ENDEAVOUR College of Natural Health

# SUBJECT OUTLINE

**Subject Name:**

## Herbal Botany and Manufacturing

**Subject Code:**

## WHMF121

## SECTION 1 – GENERAL INFORMATION

| | | | | |
|---|---|---|---|---|
| **Award/s:** | | **Total Course Credit Points:** | **Level:** | |
| | Bachelor of Health Science (Naturopathy) | 128 | Core | 1st Year |
| | Diploma of Health Science | 32 | Elective | 1st Year |
| **Duration:** | 1 Semester | | | |
| **Subject is:** | Core or Elective as noted | **Subject Credit Points:** | 4 | |

### Student Workload:

| **No. timetabled hours per week: 6** | **No. personal study hours per week: 4** | **Total hours per week: 10** |
|---|---|---|

**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<br>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

| Type | Learning Outcomes Assessed | Session Content Delivered | Due | Weighting |
|---|---|---|---|---|
| **Herbal Product Plan** (700 words) | 4, 5 | 1-12 | Week 7 | 30% |
| **Botany Field Assignment** (1200 words) | 1, 2 | 1-20 | Week 10 | 40% |
| **Herbal Product Manufacturing Assignment** (600 words) | 1, 3-5 | 1-26 | Week 13 | 30% |

All written assessments and online quizzes are due at 11:55 p.m. Sunday and submitted through the LMS.

**Pass Requirements**

To achieve a passing grade in this subject, students must:

- have a cumulative mark of at least 50%, and
- have submitted all assessment items with a value greater than 15%.

**Prescribed Readings:**

Adams, J., & Tan, E. (2011). *Herbal manufacturing: How to make medicines from plants* (2nd ed.). Eleanor Tan & Jenny Adams.

Tan, E. (2013). *Botany of the flowering plants* (4th ed.). Northern Melbourne Institute of TAFE.

**Recommended Readings:**

Blair, K. (2014). *Wild wisdom of weeds: 13 essential plants for human survival.* Chelsea Green Publishing.

Capon, B. (2010). *Botany for gardeners* (3rd ed.). Timber Press. [ebook available]

Fisher, C. (2018). *Materia medica of Western herbs*. Aeon Books. [ebook available]

Green, J. (2000). *The herbal medicine-maker's handbook.* Crossing Press. [ebook available]

Grubb, A., & Raser-Rowland, A. (2012). *The Weed foragers handbook: A guide to edible and medicinal weeds in Australia.* Hyland House Publishing.

Mauseth, J. D. (2014). *Botany: An introduction to plant biology* (6th ed.). Jones & Bartlett Learning. [ebook available]

Stubbin, C. (1999). *Do it yourself pure plant skin care*. The International Centre of Holistic Aromatherapy.

Wink, M., & Van Wyk, B. (2008). *Mind-altering and poisonous plants of the world*. Timber Press.

## Subject Content

| Week | Lectures | Tutorials / Practicals / Workshops |
|---|---|---|
| **1.** | Session 1<br>**Introduction** (Subject Outline / Subject Aims / Assessment / Teaching Resources)<br>**Introduction to Botany: Plant Taxonomy, Phylogeny and Botanical Nomenclature**<br>• Plant classifications, 5 kingdoms and 10 plant divisions<br>• Nomenclature | Activities are developed to allow the students to explore relevant concepts, expand on ideas and have peer and lecturer interaction. Activities also allow for formative assessment and feedback<br>**Pre lecture**<br>◦ Botany, plant classifications, 5 kingdoms & 10 plant divisions: why this is relevant to your study<br>**Post lecture**<br>◦ Botany, taxonomy & phylogeny<br>◦ Plant classifications, 5 kingdoms & 10 plant divisions<br>◦ Nomenclature |
| | Session 2<br>**Introduction to Manufacturing**<br>**Legislative Considerations – TGA**<br>• Therapeutic Goods Administration (TGA)<br>• Levels of Evidence | **Pre lecture**<br>◦ Library resources search activity for herbal botany & manufacturing<br>◦ Introduction to GA resources<br>**Post Lecture** |

