Academic Profile

Prof. Sanjiv Kumar

Name		**Prof. Sanjiv Kumar**
Designation		**Professor**
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EDUCATIONAL QUALIFICATIONS

Degree	Year	University
B.Sc. (H) Chemistry	1981	University of Delhi
MSc (Chemistry) (Specialisation: Physical Chemistry)	1983	University of Delhi
Certificate in German	1984	University of Delhi
PhD (Chemistry)	1990	University of Delhi
M.A. in Distance Education (MADE)	2000	Indira Gandhi National Open University

CAREER PROFILE

Name of the Institution	Position held	Temporary/ Permanent	From	To
Moti Lal Nehru College University of Delhi	Lecturer	Temporary	09.09.88	11.07.90
Kirori Mal College University of Delhi	Lecturer	Temporary	14.09.90	10.12.90
Deshbandhu College, University of Delhi	Lecturer	Permanent	11.12.90	10.11.93
Deshbandhu College, University of Delhi	Senior Lecturer	Permanent	11.11.93	26.07.98
Deshbandhu College, University of Delhi	Reader	Permanent	27.07.98	31.12.05
Deshbandhu College, University of Delhi	Associate Professor	Permanent	01.01.06	24.04.08 (FN)
School of Sciences, IGNOU	Associate Professor	Permanent	24.04.08	23.04.2011
School of Sciences, IGNOU	Professor	Permanent	24.04.11	Till date

TEACHING EXPERIENCE:

- MORE THAN 31 YEARS (AROUND 20 YEARS IN CONVENTIONAL SYSTEM AND REST IN ODL)

AREA OF INTEREST/SPECIALIZATION

- BIOPHYSICAL CHEMISTRY
- MATERIAL SCIENCE
- QUANTUM CHEMISTRY AND MOLECULAR SPECTROSCOPY

ROLES AND RESPONSIBILITIES AT IGNOU

- Design, Development and maintenance of programmes / courses
- Programme and course coordination
- Guiding students for Research Degrees
- Teaching M.Phil / PhD students (**on campus**)
- Teaching UG/PG students (**off campus**) through SLM, teleconferencing (via Gyandarshan) and Interactive Radio Counselling (IRC) through GyanVani
- Design and development of Video programmes to augment SLMs
- Learner evaluation related activities

COURSES TAUGHT

Undergraduate

- Quantum Chemistry and Spectroscopy to the students of B.Sc. (H) Chemistry IIIrd year
- Physical Chemistry Laboratory for the students of B.Sc. (H) Chemistry IIIrd year
- Industrial Chemistry to the students of B.Sc. (G) IIIrd year.
- Physical Chemistry to the students of B.Sc. (H) Biochemistry Ist year
- Photochemistry to the students of B.Sc. (G) IIIrd year.
- Laboratory work for the students of B.Sc. (G) Ist year, IInd year and IIIrd year
- Biochemistry (theory and Lab) for the students of B.Sc (H) Nursing Ist year

Post graduate

- Chemistry of Materials (Full paper)
- Macromolecules (Full paper)
- Advanced electrochemistry and kinetics (part paper)
- Principles of spectroscopy (part paper)
- ICT in Chemistry (part paper)
- Biochemistry (MSc Biochemistry) (part paper)
- Physical Chemistry Laboratory-I
- Physical Chemistry Laboratory-II
- Physical Chemistry Laboratory-III

MPhil / PhD

- Advances in Smart materials
- Analytical Techniques in Chemistry-II
- Spectroscopic methods (for PhD Biochemistry students)

RESEARCH GUIDANCE

Supervision of	Year of completion /award	Name	MPhil / PhD Topic
PhD Degree	2016/2017	S.Krishnaraj	"Assessment and monitoring spatial and temporal changes in groundwater quality in Karur district using multivariate techniques"
PhD Degree	2017/2018	Remya U.	"Development of Quality Control methods for some Ayurvedic oil preparations"
PhD Degree	2018/2018	Smily	"Formulation and assessment of the effectiveness of Fluorescent Powder Compositions in developing Latent fingerprints"
MPhil Degree	2021	Sadhna Kaliramna	"Formulation and assessment of the effectiveness of Fluorescent Powder Compositions in developing Latent fingerprints"

PUBLICATIONS

A. Books/Monographs (**Authored**/Edited)/ **Book Chapter**/ Lecture Notes

1. "Chemistry of Natural Products: Amino acids, Peptides, Proteins and Enzymes", V.K.Ahluwalia, Lalita S. Kumar and **Sanjiv Kumar**; Ane Books India, New Delhi (2006) ISBN: 81-8052-106-0
   - The book initially published by Ane Books India, was later bought by CRC press (Taylor and Francis group U.S.A) for sale in the rest of the world other than Indian subcontinent.

