



**Guru Gobind Singh Indraprastha University**  
**Sector – 16C Dwarka, New Delhi – 110078**

**(Coordination Branch)**

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**F.No.: GGSIPU/Co-ord./47<sup>th</sup> AC/2019/69**

**Dated: 10 October 2019**

**CIRCULAR**

The 47<sup>th</sup> meeting of the Academic Council of the University was held on 01.10.2019. Please find enclosed herewith the minutes of the 47<sup>th</sup> meeting of the Academic Council for kind information.

*Ravi Dadhich*

**(Ravi Dadhich)**  
**Registrar**

**F.No.: GGSIPU/Co-ord./47<sup>th</sup> AC/2019/69**

**Dated: 10 October 2019**

**To**

1. Dean- USBAS/ USBT/ USCT/ USEM/ USICT/ USHSS/ USMC/ USLLS/ USM&PMHS/ USMS/ USAP/ USE, GGSIP University
2. Director- Academic Affairs/ Coordination/ Students' Welfare/ CDMS/ Development/ International Affairs/ CEPS/ Research and Consultancy/ Legal Aid / IUIIC, GGSIP University
3. Librarian, GGSIP University
4. Prof. P.K. Jhulka, (Retired), Max Institute of Cancer Care, 26-A Ring Road, Nirmal Puri, Nirmal Colony, Block -2, Lajpat Nagar-IV, New Delhi-110024
5. Prof. M.C. Sharma, 109, Nav Shakti Sadan, Sector 13, Rohini, New Delhi-110085
6. Prof. Karmeshu, (Retired), 150, Deepali, Road No. 42, Pitampura, Delhi-110034
7. Sh. Arvind Misra, 5/101, Mathura Road, Agra-282002
8. Shri. Sandeep Gupta, 100 UB Jawahar Nagar, Delhi-110007
9. Prof. Rajiv Bhat, School of Biotechnology, Jawaharlal Nehru University, New Delhi
10. Prof. (Dr.) Pradeep Kulshrestha, Dean, School of Law, Sharda University, Plot No. 32 & 34, Knowledge Part-III, Greater Noida-201306 (UP)
11. Dr. Rupal S. Randhawa, 204-A, Pocket B, Mayur Vihar, Phase-2, New Delhi-110091
12. Prof. P.N. Varshney, E-30, Greater Kailash-III, New Delhi-110048
13. Dr. Jagdish Lal Gupta, CP-18, Maurya Enclave, Pitam Pura, Delhi-110034
14. Prof. M.N. Hooda, Director, Bharti Vidyapeeth's Institute of Computer Application & Management, A-4, Paschim Vihar, Rohtak Road, New Delhi-110063

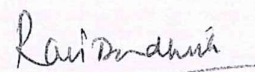
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15. Dr. Surendra Kumar, Principal, Delhi Institute of Rural Development, Holambi Khurd, Delhi-110082
16. Dr. Maharaj Krishen Bhat, Director, Maharaja Agrasen Institute of Management Studies, Maharaja Agrasen Camp, Plot No.1, Sec-22, Rohini, Delhi-110086
17. Dr. Dharendra Srivastava, Principal, ESIC Dental College & Hospital, Sector-15, Rohini, New Delhi -110085
18. Prof. Sanjiv Mittal, University School of Management Studies, GGSIP University
19. Prof. U.K. Mandal, University School of Chemical Technology, GGSIP University
20. Prof. Udayan Ghosh, University School of Information Communication & Technology, GGSIP University
21. Dr. Nimisha Sharma, Associate Professor University School of Biotechnology, GGSIP University
22. Dr. Gulshan Kumar, Asst. Professor, University School of Basic and Applied Science, GGSIP University

Copy for information of the Competent Authority:

- (i) AR to the Vice Chancellor, GGSIP University
- (ii) AR to the Registrar, GGSIP University