| | | |
|---|---|---|
| | • Assessment Methods | ○ Specific TGA resources including levels of evidence for Listed, Assessed & Registered products |
| **2.** | Session 3<br>**Plant Morphology - Cells & Seeds**<br>• Plant cell structure<br>• Introduction to Monocotyledons<br>• Introduction to Dicotyledons<br>• Seeds used in herbal medicine<br>**Practical**<br>• Seeds: structure & function<br>• Germination of seeds | **Pre lecture**<br>○ Environmental considerations and introduction to plant cells<br>**Post lecture**<br>○ Environmental considerations - seasons<br>○ Differentiation between monocots & dicots<br>○ Seeds used in herbal medicine |
| | Session 4<br>**Herbal manufacturing – Legislation**<br>• Advertising<br>• Poisons schedule<br>• Qualitative and quantitative assessment<br>**Practical**<br>• Aust L, Aust L(A) and Aust R | **Pre lecture**<br>○ TGA advertising and the herbal medicine industry in Australia<br>○ Difference between practitioner only and over-the-counter products<br>**Post lecture**<br>○ Differentiating between analytical technique<br>○ Label comparisons |
| **3.** | Session 5<br>**Plant Morphology - Roots**<br>• Gravitropism and geotropism<br>• Roots used in herbal medicine<br>**Practical**<br>• Roots: structure, functions and modifications<br>• Propagation: root division | **Pre lecture**<br>○ Roots: botanical structure and function<br>**Post lecture**<br>○ Consolidating root differentiation, common herbal examples |
| | Session 6<br>**Manufacturing: Pills, Tablets and Capsules**<br>• Advantages and disadvantages<br>• Therapeutic manufacturing calculations: Dried Herb Equivalent (DHE) and Drug Extract Ratio (DER)<br>• Herbs suitable for tablets and capsules<br>**Practical**<br>• Making pills and capsules | **Pre lecture**<br>○ Pills, tablets and capsules: historical and contemporary context<br>○ Introduction to formulation<br>**Post lecture**<br>○ Formulation and recording manufacturing process<br>○ Practicing with DHE/DER<br>○ Herbs suitable for tablets and capsules |
| **4.** | Session 7<br>**Plant Morphology - Stems**<br>• Phototropism and apical dominance | **Pre lecture**<br>○ Botanical structure and function of stems<br>**Post lecture** |

| | | |
|---|---|---|
| | • Stems used in herbal medicine<br>**Practical**<br>• Stems: structure, function and modification<br>• Propagation: stem cuttings | ○ Consolidation of stem differentiation and common herbal examples |
| | Session 8<br>**Manufacturing: Succi, Infusions and Decoctions**<br>• Solvents: water<br>• Advantages and disadvantages<br>• Herbs suitable for succi, infusions and decoctions<br>**Practical**<br>• Preparing medicinal succus, infusion and decoction | **Pre lecture**<br>○ Succi, infusions and decoctions: historical and contemporary context<br>○ Further methods for calculations herbal content for therapeutic effects<br>**Post lecture**<br>○ Formulation and recording manufacturing process<br>○ Herbs suitable for succi, infusions and decoctions |
| **5.** | Session 9<br>**Plant Morphology - Leaves**<br>• Photosynthesis<br>• Leaves used in herbal medicine<br>**Practical**<br>• Leaves: structure, function and modifications<br>• Microscopic examination of leaf cells | **Pre lecture**<br>○ Leaves: botanical structure and function<br>○ Library activity: microscopic examination of leaf cells<br>**Post lecture**<br>○ Consolidating leaves differentiation and common herbal examples |
| | Session 10<br>**Manufacturing: Tinctures and Fluid Extracts**<br>• Solvents: ethanol and alcohols<br>• Advantages and disadvantages<br>• Considerations when using fresh and dried plants: constituents and solvent ratios<br>• Standardisation<br>**Practical**<br>• Preparing a fresh and dried plant tincture (used in manufacturing products later in the course) | **Pre lecture**<br>○ Alcohol extracts: tinctures and fluid extracts: historical and contemporary context<br>○ Different manufacturing methods used in commercial and private settings<br>○ Introduction to constituent and solvent ratios<br>**Post lecture**<br>○ Formulation and recording manufacturing process<br>○ Constituents and solvent ratios |
| **6.** | Session 11<br>**Plant Morphology - Flowers**<br>• Inflorescences<br>• Pollination and reproduction<br>• Flowers used in herbal medicine<br>**Practical**<br>• Flowers: structure, function and modifications | **Pre lecture**<br>○ Flowers: botanical structure and function<br>**Post lecture**<br>○ Consolidating flowers differentiation and common herbal examples |

