Syllabus For

Advanced Post Graduate Diploma in Medicinal Plants
(PGDMP)

EFFECTIVE FROM 2005-2006
VEER NARMAD SOUTH GUJARAT UNIVERSITY,
Advanced Post Graduate Diploma in Medicinal Plants
(APGDMP)

Semester –I

DMP 101 – Elements of Herbology
DMP 102 – Ethnomedicinal studies & medicinal plants
DMP 103 – Raw material Resources & Collection, Primary health care and herbs
DMP 104 – Phytochemistry & Pharmacological screening of herbal drugs
DMP 105 – Practical course on Identification of Medicinal Plants
   Practical course on Processing and value addition
   Practical course on Phytochemistry

Semester – II

DMP 201 – Herbal raw material Processing and their Products
DMP 202 – Quality control and Phytochemical methods
DMP 203 – Project Work
DMP 204 – Practical course on Herbal classical Drug Preparation
   Practical course on Quality Control
Preamble

Humanity has developed intimate relationship with plant and plant products for human sustenance. Treating the ill using herbal resources is one of such activities. India has a rich heritage of traditional herbal knowledge as well as rich herbal diversity.

The study and research in these areas need trained personnel, who are good at plant taxonomy, field work and the applied aspects of Botany, especially medicinal plants.

Country is also witnessing a burgeoning demand and production of herbal Pharmaceuticals, Nutraceuticals and Cosmaceuticals. There is a global demand of such but authentic products. Pharma companies are in need of trained personnel at their quality control department.

This course envisages to train the students so as to develop the following.

a. Capacity building for identification of angiosperms

b. Commitment for medicinal plant diversity conservation

c. Ability to collect, process and store herbal raw material

d. Ability to handle quality control procedures and instruments for herbal drugs

e. Ability to undertake primary health care extensions for the rural populace.
I. History and development of herbal science in India and abroad
   - Sushrut
   - Theophrastus (370 – 285 BC)
   - Parashar (250 – 120 BC)
   - Charak (1 AD)
   - Dioscorides (1 AD)

II. Introduction to the literature on medicinal plants
   Classics:
   - Charak
   - Rajnighantu
   - Bhavprakash Nighantu
   - Sharangdhar Samhita
   - Nighantu Adarsh : Bapalal Vaidya
   - Indian Medicinal Plants : Kirtikar and Basu
   - Dictionary of economic products: Watt
   Contemporary literature:
   - Wealth of India
   - Compendium of Indian medicinal plants
   - Ethnovet Heritage: (Anjaria, Parabia, Dwivedi,)
   - Napralert (Website)

III. Methods of identification:
   Plant Morphology: Study of
   - Root
   - Stem
   - Leaves
   - Inflorescence
   - Flowers
   - Fruits and seeds

IV. Use of the flora in the identification of fresh plants

V. Field visit to the area as decided by the teacher
   Method of sample collection, Herbarium specimen preparation, preservation. Purpose and importance of herbaria.
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Advanced Post Graduate Diploma in Medicinal Plants

Ethnomedicinal Studies & Medicinal Plants (DMP 102)

I. Protocol for carrying out ethnomedicinal studies
II. Medicinal plants of Gujarat
Identification, distribution and importance of following medicinal plants is expected.

Azadirachta indica
Abrus precatorius
Acacia catechu
Acacia concina
Acacia nilotica
Acacia polyacantha
Adansonia digitata
Adhatoda vasica
Adenanthera zeylanica
Adenenthera pavonina
Aegle marmelos
Aloe vera
Alstonia scholaris
Andrographis paniculata
Argyreia speciosa
Asparagus adscendens
Asparagus gonoclados
Asparagus racemosus
Bacopa monieri
Basella rubra
Boerhavia diffusa
Bombax malabarica
Bryophyllum calycina
Butea monosperma
Calotropis procer
Calotropis gigantea
Cannabis sativa
Cassia angustifolia

