACHING WEEK
(note that make-up classes may be scheduled in this week)
**Semester 1** – This aligns with the week after Easter so it may fall between Weeks 6 to 8
**Semester 2 & Online students** – The non-teaching week falls between Weeks 7 and 8

### Session 15
#### Plant Identification
- Botanical keys and spotting characteristics
- Wildcrafting: cautions and considerations
- Poisonous plants and weeds: constituents and consequences

**Practical**
- Plant identification process

### Session 16
#### Manufacturing: Syrups, Pastilles and Lozenges
- Considerations for ingestible herbal therapeutics

**Pre lecture**
- Virtual Herbarium visit

**Post lecture**
- Plat Databases and example searching
- Poisons and weeds

**Pre lecture**
- Formulation and recording manufacturing process
- Positive and negative influences of commercialisation of herbal medicine
| Preservative: sugar | Post lecture:  
| Advantages and disadvantages |  
| Preparing a therapeutic syrup, pastille and lozenge |  
| **Practical** |  
| **Post lecture** |  
| 1. Formulation and recording manufacturing process |  
| 2. Traditional herbal usage and current evidence-based practice |  

### 9. Session 17

**Plant Families - Monocotyledons**

- Examine the various spotting characteristics of Monocotyledon plant families

**Practical**

- Botanical key identification of members of the *Xanthorrhoeaceae*, *Melanthiaceae*, *Zingiberaceae*, *Poaceae*, *Pinaceae* and *Equisetaceae*, *Smilax spp.*, *Ephedraceae*, *Amaryllidaceae* families

### 10. Session 18

**Manufacturing: Emulsions - Creams and Lotions**

- Topical herbal therapeutics: strengths and limitations
- Emulsifiers, preservatives and storage of topical applications
- Advantages and disadvantages
- Sourcing materials

**Practical**

- Preparing therapeutic emulsions: herbal cream and lotion

**Pre lecture**

- Emulsions - cream and lotions: historical and contemporary context
- Different manufacturing methods

**Post lecture**

- Formulation and recording manufacturing process
- Creams and lotions: commercial product label comparison
- Identifying ingredients and herbal substitutes

### 10. Session 19

**Plant Families – Dicotyledons Part 1**

- Examine spotting characteristics of dicotyledon families

**Practical**

Identification via botanical keys of *Ranunculaceae*, *Myrtaceae*, *Papaveraceae*, *Brassicaceae*, *Solanaceae*, *Plantaginaceae* & *Loganiaceae* families

**Pre lecture**

- Plant databases: Dicotyledons

**Post lecture**

- Dicotyledon plant family identification

### Session 20

**Manufacturing: Ointments, Balms and Liniments**

- Topical herbal therapeutics vs skin care: legislative differences
- Advantages and disadvantages

**Pre lecture**

- Ointments, balms and liniments: historical and contemporary context
- Different manufacturing methods
<table>
<thead>
<tr>
<th>Session</th>
<th>Practical</th>
<th>Pre lecture</th>
<th>Post lecture</th>
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<tbody>
<tr>
<td>11.</td>
<td>Preparing a therapeutic ointment, balm and liniment</td>
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<td></td>
<td>Formulation and recording manufacturing process</td>
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<td>Ointments, balms and liniments: commercial product label comparison</td>
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<td></td>
<td>Identifying ingredients and herbal substitutes</td>
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<tr>
<td>11.</td>
<td><strong>Plant Families - Dicotyledons Part 2</strong></td>
<td><strong>Pre lecture</strong></td>
<td><strong>Post lecture</strong></td>
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<tr>
<td></td>
<td>Examine spotting characteristics of dicotyledon families</td>
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<tr>
<td></td>
<td>Identification via the botanical keys of spotting characteristics of members of the Polygonaceae, Fabaceae, Rosaceae, Chenopodiaceae, Portulacaceae, Apocynaceae and Urticaceae families</td>
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<tr>
<td>11.</td>
<td><strong>Session 22</strong></td>
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<tr>
<td></td>
<td><strong>Manufacturing: Pessaries and Suppositories</strong></td>
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<td>PR and PV herbal therapeutics</td>
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<td></td>
<td>Advantages and disadvantages</td>
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<td></td>
<td><strong>Practical</strong></td>
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<tr>
<td></td>
<td>Preparing a therapeutic herbal pessary and suppository</td>
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<td>11.</td>
<td><strong>Session 22</strong></td>
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<td><strong>Plant Families - Dicotyledons Part 3</strong></td>
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<td>Examine spotting characteristics of dicotyledon families</td>
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<td>Identification via botanical keys of spotting characteristics of members of the Asteraceae, Apiaceae, Scrophulariaceae, Campanulaceae, Carophyllaceae families</td>
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<td></td>
<td><strong>Manufacturing: Infants and Children’s Remedies</strong></td>
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<td>Considerations when manufacturing and prescribing herbal medicines (internal/topical) for infants and children</td>
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<td>Herbal washes, poultices and compresses: Advantages and disadvantages</td>
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<td><strong>Session 24</strong></td>
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<td>Formulation and recording manufacturing process</td>
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<td>Ointments, balms and liniments: commercial product label comparison</td>
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<td>Identifying ingredients and herbal substitutes</td>
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</table>
Preparing medicinal herbal products suitable for use by infants and children: poultices/compresses, jellies
Group activity: formulation of a child remedy for the relief from chicken pox discomfort

### 13. Session 25
**Plant Families – Dicotyledons Part 4**
- Examine spotting characteristics of dicotyledon families

**Practical**
- Identification via botanical keys of spotting characteristics of members of the *Lamiaceae, Malvaceae, Amaranthaceae, Euphorbiaceae, and Cannabinaceae* families

**Pre lecture**
- Plant databases: Dicotyledons continued

**Post lecture**
- Dicotyledon plant family identification continued

### Session 26
**Global Herbal Medicine Manufacturing**
- Global herbal medicine perspective
- Sustainability

**Practical**
- Complete manufacturing of therapeutic herbal products

**Pre lecture**
- Global differences in manufacturing and supply

**Post lecture**
- Collation of formulation manufacturing record

### 14. Non-Teaching Week/Practical Examination Week 1
Note that make-up classes may be scheduled in this week

### 15. Non-Teaching Week/Practical Examination Week 2
Note that make-up classes may be scheduled in this week

### 16. Final Examination Week 1
There is no final exam for this subject

### 17. Final Examination Week 2
There is no final exam for this subject