| | | |
|---|---|---|
| | Session 12<br>**Manufacturing: Infused Oils**<br>• Solvents: oil<br>• Advantages and disadvantages<br>• Shelf life and preservatives<br>• Aromatherapy in herbal manufacturing<br>**Practical**<br>• Preparing warm and cold infused oils (used in manufacturing products later in the course)<br>• Inhalers | **Pre lecture**<br>○ Infused oils: historical and contemporary context<br>○ Different manufacturing methods and introduction to aromatherapy<br>○ Introduction to constituent and solvent ratios<br>**Post lecture**<br>○ Formulation and recording manufacturing process |
| **7.** | Session 13<br>**Plant Morphology – Fruits**<br>• Fruit formation and different types<br>• Methods of fruit dispersal<br>• Fruits used in herbal medicine<br>**Practical**<br>• Fruits: structure and function | **Pre lecture**<br>○ Fruits: botanical structure and function<br>**Post lecture**<br>○ Consolidating fruit differentiation and common herbal examples |
| | Session 14<br>**Manufacturing: Glycetracts and Oxymels**<br>• Solvents: glycerine and vinegar<br>• Advantages and disadvantages<br>• Therapeutics of honey<br>**Practical**<br>• Preparing a therapeutic glycetract and oxymel | **Pre lecture**<br>○ Glycetracts and oxymels: historical and contemporary context<br>○ Different manufacturing methods<br>**Post lecture**<br>○ Formulation and recording manufacturing process<br>○ Positive and negative influences of commercialisation of herbal medicine |
| | **NON-TEACHING WEEK** (note that make-up classes may be scheduled in this week)<br>**Semester 1** – This aligns with the week after Easter so it may fall between Weeks 6 to 8<br>**Semester 2 & Online students** – The non-teaching week falls between Weeks 7 and 8 | |
| **8.** | Session 15<br>**Plant Identification**<br>• Botanical keys and spotting characteristics<br>• Wildcrafting: cautions and considerations<br>• Poisonous plants and weeds: constituents and consequences<br>**Practical**<br>• Plant identification process | **Pre lecture**<br>○ Virtual Herbarium visit<br>**Post lecture**<br>○ Plat Databases and example searching<br>○ Poisons and weeds |
| | Session 16<br>**Manufacturing: Syrups, Pastilles and Lozenges** | **Pre lecture** |

| | | |
|---|---|---|
| | • Considerations for ingestible herbal therapeutics<br>• Preservative: sugar<br>• Advantages and disadvantages<br>**Practical**<br>• Preparing a therapeutic syrup, pastille and lozenge | ○ Syrups, pastilles and lozenges: historical and contemporary context<br>○ Different manufacturing methods<br>**Post lecture**<br>○ Formulation and recording manufacturing process<br>○ Traditional herbal usage and current evidence-based practice |
| **9.** | Session 17<br>**Plant Families - Monocotyledons**<br>• Examine the various spotting characteristics of Monocotyledon plant families<br>**Practical**<br>• Botanical key identification of members of the *Xanthorrhoeaceae, Melanthiaceae, Zingibereaceae, Poaceae, Pinaceae and Equiseteaceae, Smilax spp. Ephedraceae, Armaryllidaceae* families | **Pre lecture**<br>○ Plant databases: Monocotyledons<br>**Post lecture**<br>○ Monocotyledon plant family identification |
| | Session 18<br>**Manufacturing: Emulsions - Creams and Lotions**<br>• Topical herbal therapeutics: strengths and limitations<br>• Emulsifiers, preservatives and storage of topical applications<br>• Advantages and disadvantages<br>• Sourcing materials<br>**Practical**<br>• Preparing therapeutic emulsions: herbal cream and lotion | **Pre lecture**<br>○ Emulsions - cream and lotions: historical and contemporary context<br>○ Different manufacturing methods<br>**Post lecture**<br>○ Formulation and recording manufacturing process<br>○ Creams and lotions: commercial product label comparison<br>○ Identifying ingredients and herbal substitutes |
| **10.** | Session 19<br>**Plant Families – Dicotyledons Part 1**<br>• Examine spotting characteristics of dicotyledon families<br>**Practical**<br>Identification via botanical keys of *Ranunculaceae, Myrtaceae, Papaveraceae, Brassicaceae, Solanaceae, Plantaginaceae & Loganiaceae* families | **Pre lecture**<br>○ Plant databases: Dicotyledons<br>**Post lecture**<br>○ Dicotyledon plant family identification |
| | Session 20 | **Pre lecture** |