Ceiba pentandra
Centella asiatica
Chlorophytum borivilianum
Chlorophytum tuberosum
Cissus quadrangularis
Clerodendrum inerme
Clerodendrum multiflorum
Clerodendrum serratum
Commiphora wightiana
Costus speciosus
Crataeva nurvala
Cymbopogon citratus
Desmodium gangeticum
Emblica officinale
Enicostema axillare
Erythrina indica
Euphorbia hirta
Ficus benghalensis
Ficus glomerata
Ficus religiosa
Ficus virens
Gmelina arborea
Gymnema sylvestre
Kalanchoe pinnata
Lawsonia inerm
Limonia acidissima
Mimosa pudica
Mimusops elengi
<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Plant Name</th>
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<tr>
<td>Oroxyllum indicum</td>
<td>Saraca asoca</td>
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<tr>
<td>Oxalis corniculata</td>
<td>Semecarpus anacardium</td>
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<td>Papaver somniferum</td>
<td>Sesbania grandiflora</td>
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<td>Pedalium murex</td>
<td>Smilax zeylanica</td>
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<td>Phyllanthus fraternus</td>
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<td>Piper betel</td>
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<td>Premna integrifolia</td>
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<td>Thespesia populnea</td>
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<td>Pterocarpus marsupium</td>
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<td>Rauvolfia serpentina</td>
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<td>Ricinus communis</td>
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<td>Saccharum spontaneum</td>
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<td>Salvadora oleioides</td>
<td>Vitex negundo</td>
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<td>Salvadora persica</td>
<td>Withania somnifera</td>
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<tr>
<td>Santalum album</td>
<td>Zizyphus glabrata</td>
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<tr>
<td>Sapindus laurifolius</td>
<td>Zizyphus nummularia</td>
</tr>
</tbody>
</table>

III. Nutritional Potential of Conventional and unconventional food material of Gujarat

- Madhuca indica
- Morinda citrifolia
- Garuga pinnata
- Diospiros melanoxylon
- Eugenia jambolana
- Eleusine coracana
- Hordeum vulgare
- Vigna angularis
- Pithecellobium aman
- Pithecellobium dulce

IV. Plants of cosmaceutical importance

- Aloe vera
- Santalum album
- Hemidesmus indicus
- Sapindus laurifolius
- Acacia concina
V. Ambiguity & Controversy on the identity of some classical drugs

- Som
- Astavarga
- Rasna
- Pashan bhed

VI. Conservation of medicinal plants
1. Non destructive and sustainable exploitation
2. Cultivation of medicinal plants
   - *Withania somnifera*
   - *Chlorophytum tuberosum*
   - *Andrographis paniculata*
   - *Cassia angustifolia*
   - *Justicia adhatoda*
   - *Cissus quadrangularis*
   - *Costus speciosus*

3. Micropropagation of medicinal plants
   - Methods
   - Development of tissue culture protocol for medicinal plants
   - Possible methods of improving yield
     - Selection of strains
     - Biotechnological methods (GM etc.)

4. Vegaries of market forces and importance of co-operative movement
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Advanced Post Graduate Diploma in Medicinal Plants
Raw material Resources & Collection, Primary health care and herbs
(DMP 103)

I. Method and time of collection
II. Processing and value addition methods

• Underground parts:
  - Roots, tubers
• Bark
• Leaves
• Flowers

• Seed & Fruits
• Exudates & gums
• Wood & wood extracts

III. Examples to be studied as under

Underground parts: roots, tubers, suckers

  - Asparagus racemosus
  - Asparagus adscendens
  - Chlorophytum tuberosum
  - Chlorophytum borivilianum
  - Dashmool (Ideal vs. Reality)
  - Shemal musli: bombax malabarica
  - Boerhavia diffusa
  - Tephrosia purpurea
  - Withania somnifera

Bark:

  - Terminalia arjuna
  - Tecomella undulata
  - Moringa oleifera

Leaves:

  - Justicia adhatoda
  - Centella asiatica
  - Ocimum sanctum
  - Vitex negundo
  - Cassia angustifolia
  - Abrus precatorius

Flowers:
o Madhuca indica
o Careya arborea
o Hibiscus rosasinensis

Seeds & fruits:
  o Emblica officinale
  o Embelia tsjerum cottam
  o Semecarpus anacardium
  o Terminalia chebula
  o Terminalia bellirica
  o Gmelina arborea
  o Cassia tora
  o Cassia sophera