B. Research Papers

1. A Comparative Evaluation of Fluorescent Powder Compositions for Developing Latent Fingerprints on a Legion of Surfaces, Kapoor Smily, Kumar Sanjiv, Sodhi G. S., Kaur Jasjeet, J Punjab Acad Forensic Med Toxicol, Volume : 22, Issue : 1, 94-97 (**2022**). Print ISSN: 0972-5687 Online ISSN: 0974-083X. DOI : 10.5958/0974-083X.2022.00016.4
2. Depletion Studies on Different Fluorescent Powder Compositions, Smily, Gurvinder S. Sodhi, and Sanjiv Kumar; Journal of Forensic Chemistry and Toxicology Volume 5 Number 1, 11-15, Jan - June **(2019)** ISSN: 2454-9363
3. Validation of RP-HPLC method for simultaneous determination of Curcumin, Sesamin and Glycyrrhetinic Acid in a wound healing polyherbal oil formulation, Remya U, Pradnya J. Prabhu, Sanjeev Kumar and Suresh Patankar, International Journal of Chemistry, Vol. 5 (3 & 4) July - September **2016** & October - December 2016 pp 264 – 274 (2016) ISSN: 2249–2119
4. TLC-MS Identification and HPTLC fingerprinting of Curcumin, Sesamin, Glycyrrhetinic acid and Beta sitosterol in wound healing Polyherbal Oil formulations followed by preliminary phytochemical screening and physiochemical analysis, Remya U, Dr. Pradnya J. Prabhu, Sanjeev Kumar and Suresh Patankar, International Journal of Chemistry, Vol. 5 (3 & 4) July - September 2016 & October - December **2016** pp 212 – 222 (2016) ISSN: 2249–2119

5. Application of Cluster and Factor Analysis in Groundwater Quality Monitoring-a case study, S. Krishnaraj, Sanjiv Kumar and K. P. Elango, International Journal of Scientific Engineering and Technological research(IOSR-JESTFT) Volume 4, Issue 7 pp 1241-46, (**2015**) ISSN: **2319-8885**

6. Spectroscopic and Photophysical Studies of Fingerprint Dusting Compositions, Smily Kapoor, Gurvinder S. Sodhi and **Sanjiv Kumar**, Journal of Forensic Investigation, Vol.: 3, Issue: 2, 4 November 2015 **(2015) ISSN: 2330-0396**

7. Visualization of Latent Fingermarks using Rhodamine B: A New Method. Kapoor S, Gurvinder S. Sodhi, Sanjiv K, Int J Forensic Sci Pathol. 3(11), 199-201 (2015) ISSN: 2332-287X

8. Spatial Analysis of Groundwater Quality Using Geographic Information System – A Case Study, S. Krishnaraj, Sanjiv Kumar and K. P. Elango, IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT) Volume 9, Issue 2 PP 01-06 (**2015**) ISSN: e-ISSN: 2319-2402

9. A Multipurpose Composition Based on Brilliant Blue R for Developing Latent Fingerprints on Crime Scene Evidence, Sanjiv Kumar and G.S.Sodhi, Journal of Forensic Investigation, Volume 2, Issue 2, PP 3-5 (**2014**) ISSN: 2330-0396

10. Assessment of groundwater quality in Karur block of Tamil Nadu using multivariate techniques: A case study; S. Krishnaraj, Sanjiv Kumar and K. P. Elango, IOSR Journal Of Environmental Science, Toxicology And Food Technology (IOSR-JESTFT) Volume 6, Issue 1 (Sep. - Oct. **2013**), PP 36-41 (e-ISSN: 2319-2402, ISSN: 2319-2399)

11. Factor analysis as a tool for evaluation of spatial and temporal variations in groundwater quality: A case study; S. Krishnaraj, Sanjiv Kumar and K. P. Elango, IOSR Journal of Applied Chemistry (IOSR-JAC) Volume 5, Issue 5 (Sep. – Oct. **2013**), PP 13-16 (e-ISSN: 2278-5736)

