

# BOTANY

## Associate Professor & Head of Department

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## Herbarium Curator

AP Dold, MSc(Rhodes)

**Botany** (BOT) is a six-semester subject which may be taken as a major subject for the degrees of BSc, BA and BJourn. Botany is a recommended co-major with Environmental Science (ENV), Entomology (ENT) or Zoology (ZOO) full details of which are given in a separate entry.

To major in Botany, a candidate is required to obtain credit in the following courses: CHE 1, CEL 101, BOT 102, ZOO 101, BOT 201, BOT 202, BOT 301, BOT 302. See Rule S.23.

Two, or in some cases four, Botany semester-credit courses are allowed as credits for other degree/diploma curricula in the Faculties of Humanities and Education.

See the Departmental Web Page

<http://www.ru.ac.za/botany/> for further details, particularly on the contents of courses.

## First-year level courses in Botany

There are two first-year courses in Botany. CEL 101 is held in the first semester and BOT 102 in the second semester. Credit may be obtained in each course separately and, in addition, an aggregate mark of at least 50% will be deemed to be equivalent to a two-credit course BOT 1, provided that a candidate obtains the required sub-minimum (45%) in each component. However, students wishing to major in Botany must normally obtain credit in both components separately. Both theory and practical examinations are held. Supplementary examinations

may be awarded in either course, provided that a candidate achieves 35% in semester 1 and 45% in semester 2. Practical reports, essays and class tests collectively comprise the class mark, which forms part of the final mark. Adequate performance for CEL 101 (at least 35%) is required before a student may register for BOT 102. Each course is comprised of modules of two to four weeks, with 5 lectures and 1 practical per week.

## CEL 101: Cell Biology

This course compares cell structure in prokaryotic and eukaryotic cells and examines cellular processes including cell to cell communication, photosynthesis and cell respiration. Cell division and fundamental genetics, including the structure of genetic material and how it controls cellular processes, are also covered.

## BOT 102: Plant Evolution and Ecology

This course examines the mechanisms of evolution through natural selection and the resultant plant diversity. Whole plant function and adaptations are then used to introduce plant ecology, which deals with the characteristics and processes found at different levels of organisation from the individual to ecosystems. The course ends with an introduction to the biomes of South Africa, highlighting the diversity in ecological processes that have shaped the vegetation in different parts of the country. A compulsory field trip to the coast provides an introduction to field ecology.

## Second-year level courses in Botany

There are two second-year courses in Botany. BOT 201 is normally held in the first semester and BOT 202 in the second semester. An aggregate mark of at least 50% will be deemed to be equivalent to a two-credit course BOT 2, provided that a candidate obtains the required subminimum of 45 % in each semester. No supplementary examinations will be offered for either course. When the intention is to major in Botany, credit in Botany (CEL 101, BOT 102), Zoology (ZOO 102) and Chemistry (CHE 1) is required before a student may register for BOT 201 or BOT 202. Permission may be granted to repeat CHE 1 or ZOO 101 concurrently with BOT 201 and BOT 202. Adequate performance (at least 40%) in the first semester is required before a

student may register for the second semester. These courses each comprise several modules and weekly practicals. Students registered for BOT 201 will also be required to assemble a plant collection, and students will participate in field trips in BOT 201 or BOT 202.

**BOT 201** begins with a module on plant taxonomy, which comprises lectures, practical sessions and a field trip covering plant collection and identification, the role of herbaria in modern science, and an introduction to taxonomy, including species delimitation and numerical methods. This is followed by a module on applied population biology, which includes topics such as biological invasions, plant utilisation and conservation ecology. Together with field- and lab-based practicals, this course provides the student with an insight into applied and theoretical aspects of botanical diversity and its conservation.

**BOT 202** starts with a module on carbon and nitrogen metabolism in plants, which examines pathways of energy production and utilisation and the regulation of metabolism. This is followed by a module on herbivory, which covers aspects of plant-herbivore interactions, plant defences and rangeland ecology. The final module deals with plant reproduction and introduces some of the many modes of reproduction in Angiosperms before focusing on the interaction between plants and their pollinators.

### **Third-year level courses in Botany**

Credit in Botany 2 is required before a student may register for BOT 3. There are two independent third-year courses in Botany. BOT 301 is normally held in the first semester and BOT 302 in the second semester. An aggregate mark of at least 50% will be deemed to be equivalent to a two-credit course BOT 3, provided that a candidate obtains the required subminimum in each semester. No supplementary examinations will be offered for either course. Students are also required to undertake a mini research project which runs throughout the year, culminating in a written project and research seminar.

**BOT 301** commences with an intensive two week session on project development to enable students to commence their research projects with a firm footing of research planning, project design and data

analyses. An ecology module covers topics such as plant life histories, competition and mechanisms of coexistence in plant communities. A module on Climate change and physiology includes aspects of plant physiology and the environment where these plants grow, in particular the physiological consequences of stress. Both modules are linked to climate change issues.

BOT 302 comprises four modules. A module on applied marine botany examines the challenges presented by the marine environment and includes a field trip to the coast. A module on evolutionary biology examines evolutionary theory, concentrating on the mechanisms that have driven the speciation of organisms to produce present day biodiversity. A module on plant systematics covers aspects such as nomenclature, taxonomic data and analysis, especially phenetics and cladistics. This is followed by a final module on biogeography which explores the relationship between present-day distribution patterns of biota, their past evolutionary history and the geological history of the earth.

### **Botany Honours**

The Honours degree course allows for specialisation in a chosen direction within Botany. It involves a field trip, seminars, tutorials and research projects, and is intended to provide the student with the opportunity for in-depth study in particular aspects of the subject. These may be seen as relevant training for subsequent employment or as a step between an undergraduate degree and a research degree. Modules include: savanna ecology, pollination biology, plant-insect feeding interactions, molecular ecology, advanced systematics, ecophysiology, climate change, estuarine ecology, advanced anatomy, and a practical-based module on assessment and mapping of plant diversity.

### **Joint Honours**

Joint Honours courses may be followed where topics from the Botany Honours course may be taken in combination with courses in some other Departments (for example, Geography, Entomology, Environmental Science, Ichthyology or Zoology).

### **Honours in Biodiversity and Conservation**

The departments of Botany and Environmental Science also offer a specialist Honours course in Biodiversity and Conservation that includes three

compulsory and one optional module, a project, seminars and tutorials. The topics of compulsory modules include a practical-based module on assessment and mapping of plant diversity, community-based natural resource management or people and conservation, and diversity, rarity and endemism. The course is designed as training for a career in biodiversity conservation or as a step towards further postgraduate study. Full details of the curriculum may be found at the web page <http://www.ru.ac.za/botany/>

**MSc and PhD degrees**

Suitably qualified students are encouraged to proceed to the research degrees of MSc and PhD under the direction of the staff of the Department or associated Institutes. Requirements for the MSc and PhD degrees are given in the General Rules.