# SKILL BASED EDUCATION UNDER NATIONAL SKILLS QUALIFICATION FRAMEWORK FOR THE ACADEMIC YEAR 2020-2021

# P.G. DIPLOMA IN HERBAL DRUGS

## Submitted to

**UNIVERSITY GRANT COMMISSION**

**NEW DELHI**

**Submitted by**

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**2020-21**

**Call for online applications to run Skill-based Programs for the academic year 2020-2021**

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**Name(s) of proposed programme(s), trade/sector and course(s):** Diploma in Herbal Drugs (one year course)

## Rationale for introducing the course

Herbal drugs (medicines) includes herbs, herbal materials, herbal preparations and finished products that contain as active ingredients parts of plants or the plant materials or combinations and are used especially for prevention and treatment of diseases. Herbal drugs remain major components of the primary healthcare in many rural areas of developing and under developing countries. Many herbal drugs have long traditional history of folk uses and claims of health benefits. Present day, the people are very much interested and fond about to take herbal based drugs to treat various diseases because the plant based drugs have less toxicity and freely available. The herbal drugs market is increasing in world drastically. To fulfil the requirement and demand of the people, need of technically and professionally trained individuals with suitable scientific knowledge to fill the gap. The programme guides, trains, educate the candidates through theoretical and hands-on experiments in institute and industry to produce competent, creative and trained productive students which the industry prefers.

In conventional degree or studies, the students only study the theoretical aspects but the programme will provide a competitive platform to the PG Diploma students with hands on experiments. The course will provide theoretical knowledge on herbal drugs, preparations, characterizations, bioactive compounds identifications, biological assays in vitro and in vivo studies. The course also helps in isolation, purification and characterization of bioactive active compounds using modern tools to identify exact drug. The increased demand of herbal drugs the course will led to understand with laboratory techniques will be a fulfilling challenging gap of the students. From the proposed course the students will study on preparation of herbal drugs, bioactive compounds identification, purification and characterization of bioactive compounds, biological assays in in vitro and in vivo studies in details with hands on experiments.

**Availability of relevant industry, market survey undertaken in order to assess the feasibility and potential for employment generation**

Herbal drugs are a source of new chemical compounds and are the choice of today's human races. There have been increasing trends in the trade of therapeutic plants and their extraction at industrial level, particularly of medicinally important products. A high trade status of natural plant products at global, national as well as a regional level can improve the economy of a nation. It is estimated that 25 % people of the most of the countries depend on the plant resources for their livelihood. India is a major exporter of medicinal plants and is estimated that raw materials and drug from medicinal plants of 860 million are exported annually from India. In India, more than 41 million tribal and forests dwellers derive their earnings from these products. India is one of the major exporters of crude drugs mainly to the six developed nations.

**Current scenario of herbal industry**

The recent upsurge in use of ayurvedic medicines has led to a sudden increase in ayurvedic manufacturing industry. In India, there are about 14 well-recognized and 86 medium scale manufacturers of ayurvedic drugs. Other than this about 8,000 licensed small manufacturers in India are on record. In addition, thousands of ayurvedic physicians also have their own miniature manufacturing facilities. The estimated current annual production of herbal drugs is around Rs 3500 crore. The turnover of Ayush industry is estimated to be more than Rs 8,800 crore. The domestic market of Indian Systems of Medicine & Homoeopathy (ISM & amp;H) is of the order of Rs 4,000 crore with a total consumption of all botanicals to a figure of 1,77,000 MT, which is expanding day by day. The total annual turnover of the

ayurvedic drug manufacturing industry is estimated to be around Rs 3,500 crore. Besides this, there is also a growing demand for natural products including items of medicinal value/pharmaceuticals, food supplements and cosmetics in both domestic and international markets. India with its diversified biodiversity has a tremendous potential and advantage in this emerging area.