Exudates & Gums:
  o Sterculia urens
  o Acacia nilotica
  o Anogeissus latifolia
  o Bombax malabarica
  o Commiphora wightiana
  o Boswellia serrata

Wood & wood extract:
  o Santalum album
  o Adenanthera pavonina
  o Pterocarpus marsupium
  o Acacia catechu

Panchang:
  o Eclipta alba
  o Phyllanthus fraternus
  o Andrographis paniculata

IV. Primary health care with reference to digestive system, dermal system, and skeletal system
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Advanced Post Graduate Diploma in Medicinal Plants

Phytochemistry & Pharmacological screening of herbal drugs
(DMP 104)

Phytochemistry:

I. Carbohydrates: mono and disaccharides, sugar alcohols, sugar acids, sugar amines. Polysaccharides: dextrins, inulin, matrix polysaccharides, gums and mucilages
II. proteins : peptides, lectins,
III. Lipids, Volatile oils Fatty acids and fatty oils Sesquiterpenes, diterpenes, triterpenes and tetraterpenes
IV. Glycosides: anthraquinones, isothiocynates, Flavonols, Lactones phenols Saponins and cardiac glycosides
V. Alkaloids, indoles, isoquinolines, tropanes, pyridine and piperidine, steroidal alkaloids.
VI. Bitter principle
VII. Phenols and tannins
VIII. Antibiotics
IX. Phyto-inorganic chemistry

Pharmacological screening of herbal drugs:

I. Need for phyto-pharmacological evaluation
II. Evaluation of anti diabetic agents
III. Evaluation of anti microbial agents
IV. Evaluation of anti diarrheal agents
Methods of herbal drug preparation (Bhaishajya Kalpana)

I. Quath:
   Dashmool
   Pathyadi
   Patoladi
   Mahamanjistadi
   Devdarvyadi

II. Avaleha:
   Kantakari
   Bilvadi
   Chyavan prash
   Unnabadi

III. Asava and Arista:
   Drakshasva
   Abhayarista
   Arnitarista
   Khadirarista
   Arjunasava
   Lohasav
   Chandanasav
   Vasarista

IV. Syrups:
   Amla syrup
   Balchaturbhadra syrup

V. Goolkand:
   Rose
   Silk cotton flowers
VI. **Churna:**
- Panchkol
- Vasadi
- Pushyanug
- Sitopaladi
- Triphala
- Trikatu
- Lavan Bhaskar
- Hingvastak

VII. **Ghan:**
- Guduchighan
- Yashtimadhughan
- Udumbar patraghan
- Mamejak ghan

VIII. **Vati** (tablets, pills)
- Khadiradivati
- Yashtimadhu vati
- Karpur-hingool vati
- Lashunadi vati
- Kanyalohadi

IX. **Liniments:**
- Jatyadi taila
- Bhringraj taila
- Bala taila

X. **Kshar:**
- Apamarg kshar
- Kadali stambha kshar

XI. **Bhasma:**
- Ashwatha patra bhasma (Ficus regiosa leaves)
- Kafkartari bhasma (Achyranthes aspera)

XII. **Ointments:**
- Gandhak malam
- Ral malam
- Sindooradi
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Advanced Post Graduate Diploma in Medicinal Plants

Quality control and Phytochemical methods (DMP 202)

Pharmacognosy:

I. Morphological examination

II. Microscopical evaluation

III. Development of Standardization parameters
   b. Solvent extractive values
   c. Ash values
   d. Crude fiber
   e. Moisture content
   f. Microbial infestation
   g. Bitter value
   h. Foaming index
   i. Swelling index
   j. Heavy metals
   k. Contaminations & Aflatoxins

IV. Adulteration and deterioration

Quality Control

V. Quality Assurance and stability testing

   a. GMP
   b. Physical quality assurance
   c. Stabilization
   d. Validation
   e. Marker compound evaluation

VI. Methods of isolation
   a. Solvent extraction
   b. Thin layer chromatography
   c. HPTLC
d. Column Chromatography

e. HPLC

VII. Methods of characterization

a. Spectroscopic methods
   i. UV
   ii. Visible
   iii. IR
   iv. NMR

b. Mass Spectrometry

c. Atomic absorption

d. GC-MS

e. LC-MS

VIII. Intellectual property rights and Patent laws

SUGGESTED READINGS


Chauhan M. (): Microscopic profile of powdered drug used in Indian System of Medicine (Volume I).