(Ravi Dadhich)  
Registrar



**GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY**  
**SECTOR – 16 C, DWARKA, NEW DELHI - 110078**



GURU GOBIND SINGH  
INDRAPRASTHA  
UNIVERSITY

**FORTY SEVENTH MEETING OF THE ACADEMIC COUNCIL**

**DATE : 1<sup>st</sup> OCTOBER, 2019 (TUESDAY)**

**TIME : 10:30 A.M.**

**VENUE : VC SECTT., (CONFERENCE HALL)**

**MINUTES FOR 47<sup>th</sup> ACADEMIC COUNCIL MEETING**

*Ranindras*



## INDEX

S.No.	Agenda Item(s) No.	Particulars	Page No.
01	AC 47.01	To confirm minutes of the 46 <sup>th</sup> meeting of the Academic Council held on 22.07.2019.	05
02	AC 47.02	To report action taken on the minutes of 46 <sup>th</sup> meeting of the Academic Council held on 22.07.2019.	05
03	AC 47.03	To ratify the introduction of DM Neonatology at Dr. Ram Manohar Lohia, Hospital, New Delhi and the MCI approved syllabus for the course w.e.f, Academic Session 2019-20.	05
04	AC 47.04	To ratify the proposal for introduction of B.Sc. Clinical Neuroelectrophysiology & Technology (3 year course) at Vardhman Mahavir Medical College & Safdarjung Hospital, New Delhi w.e.f academic session 2020-21.	05
05	AC 47.05	To ratify the M.Sc. Nursing syllabus (page 32 to 51 and pages 73 to 145) drawn by the Indian Nursing Council running at the St. Stephen's Hospital stands post-facto approved.	05
06	AC 47.06	To ratify the scheme of examination for B.Sc. Nursing course effective Academic Session 2019-20.	05
07	AC 47.07	To consider and approve the Credit changes 3 to 1 in the Ph.D. course (CT-715 Self Study, L-0, T-1, P-0).	06
08	AC 47.08	To consider and approve the course title of B.Tech (Biochemical Engineering) course BCT-455.	06
09	AC 47.09	To consider and approve the minor changes in the B.Tech (Chemical Engineering) course BA-116 Physics-II syllabus contents.	06
10	AC 47.10	Approval of admission process for the MBA (Finance Analysis) Programme w.e.f. Academic Session 2020-2021.	06
11	AC 47.11	The representations received from non promoted students of 1 <sup>st</sup> year B.Arch Programme (2018-2019) batch Vis-à-vis the Promotion policy as per the new semester scheme introduced with effect from Academic Session 2018-2019.	06
12	AC 47.12	To start the new B.A.B.ED. (4 years Integrated) Programme at University School of Education, Guru Gobind Singh Indraprastha University from the session 2020-21 onwards.	07
13		Any other item with permission of the Chair	07

*Raninder*



The Academic Council considered and ratified the scheme of examination for B.Sc. Nursing course w.e.f. Academic Session 2019-20.

**Agenda Item No. AC 47.07 :** To consider and approve the Credit changes 3 to 1 in the Ph.D. course (CT-715 Self Study, L-0, T-1, P-0).

The Academic Council considered and approved the Credit changes 3 to 1 in the Ph.D. course (CT-715 Self Study, L-0, T-1, P-0).

**Agenda Item No. AC 47.08 :** To consider and approve the course title of B.Tech (Biochemical Engineering) course BCT-455.

The Academic Council considered and approved the course title of B.Tech (Biochemical Engineering) course BCT-455.

**Agenda Item No. AC 47.09 :** To consider and approve the minor changes in the B.Tech (Chemical Engineering) course BA-116 Physics-II syllabus contents.

The Academic Council considered and approved the minor changes in the B.Tech (Chemical Engineering) course BA-116 Physics-II syllabus contents.

**Agenda Item No. AC 47.10 :** Approval of admission process for the MBA (Finance Analysis) Programme w.e.f. Academic Session 2020-2021.

The agenda item was withdrawn.