**Phytochemical (Pharma) Industry**

The success of herbal extract and phytochemical industry lies in the quality and authenticity of raw herbs being used. Most of the supplies of herbs which cater the needs of herbal extract and ayurvedic industry come from the wild sources. Very limited data is present on the Indian phytochemical industry. Chinese phytochemical industry is contributing towards nation economy. We need to set up regulatory council for Indian phytochemical industry so that potential phytochemicals extracted from medicinal plants can enter the international market. Phytochemical association was set up in Himachal Pradesh with purpose of exploiting medicinal flora for novel phytochemicals. What really seems to be the problem is that lack of person who is well versed in phytochemical extraction, purification and characterization of herbal medicine and lab expert with immense knowledge of performing biological assays of plant based drugs. So the proposed new program aids in mastering students with analytical techniques and hands on training required for drug development who can become self-reliant after the completion of course.

## Outcome of the programme

**Upon completion of the course, the student shall be able to know**

- To conduct skill development training programmes leading to self-employment.
- To establish entrepreneurship awareness camps, entrepreneurship development programmes, hands on training and faculty development programmes.
- To develop and introduce curriculum on entrepreneurship development at various levels and also to assist curriculum updating of the same.
- To conduct research work and survey for identifying entrepreneurial opportunities especially in S and T sectors.
- Expertise in phytochemical isolation, extraction and characterization of medicinal plants.
- Expertise to carry out biological assays.
- To setup small scale industries for herbal drug formulations.
- They also get awareness on entrepreneurship, Intellectual Property Rights and patents.

**Justification for starting the Programme**

It would be good to have diploma in Herbal Drugs in colleges under graduation course will help us to train students, studying in colleges along with additional diploma course. Students will gain additional knowledge and hands on training in their degree simultaneously. After completion of their bachelor course they can become entrepreneur individually or they can opt for higher studies. By starting this diploma course would be helpful to enhance the hands on training for all life sciences departments viz. Biotechnology, Biochemistry, Microbiology, Botany, Zoology, Statistics, Mathematics, and Computer Science departments. The trained diploma students can easily get job in pharma industry and even industry also prefers suck kind of trained students.

**Capacity of the Course**

- Different training modules will be developed for capacity enhancement of various categories of students, scientists, teachers and stake holders.
- Involvement of under-graduate students in developing and execution of project works related to thrust area identified.
- Organization of seminars, workshops, meetings, field survey, industry visit etc
- Publication of booklets, brochures etc for dissemination of knowledge.

## Budget Diploma course

| Name of the item | For first year | Second year | Total |
|---|---|---|---|
| **Non Recurring**<br><br>Equipment | 15,00,000/- | ---------- | 15,00,000/- |
| Minor repairs of labs/ Workshops/Class room | 5,00,000/- | ---------- | 5,00,000/- |
| Total | | | **20,00,000/-** |
| **Recurring** | | | |
| Honorarium to existing /visiting/guest faculty | 3,00,000/- | 3,00,000/- | 6,00,000/- |
| Honorarium to Co-ordinator and Programme-in-charge | 1,10,000/- | 1,10,000/- | 2,20,000/- |
| Hiring charges for lab attender | 1,40,000/- | 1,40,000/- | 2,40,000/- |
| Faculty training | 50,000/- | 50,000/- | 1,00,000/- |
| Consumables | 1,00,000/- | 1,00,000/- | 2,00,000/- |
| Travel/Industrial visit | 50,000/- | 50,000/- | 1,00,000/- |
| Seminars/ workshop | 50,000/- | 50,000/- | 1,00,000/- |
| Admission/ Examination/ Assessment | 1,00,000/- | 1,00,000/- | 2,00,000/- |
| Stipend to students during project work/ hands on experiment in industry | ---------- | 5,000 x 10 x 6 | 3,00,000/- |
| Office expenses/contingencies | 2,00,000/- | 2,00,000/- | 4,00,000/- |
| Recurring Total | | | **24,60,000/-** |
| **Grand Total (A+B)** | | | **44,60,000/-** |

## Justification

## Recurring:

**Binocular microscopes with computer attached**

This is required to view onion and yeast during *in vitro* cytotoxicity analysis of herbal drugs and antimicrobial analysis.

