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☎ 01662-276240

Department of Pharmaceutical Sciences
GURU JAMBHESHWAR UNIVERSITY OF SCIENCE & TECHNOLOGY, HISAR
'A' Grade NAAC Accredited

To,
The Registrar,
Gurukul Kangri Vishwavidyalaya,
Haridwar-249 404

Sub: Consent to be subject expert on the Board of Studies in Pharmaceutical Sciences

Dear Sir,

This is in reference to your letter No Acad/Res/2019-20/658, dated 21/02/2019 regarding appointment as subject expert on the Board of Studies in Department of Pharmaceutical Sciences. I do hereby give my consent to serve as subject expert on the Board of Studies in Pharmaceutical Sciences.

Thanking you,

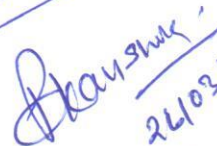
Yours Sincerely,


(Prof. Munish Ahuja)

CC: Prof. S. K. Gupta, Dept of Pharmaceutical Sciences,

BOS

B: Pharma


24/03/2019

Date.23.10.2019


To
The Registrar
Gurukul Kangri Vishwavidyalaya
Haridwar-249404 (Uttarakhand)

Dear Sir

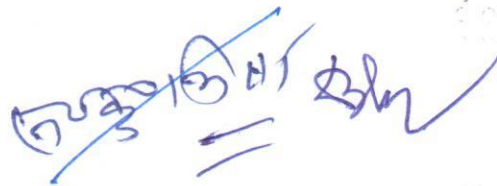
Please find the Ph.D. course work syllabus approved by duly constituted board of studies. The meeting of board of studies was held on 28.09.2019 in the Department of Pharmaceutical Sciences, Faculty of Medical Science & Health.

Thanking you

With regards


23.10.19

(Prof. S. K. Gupta)
Head
Department of Pharmaceutical Sciences
Gurukul Kangri Vishwavidyalaya
Haridwar



Syllabus of Pre Ph. D Course

BOS (BPharm)

23/10/2019

**Gurukul Kangri Vishwavidyalaya
Haridwar, Uttarakhand**

**DEPARTMENT OF PHARMACEUTICAL SCIENCES
Faculty of Medical Science & Health**

SYLLABI

FOR

Pre Ph.D Course

**(Under Credit Based Continuous Evaluation Grading System)
(Academic Session 2019-2020)**

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SYLLABUS FOR PRE-Ph.D. COURSE (2019-20)
 Deptt. of Pharmaceutical Sci.

SEMESTER I

Course Code	Subject Title	L	T	P	Credits	Int. Assessment	Ext. assessment	Max. Marks
PFM-C101	Research Methodology	6	-	-	6	30	70	100
PFM-C102	Advanced Pharmaceutical Techniques	6	-	-	6	30	70	100
Total		12	-	-	12	60	140	200

Total hours: 8; Total Credits: 8

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Course I Course Code: PFM-C101
Subject Title: Research Methodology (Theory)

4 Credits (4-0-0)

Ma. Marks: 100

Pass. Percentage: 50

Unit 1

Research Methodology: An Introduction: Meaning of Research, Objectives of Research, Motivation in Research, Types of Research ((Educational, Clinical, Experimental, historical descriptive, Basic applied and Patent oriented Research), Research Approaches, Significance of Research, Research Methods versus Methodology, Research and Scientific Method, Importance of Knowing How Research is Done, Research Process, Criteria of Good Research, Problems Encountered by Researchers in India.

Defining the Research Problem: Selecting the Problem, Necessity of Defining the Problem Technique Involved in Defining a Problem, an Illustration.

Unit 2

Research Design: Meaning of Research Design, Need for Research Design Features of a Good Design, Important Concepts Relating to Research Design, Different Research Designs, Basic Principles of Experimental Designs, Developing a Research Plan.

Sampling Design: Census and Sample Survey, Implications of a Sample Design, Steps in Sampling Design, Criteria of Selecting a Sampling Procedure, Characteristics of a Good Sample Design, Different Types of Sample Designs, Random Sample from an Infinite Universe, Complex Random Sampling Designs.

Unit 3

Statistical Analysis: Introduction, significance of statistical methods. Normal distribution. Probability. Degrees of freedom. Measures of variation - standard deviation, Non linear regression, iteration methods. Analysis of variance. Standard error. Test for statistical two ways ANOVA and multiple comparison procedures. Significance - students Test, chi-square test. Fishers exact test. Wilcoxon rank test. Two-tailed student's t-test. Mann-Whitney test. Dunnet's two-tailed test, Kruskal - Wallis nonparametric test.

Unit 4

Literature review: Need, Procedure- Search for existing literature, Review the literature selected, Develop a theoretical and conceptual framework, writing up the review.

Presentation (especially for oral presentation): Importance, types different skills, contained, format of model, introduction, Poster, Gestures, eye contact, facial, expressions, stage, fright, volume- pitch, speed, pause & language, Visual aids & seating, Questionnaire.