**Agenda Item No. AC 47.11 :** The representations received from non promoted students of 1<sup>st</sup> year B.Arch Programme (2018-2019) batch Vis-à-vis the Promotion policy as per the new semester scheme introduced with effect from Academic Session 2018-2019.

The Academic Council members deliberated on the representations received from the non-promoted students of 1<sup>st</sup> and 2<sup>nd</sup> Semester of B.Arch Programme of Academic Session 2018-2019.

The members considered the recommendation of the Board of Studies and approved that a onetime supplementary examination may be conducted only for Theory Courses of 1<sup>st</sup> and 2<sup>nd</sup> Semester for the students of Academic Session 2018-19 only, without creating precedence.

*Ramant*

# UNIVERSITY SCHOOL OF CHEMICAL TECHNOLOGY

## SCHEME OF EXAMINATION

&

## SYLLABI

of

### Ph. D. in Chemical Engineering

(w.e.f. 2019 Onwards)



**GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY**  
**Dwarka, New DELHI - 110078**

**Entrepreneurship | Employability | Skill Development**

Approved in the 47<sup>th</sup> meeting of the Academic Council vide agenda item 47.07

## Guru Gobind Singh Indraprastha University

### **Vision**

The University will stimulate both the hearts and minds of scholars, empower them to contribute to the welfare of society at large; train them to adopt themselves to the changing needs of the economy; advocate them for cultural leadership to ensure peace, harmony and prosperity for all.

### **Mission**

Guru Gobind Singh Indraprastha University shall strive hard to provide a market oriented professional education to the student community of India in general and of Delhi in particular, with a view to serving the cause of higher education as well as to meet the needs of the Indian industries by promoting establishment of colleges and Schools of Studies as Centers of Excellence in emerging areas of education with focus on professional education in disciplines of engineering, technology, medicine, education, pharmacy, nursing, law, etc.

### **Quality Policy**

Guru Gobind Singh Indraprastha University is committed to providing professional education with thrust on creativity, innovation, continuous change and motivating environment for knowledge creation and dissemination through its effective quality management system. Rules & Regulations University administration functions while dealing with various issues of administrative and academic significance, within the provisions of the University Act, rules and regulations (Statutes & Ordinances) framed thereunder.

## University School of Chemical Technology

The University School of Chemical Technology recognizes the importance of chemical industry and the need for trained manpower, since establishment of the University in 1999, THE UNIVERSITY has taken the bold and visionary decision to start the University School of Chemical Technology, the only one of its kind in this part of the country after IIT, DELHI. The founding fathers concerned with education required in chemical industry showed extraordinary vision 100 years ago to recognize that education to provide trained manpower could be provided under two broad areas namely Unit Operations and Unit Processes. This framework still holds although it has evolved, expanded and continuously tuned over the last 10 decades to progressively include thermodynamics, reaction engineering, process control, process economics, mathematical and numerical methods, computers, process engineering, separation processes, catalysis hazard and safety etc. each one advancing in its own right with extensive research work both in academia and in industry. The school was established with the twin objectives of generating effective trained professionals and to keep pace with the R & D activities of this fast- changing field of Chemical Technology. The B.Tech. and M. Tech (Chemical and Biochemical) programme being offered by the school are based on the pattern of I.I.T.'s and other national and international institutions of repute. The well-structured programmes are meant to impart comprehensive knowledge of various core chemical and biochemical engineering subjects, interdisciplinary courses in Biotechnology, Information Technology, Environment Management, Management Studies through Electives, and industrial exposure through practical training in laboratories and Industrial Units.

### **Vision**

Achieving excellence through active teaching, skill development and research in the areas of chemical and biochemical engineering and allied areas to become a recognized center for education and research.

### **Mission**

- To generate new knowledge by offering graduate and post graduate programme and provide quality manpower with high employment potential in the present liberalized economic climate in the era of globalization.
- To generate new knowledge by offering graduate and post graduate programme.
- Impart quality teaching and train students in addressing the challenges in the Chemical and Biochemical Engineering and allied areas.
- Provide quality manpower with high employment to achieve proficiency in Chemical and Biochemical Engineering through innovative teaching and state of the art laboratories.
- Develop inclusive technologies with a focus on sustainability.
- Team up with industries and research institutes to cater community needs.