**HPTLC and Trans Illuminator**

To analyse and observe the phytochemicals and their separations.

**UV-Visible spectrophotometer**

To analyse the phytochemicals in herbal drugs by quantitatively and time study for anti-microbial activity.

**Soxhlet Apparatus**

To prepare herbal drugs formulations and isolation of bioactive compounds.

**Table top centrifuge**

To mix the herbal drugs formulations.

**Column chromatography**

To separate and collect bioactive compounds from herbal drugs**.**

**Advanced Laminar Air Flow**

To carry out extraction process and antimicrobial activity.

**Renovation of laboratories**

Renovation of the building is mandatory for placing the instruments in instrumentation room, documentation center, herbaria collection room, microbial culture facility, inoculation and incubation room, extraction preparation room, formulations documentation chamber, etc

**Computerization and networking of Diploma course**

Importance of computerization and networking in today's world needs no emphasis. Through our departments and teachers have computer lab facility. The existing facility is much inadequate and has not reached all the faculty and large number of students and scholars. It is therefore proposed to establish a computerized laboratory with internet connectivity in our campus. Further it is proposed to computerize all administrative activities. So as to bring in e-governance in all its activities. Estimated cost for providing all these computerization and networking of the campus works out upto 5 lakhs.

# Herbal Drugs (60 credits=1250 marks)

| S. No. | Course | Course title | Credit | Period per week | | | Distribution of marks | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | Mid Sem Evaluation | | End Sem exam | Total |
| | | | | | | | CWS | MST | | |
| **FIRST SEMESTER** | | | | | | | | | | |
| 01 | 001 | Traditional knowledge of herbal medicines | 4 | 3 | 1 | 0 | 20 | 20 | 60 | 100 |
| 02 | 002 | Phyto-pharmacological medicines | 4 | 3 | 1 | 0 | 20 | 20 | 60 | 100 |
| 03 | 003 | Analytical techniques in herbal drugs | 4 | 3 | 1 | 0 | 20 | 20 | 60 | 100 |
| 04 | 004 | *In silico* approaches in herbal drugs | 4 | 3 | 1 | 0 | 20 | 20 | 60 | 100 |
| 05 | 005 | Herbal Medicines Lab | 2 | 0 | 0 | 2 | 10 | 10 | 30 | 50 |
| 06 | 006 | Analytical Techniques in lab | 2 | 0 | 0 | 2 | 10 | 10 | 30 | 50 |
| 07 | 007 | Biological assays for herbal drugs | 2 | 0 | 0 | 2 | 10 | 10 | 30 | 100 |
| 08 | 008 | Bioinformatics lab | 2 | 0 | 0 | 2 | 10 | 10 | 30 | 50 |
| | | TOTAL CREDITS | 26 | | | | TOTAL MARKS | | | 650 |
| **SECOND SEMESTER** | | | | | | | | | | |
| 01 | 101 | Quality control of herbal drugs (WHO and ICH) | 4 | 3 | 0 | 1 | 20 | 20 | 60 | 100 |
| 02 | 102 | Good manufacturing practices for herbal medicine | 4 | 3 | 0 | 1 | 20 | 20 | 60 | 100 |
| 03 | 1031 | IPR and Patents | 4 | 3 | 0 | 2 | 20 | 20 | 60 | 100 |
| 04 | 104 | Herbal Drugs Marketing | 4 | 3 | 0 | 2 | 20 | 20 | 60 | 100 |
| 05 | 105 | Project dissertation (Toxicology and Bioassay studies – *in vitro*, *in vivo* and *in silico*) Viva Voce | 16 | - | | - | 0 | 0 | 250 | 150 |
| 06 | 106 | Seminar presentations/ group discussions, herbal drugs formulations | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 50 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | submissions/ Journal club meet/ training by local drug practitioners | | | | | | | | |
| | | TOTAL CREDITS | 30 | | | | TOTAL MARKS | | | 600 |

L: Lecture T: Tutorial P: Practical

28/09/2020

Signature of the Co-ordinator

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Signature of the Registrar

Registrar
Davangere University
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