Wallis ( ) : Pharmacognosy

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT  
Advanced Post Graduate Diploma in Medicinal Plants  

ELIGIBILITY, EXAMINATION AND PASSING RULES FOR  

APGDMP-1  

The duration of the course shall be One-year, full time. Academic year shall be divided into two semesters. Teaching and examinations schedules shall be as per semester system.  

APGDMP-2  

Eligibility: M.Sc. in any Biological Science, M.Sc. Chemistry, M.Sc. (Ag), Horticulture, M.Pharm and M.D. with sufficient interest in study of Medicinal plants as to be adjudged by the entrance test and personal interview.  

For persons having non-botanical background an intense crash course of one week will be arranged for selected candidates.  

APGDMP – 3  

Candidates desirous of appearing at any semester examination of the (APGDMP) course must forward their applications in the prescribed form to the Registrar, through the coordinator, on or before the prescribed dates.  

APGDMP – 4  

No candidate shall be permitted to re-appear at any semester examination, which he/she has already passed.  

APGDMP – 5  

The marks for each theory and practical course, their distribution between internal and External examinations, teaching schedule, examination duration etc. will be as per Course Management and Evaluation scheme.
APGDMP – 6

A candidate shall be allowed to join the second semester irrespective of his/her result of the first semester.

APGDMP – 7

If a candidate fails in certain heads in first semester examination, he/she can re–appear in those heads along with second semester examination.

APGDMP – 8

The standard of passing the (APGDMP) examination will be as under

To pass any semester examination of the (APGDMP), candidate must obtain at least 40% marks in the University examination and 40% marks in the aggregate of University and Internal examination in each course of Theory and Practical, including Project Viva, if any.

APGDMP – 9

Class shall be awarded to the successful candidate at the end of Second semester examinations on the basis of:

(A)Aggregate of marks obtained by the candidate in the external evaluations of the two semester examinations of that particular year and

(B)Aggregate of marks obtained by the candidate in the (external + internal)) evaluation of two semester examinations of that particular year.

Award of class

i) A successful candidate will be placed in FIRST CLASS WITH DISTINCTION, if he/she obtains 70% marks under both (A) and (B) above.

ii) A successful candidate will be placed in FIRST CLASS, if he/she obtains 60% or more but less then 70% marks under both (A) and (B) above.
iii) A successful candidate will be placed in SECOND CLASS, if he/she obtains 48% or more but less then 60% marks under both (A) and (B) above.

iv) A successful candidate will be placed in PASS CLASS, if he/she obtains 40% or more but less then 48% marks under both (A) and (B) above.

APGDMP –10

A candidate who fails in any semester shall have an option to reappear in the subjects of failure or Full examination. However, candidates appearing in the part examination shall not be entitled for any class and such candidates shall be placed in PASS CLASS only. In such case, credit marks shall be considered equivalent to percentage of aggregate marks for passing for that particular year.
**Course Management & Evaluation**

The minimum teaching (actual) per semester will be of 14 weeks excluding examinations

First Semester:  
Four Theory Courses  
Three Practicals/ week

Second Semester:  
Two Theory Courses  
Two Practicals/ week  
Project work

Each course shall have 4 hours per week teaching  
Each practical shall have 4 hours per practical  
Weekly load will be 28 hrs per week

**Examination pattern:**

70:30 External: Internal pattern will be followed. Internal evaluation will be as done at P.G. level

There will be external examination at the end of each semester  
Each candidate shall carryout project work of 200 marks. A committee consisting internal and external examiner will evaluate this. The candidate will defend his/her work at the time of Viva-voce & presentation session. The project work evaluation will carry only external marks.

Industrial visits and field excursions will also be carried out during the course study.
# Proposed Teaching and Evaluation Scheme for APGDMP

## Semester-I

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<td>3</td>
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<td>DMP 104</td>
<td>Phytochemistry &amp; Pharmacological screening of herbal drugs</td>
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<td>DMP 105</td>
<td>Practicals</td>
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## Semester-II

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