## **Doctor of Philosophy** **(Chemical Engineering)**

The school was established since the foundation of the university in 1999. It is now a center for teaching and research in the modern field of chemical technology and biochemical engineering. Considering the dynamism of science and engineering, the school started the post graduate course in chemical engineering since the conception of the university. The purpose was creating well-trained human resources to fulfil the growing demand in the fields of chemical processes development. The course emphasized to synthesize and evolve chemical process technology towards sustainable development and trained work force for research and development. The curriculum has been designed in order to provide education to the students with background of Chemical Engineering/ Biochemical Engineering/ Chemical Technology/Biotechnology/Environmental Engineering or allied fields. The Ph.D. in Chemical Engineering has been designed to prepare each student to actively participate in the development and growth of the field of chemical engineering at all levels in the industry or in research and teaching in a university or a research organization. Students can enter the Ph.D. program either with a master's or a bachelor's degree in engineering and select their research areas at the end of the first semester. Research is being carried out in a wide range of modern chemical engineering areas ranging from separation technology, nanotechnology, bioengineering, energy and sustainability, transport and reaction engineering etc.. Students are exposed to advanced experimental and theoretical techniques, attend national and international conferences as well as workshops and specialized schools during the program. Several research areas are interdisciplinary in nature and others are funded by industry/Govt. funding agencies, giving students a flavor for both applied and basic research. Students with a Ph.D. degree either pursue a post-doctoral position aiming for an academic career or find employment in industries at different level including R & D. Also students will gain competence to serve the various higher educational institutions for both teaching and research.

**Program Educational Objectives (PEO)**

PEO1	Pursue successful industrial/academic/research careers in chemical engineering and allied fields. Contribute as Chemical Engineer by conceptualizing various engineering principles to improve technology.
PEO2	Apply the knowledge of advanced topics in chemical engineering to meet contemporary needs of industry and research. Pursue higher education, and contribute to research and development, through innovation and continuous learning.
PEO3	Exhibit project management skills with the multifaceted aspects of using modern software, equipment/ analytical instrument, and ability to work in collaborative environment.
PEO4	To make professionals to apply principles of chemical engineering in solving practical problems related to safety, energy and environment.
PEO5	Pursue self-learning to remain abreast with latest developments for continuous technical and professional growth. Exhibit leadership skills and entrepreneurial qualities for the welfare of society.
PEO6	Research is carried out in a wide range of modern chemical engineering areas ranging from biochemical engineering, energy and sustainability, environment engineering. To apply a significant range of advanced and specialized skills and be able to act autonomously in the planning and implementation of research.
PEO7	Explain aspects of instrumentation such as, Spectroscopic detection Techniques, Chromatographic techniques, and students will be proficient in utilizing the various equipment in the department.
PEO8	To educate students to be scientifically literate and provide them opportunities for professional growth through designing and executing chemical research projects.



### **Programme Outcomes (POs)**

At the end of the program the student will be able to:

PO1	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
PO2	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO3	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to arrive at scientifically acceptable conclusions.
PO4	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO5	Function on multidisciplinary team or to lead a technical group.
PO6	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
PO7	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings
PO8	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological challenges.

**Programme specific outcomes (PSOs)**

PSO1	Apply the knowledge of basic science and engineering principles to identify, formulate and analyze Chemical engineering and allied industrial problems as a successful employee/employer. Apply the principles and practices of Chemical Engineering discipline along with the basic sciences and humanities to solve the complex engineering problems concerning the issues of environment, safety, economics, culture and society etc.
PSO2	The students acquire the design solutions for engineering problems and processes with due consideration for transport operations, control systems, environmental concern, safety and waste minimization by appropriate technology and process simulation tools. Design, develop and modify the chemical processes and to analyze these by applying the physicochemical and biological techniques.
PSO3	The students will be expertise to synthesizing the information of recent advancement in chemical engineering for conducting research in the wider fields of theoretical development, current issues and strategies planning.
PSO4	The students will comprehend to function effectively as an individual, researcher and as a member or leader in multidisciplinary settings of engineering community and society. Acquire and apply the new knowledge with professional responsibility and ethics towards the advancement of academic and research pursuits in chemical and allied disciplines in the societal contexts.