Sources for procurement research grants – international agencies, Government and private bodies.

Unit 5

Computer: Introduction to the creation and advancement of databases, algorithms, computational and statistical techniques for data analysis

MS office, excel & power point: Preparation of power point presentations based on the topic of research. Insertion of figures, graphs, charts in presentation. Preparation of scientific posters for presentations. Use of various presentation techniques, Practical knowledge of MS Word. Construction of spreadsheets from the experimental data Applications of Microsoft excel for quantitative and in statistical data analysis,

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Recommended books:

1. Kothari, C.R. (2004). Research Methodology: Methods and Techniques, New Age International Publishers, New Delhi
2. Arya., P.P. and Pal, Y. (2001), Research Methodology in Management: Theory and Case Studies, Deep and Deep Publishers Pvt. Ltd., New Delhi
3. Robert A. Day (1998), How To Write & Publish a Scientific Paper. Oryx Press; 5 edition
4. Frank D. Bell (1995), Basic Biostatistics: Concepts for the Health Sciences. William C. Brown
5. Suresh C. Sinha and Anil K. Dhiman, (2002), Research Methodology (2 Vols-Set) Vedams Books (P) Ltd.
6. Krishnaswamy, K. N., Sivakumar, Appa Iyer and Mathirajan, M. (2006), Management Research Methodology: Integration of Principles, Methods and Techniques (Pearson Education, New Delhi).
7. Ranjit Kumar, (2006), Research Methodology- Step-By-Step Guide for Beginners, (Pearson Education, Delhi) ISBN: 81-317-0496-3.
8. Trochim, William M. K., (2003), 2/e, Research Methods, (Biztantra, Dreamtech Press, New Delhi), ISBN: 81-7722-372-0.
9. Central Drugs Standard Control Organization <http://edsco.nic.in/>
10. Thesis projects in Science & Engineering – Richard M. Davis. **Publisher:** St Martins Pr
11. Thesis & Assignment – Jonathan Anderson. **Publisher:** Gardners Books; 4th edition
12. Writing a technical paper- Donald Menzel. **Publisher:** McGraw-Hill
13. Presentation skills - Michael Hallon By: Indian Society for Institute education.
14. Spelling for the millions- Edna Furness.

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Course II Course Code: PFM-C102
Subject Title: Advanced Pharmaceutical Techniques (Theory)
5 Credits (4-0-0)

Ma. Marks: 100

Pass. Percentage: 50

Unit 1

Spectroscopic methods: Theory, Instrumentations, chemical applications and structural elucidation by UV, IR, ¹H NMR, ¹³C NMR including DEPT, Mass Spectrometry, ESR and Emission spectroscopy, X-ray diffraction technique .

Unit 2

Separation Techniques: Fundamental principles, theory, instrumentation and applications of the following techniques: Gas-liquid Chromatography, HPLC, Size Exclusion chromatography, GC-MS, LC-MS, UPLC, HPTLC, Ion Pair & Ion Exchange Chromatography and Supercritical Fluid Chromatography.

Unit 3

Thermal Analysis: Theory, Instrumentation & application of Thermogravimetric analysis (TGA) and Differential Thermal Analysis (DTA).

Calorimetric Analysis: Theory, Instrumentations, chemical applications and structural elucidation, Differential Scanning Calorimetry (DSC), Isotherm titration Calorimetry (ITC).

Unit 4

Modern Pharmacognostic Techniques: Extraction, isolation, identification and characterization (quantitative & qualitative) of bioactive phytoconstituents of following groups: Alkaloids, Flavonoids, Glycosides, Steroids, Triterpenoids

Unit 5

Immunochemical Techniques: Immunolectrophores, Immunoprecipitation, ELISA, Radio-immuno assays. Southern blot and northern blot assays.

Bioassays: in-vitro and in-vivo techniques

Bioavailability and bioequivalence testing: Definitions, in-vitro and in-vivo bioavailability testing.

Lyophilization: Principles and Practice of freeze-drying. Freeze drying equipment

Recommended Books:

1. Skoog: Principles of Instrumental Analysis (Saunders College Publishing Philadelphia).
2. M. Orchin and H.H. Jaffe – Theory and Applications of Ultra Violet Spectroscopy (John Wiley and Sons, N.Y).
3. Silverstein. Basseler, Moiril-Spectrometric Identification of Organic Compounds (John Wiley and Sons, N.Y).
4. Willard, Merritt, Dean-Instrumental Methods of Analysis (CBS Publishers and Distributors, Delhi).
5. Pharmaceutical Dosage forms Series by Herbert Lieberman
6. Bernard R. Glick Molecular Biotechnology: Principles and Applications of Recombinant DNA.
7. Remington: The Science and Practice of Pharmacy (Remington the Science and Practice of Pharmacy) Lippincott Williams & Wilkins.

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Dr. 5/10/19 *Dr. 5/10* *Dr. 5/10*