| | | |
|---|---|---|
| | **Manufacturing: Ointments, Balms and Liniments**<br>• Topical herbal therapeutics vs skin care: legislative differences<br>• Advantages and disadvantages<br>**Practical**<br>• Preparing a therapeutic ointment, balm and liniment | ○ Ointments, balms and liniments: historical and contemporary context<br>○ Different manufacturing methods<br>**Post lecture**<br>○ Formulation and recording manufacturing process<br>○ Ointments, balms and liniments: commercial product label comparison<br>○ Identifying ingredients and herbal substitutes |
| **11.** | Session 21<br>**Plant Families - Dicotyledons Part 2**<br>• Examine spotting characteristics of dicotyledon families<br>• Identification via the botanical keys of spotting characteristics of members of the *Polygonaceae, Fabaceae, Rosaceae, Chenopodiaceae, Portulacaceae, Apocynaceae and Urticaceae* families | **Pre lecture**<br>○ Plant databases: Dicotyledons continued<br>**Post lecture**<br>○ Dicotyledon plant family identification continued |
| | Session 22<br>**Manufacturing: Pessaries and Suppositories**<br>• PR and PV herbal therapeutics<br>• Advantages and disadvantages<br>**Practical**<br>• Preparing a therapeutic herbal pessary and suppository | **Pre lecture**<br>○ Pessary and suppository: historical and contemporary context<br>○ Different manufacturing methods<br>**Post lecture**<br>○ Formulation and recording manufacturing process |
| **12.** | Session 23<br>**Plant Families – Dicotyledons Part 3**<br>• Examine spotting characteristics of dicotyledon families<br>**Practical**<br>• Identification via botanical keys of spotting characteristics of members of the *Asteraceae, Apiaceae, Scrophulariaceae, Campanulaceae, Carophyllaceae* families | **Pre lecture**<br>○ Plant databases: Dicotyledons continued<br>**Post lecture**<br>○ Dicotyledon plant family identification continued |
| | Session 24<br>**Manufacturing: Infants and Children's Remedies**<br>• Considerations when manufacturing and prescribing herbal medicines (internal/topical) for infants and children | **Pre lecture**<br>○ Remedies for infants & children: Different manufacturing methods<br>**Post lecture**<br>○ Formulation and recording manufacturing process |

| | | |
|---|---|---|
| | • Herbal washes, poultices and compresses: Advantages and disadvantages<br>**Practical**<br>• Preparing medicinal herbal products suitable for use by infants and children: poultices/ compresses, jellies<br>• Group activity: formulation of a child remedy for the relief from chicken pox discomfort | |
| **13.** | Session 25<br>**Plant Families – Dicotyledons Part 4**<br>• Examine spotting characteristics of dicotyledon families<br>**Practical**<br>• Identification via botanical keys of spotting characteristics of members of the *Lamiaceae, Malyaceae, Amaranthaceae, Euphorboraceae, and Cannabinaceae* families | **Pre lecture**<br>◦ Plant databases: Dicotyledons continued<br>**Post lecture**<br>◦ Dicotyledon plant family identification continued |
| | Session 26<br>**Global Herbal Medicine Manufacturing**<br>• Global herbal medicine perspective<br>• Sustainability<br>**Practical**<br>• Complete manufacturing of therapeutic herbal products | **Pre lecture**<br>◦ Global differences in manufacturing and supply<br>**Post lecture**<br>◦ Collation of formulation manufacturing record |
| **14.** | **Non-Teaching Week/Practical Examination Week 1**<br>Note that make-up classes may be scheduled in this week | |
| **15.** | **Non-Teaching Week/Practical Examination Week 2**<br>Note that make-up classes may be scheduled in this week | |
| **16.** | **Final Examination Week 1**<br>There is no final exam for this subject | |
| **17.** | **Final Examination Week 2**<br>There is no final exam for this subject | |