<b>Theory Papers</b>					
<b>S. No</b>	<b>Paper Code</b>	<b>Paper</b>	<b>L</b>	<b>T</b>	<b>Credits</b>
<b>Compulsory Courses</b>					
1	CT-713	Research Methodology and Data Analysis	3	1	4
2	Ph.D. ICT-102	Research Publication and Ethics	2	0	2
<b>Optional Courses</b>					
3		Elective*			
4.	CT715	Self-Study	0	1	1

\*(**Elective Course**): Students can select from any existing/running PG/Ph.D. courses from USCT or any other University school studies depending on student's requirements with the consent of RAC/SRC.

**Elective course credits can be 2/3/4 depending on the subject chosen for study.**

The student is required to complete the course work requirements as per Ph.D. Ordinance of GGSIPU applicable from time to time.

Practical/Viva Voce						
Paper ID	Paper Code	Title	L	T	P	Credit
	CT-715	Self-Study	0	1	0	1
		Total	0	1	0	1

**Course Objectives:**

- To acquire hands-on experience in the application of theoretical techniques to engineering problems.
- To educate the students in understanding the multifaceted aspects of chemical engineering and in applying the various computational methods studied, for problem analysis and solution.
- To use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.
- Create, select, and apply appropriate techniques, resources, and modern engineering and research tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

**Course Outcomes:**

- The students will be able to deliver well-organized technical presentations at conferences and other symposia.
- Undertake real life projects in process industries and allied fields.
- Students will gain the understanding of selected classic and current topics in theoretical aspects.
- Communicate effectively on complex engineering activities with the engineering community and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**Couse Content**

- Students should give atleast three presentations per semester to his/her research topic.



Code	Course name	L	T	P	Total credits
CT -713	Research Methodology and Data Analysis	3	1	0	4

### Course Objective

- To develop an understanding of various techniques used in research and data analysis

### Course Outcomes

- Understand research process, different research methods and techniques
- Understand and apply statistical concepts and statistical interference to analyze data that can assist in future researches
- Explore regression analysis and learn to develop models
- Enable the students to conduct the design of experiments

### Course content:

**Unit 1: Scientific research:** Meaning, characteristics, and significance of the scientific research. Steps of research process, Research presentation, Data/ Literature sources and their access.

(4 Hrs)

**Unit 2: Descriptive Statistics and Measures of Variability:** Representation of data: Mean absolute deviation, variance, standard deviation and their calculation; z-scores; Coefficient of variation.

(8 Hrs)

**Unit 3: Regression Analysis and Correlation:** Correlation; Single and multiple regression analysis; Residual analysis; Standard error of estimate; Coefficient of determination; Estimates.

(10 Hrs)

**Statistical Interference:** Hypothesis testing; z- statistics and t-statistics; Sampling and data collection: Analysis of variance (ANOVA).

(10 Hrs)

**Unit 4: Research Design:** Basis principles of experimental design: Types of experimental design; Factorial design of experiment; Box Wilson method; Response surface analysis: Design of experiments and analysis of data using statistical software like Design Expert etc. with application to chemical/biochemical engineering problems.

(10 Hrs)

**Text & Reference Books:**

1. C.R. Kothari, and Gaurav Garg, Research Methodology Methods and Techniques, Fourth edition, New Age International (P) Limited, Publishers, 2020.
2. Ken Black, Applied Business Statistics, Seventh Edition Wiley India, 2012.
3. C. George Thomas, Research Methodology and Scientific Writing, 2nd Edition, ANE Books India and Springer Nature Switzerland AG, 2021.
4. R.E. Walpole, Myers, R.H., Myers, S.L. and Ye, K., Probability and Statistics for Engineers and Scientists, Ninth edition Pearson Education (2012).

Code	Course name	L	T	P	Total credits
Ph.D. ICT102	Research Publication and Ethics	2	0	0	2

#### Course Objectives:

- The purpose of this course is to engage researchers in recognizing the relevant ethical principles related to the conduct of research.
- Provide students with knowledge, general competence, and analytical skills in Research Methodology and Research & Publication Ethics.

#### Course Outcomes:

- To provide students with knowledge and analytical skills in research and publication ethics.
- To be able to describe and apply theories and methods in research ethics.
- To identify publication misconduct and predatory journals.
- To utilize various indexing and citation databases and outline research matrix.
- To appraise research integrity and to apply different tools for plagiarism check.
- Build a strong foundation for future research work in a systematic manner by applying notions of Research Methodology

#### Course content:

##### Unit I: Philosophy and Ethics

Introduction to philosophy: definition, nature and scope, concept, branches - Ethics: definition, moral philosophy, nature of moral judgements and reactions. **(3 Hrs)**

##### Unit II: Scientific Conduct

Ethics with respect to science and research - Intellectual honesty and research integrity - Scientific misconducts: Falsification, Fabrication and Plagiarism (FFP) - Redundant Publications: duplicate and overlapping publications, salami slicing - Selective reporting and misrepresentation of data. **(5 Hrs)**

##### Unit III: Publication Ethics

Publication ethics: definition, introduction and importance - Best practices / standards setting initiatives and guidelines: COPE, WAME, etc. - Conflicts of interest - Publication misconduct: definition, concept, problems that lead to unethical behavior and vice versa, types - Violation of publication ethics, authorship and contributor ship - Identification of publication misconduct, complaints and appeals - Predatory publisher and journals. **(7 Hrs)**



#### **Unit IV: Open Access Publishing**

Open access publications and initiatives - SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies - Software tool to identify predatory publications developed by SPPU - Journal finger / journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer, Journal Suggester, etc. **(4 Hrs)**

#### **Unit V: Publication Misconduct**

Group Discussion (2 Hrs.) :a) Subject specific ethical issues, FFP, authorship b) Conflicts of interest c) Complaints and appeals: examples and fraud from India and abroad Software tools (2 Hrs.) : Use of plagiarism software like Turnitin, Urkund and other open source software tools. **(4Hrs)**

#### **Unit VI: Databases and Research Metrics**

Databases (4 Hrs): Indexing databases, Citation databases: Web of Science, Scopus, etc. Research Metrics (3 Hrs.): Impact Factor of journal as per Journal Citations Report, SNIP, SJR, IPP, Cite Score - Metrics: h-index, g index, i10 Index, altmetrics. **(7Hrs)**

#### **References**

1. Nicholas H. Steneck. Introduction to the Responsible Conduct of Research. Office of Research Integrity. 2007. Available at: <https://ori.hhs.gov/sites/default/files/rcrintro.pdf>
2. The Student's Guide to Research Ethics By Paul Oliver Open University Press, 2003
3. Responsible Conduct of Research By Adil E. Shamoo; David B. Resnik Oxford University Press, 2003
4. Ethics in Science Education, Research and Governance Edited by Kambadur Muralidhar, Amit Ghosh Ashok Kumar Singhvi. Indian National Science Academy, 2019. ISBN : 978-81-939482-1-7.
5. Anderson B.H., Dursaton, and Poole M.: Thesis and assignment writing, Wiley Eastern 1997.
6. Bijorn Gustavii: How to write and illustrate scientific papers? Cambridge University Press.
7. Bordens K.S. and Abbott, B.b.: Research Design and Methods, Mc Graw Hill, 2008.
8. Graziano, A., M., and Raulin, M.,L.: Research Methods – A Process of Inquiry, Sixth Edition, Pearson, 2007.