12. "Evidence for oligolysine binding to the minor groove of Poly (dA-dT). Poly (dA-dT); M.Atreyi, M.V.R. Rao and Sanjiv Kumar; Indian Journal of Biochemistry and Biophysics Vol. 25pp 385-388 (**1988**) ISSN: 0301-1208

C. Articles

1. "Quality Assured Delivery of Post Graduate Diploma in Analytical Chemistry (PGDAC) Programme using Vedyadhara Open e-Learning Environment (VOLE)"; Lalita S. Kumar and Sanjiv Kumar; Book "Creative Sparks of Innovation", MPDD, IGNOU, New Delhi pp 87-92 (**2013**) ISBN: 978-81-266-6603-4

2. "SI units for Chemists" Sanjiv Kumar and Lalita S. kumar; Chemistry Education Review-a UGC Journal Vol. 14 (No.4) pp 25-32 (**1999**)

D. Presentations in conferences

1. Early Experiences with a Community Driven Open Education Management System, Lalita S. Kumar, Sanjiv Kumar, and K.R. Srivathsan, presented at the PCF7 Conference being held at Abuja, Nigeria (2-7 December 2013). (2013)

2. "Structural and Functional Aspects of DNA Triplex in Relation To GAA/TTC Repeat Expansion in Friedreich's Ataxia' M.R. Rajeswari, Aklank Jain and Sanjiv Kumar, National Symposium of Functional Genomics held at CAS in Functional Genomics, Madurai Kamraj University, Feb.15-17, (2002)
3. "Structural transformations of polynucleotides induced by polyamines and oligolysines"; M.V.R. Rao, M.Atreyi, Sanjiv Kumar and Shashi Saxena; Indo-soviet workshop on 'DNA-proteins interactions and crosslinking" Indian Institute of Science, Bangalore, March (1990)
4. "Binding of (Lys)n in the minor groove of Poly (dA-dT). Poly (dA-dT): Evidence and model for the interaction."; M.Atreyi, M.V.R. Rao, Suresh Kumar.G and Sanjiv Kumar; 14th IUB International Congress of Bio-chemistry, Prague, Chechoslovakia, (1988)
5. "Ionisation of tyrosine in oligo and copolypeptides: Role of hydrophobic interactions"; M.Atreyi, M.V.R. Rao and Sanjiv Kumar; XIIth IBS symposium on Structure, assembly and Function of Bio-molecules; Dept. of Bio-chemistry, University of Mysore, Mysore, Jan (1985)

E. List of Projects supervised for M.Sc. (Chemistry) On campus Learners

S.No.	Title	Year
1	"Role of Polymers in Control Drug Delivery-A Review"	2011
2	"Generating Term Symbols-a Computational Approach"	2012
3	"Generation of atomic term symbols"	2012
4	"Biomimetic Polymers -a Review"	2012
5	"In-Vitro Evaluation of Chitosan-PVA-Polyol Hydrogels: Synthesis and Characterization"	2012
6	"Targeted Drug Delivery-a Review"	2012
7	"pH sensitive smart polymers-a review"	2013
8	"Conducting Polymers: Conduction Mechanisms"	2013
9	"Biomedical applications of conducting polymers -a review"	2013
10	"Magnetic Resonance Imaging-a Diagnostic Tool"	2013
11	"Temperature Responsive Smart Polymers-A Review"	2013
12	"A review on conducting polymers: synthetic strategies"	2013
13	"Polymerisation in ionic liquids- a review"	2013
14	"A review on biodegradable polymers"	2013

CONFERENCES/SEMINARS/WORKSHOPS: ORGANISED/PARTICIPATED / ATTENDED

A. Conferences/Seminars/Workshops organised

S.No.	Sponsoring Agency	Title/Theme	Duration/ Dates	Extent of involvement

1	School of Sciences, IGNOU	Seminar on "Environmental Earth Observation: A multi disciplinary approach"	½ day on 30th Sept. 2011	Convenor, Seminar Committee
2	School of Sciences and Raman chair, IGNOU	National Conference on "Chemistry: Education and Research Frontiers"	2 days 13th-14th October 2011	Member, Organizing committee
3	School of Sciences, IGNOU	A talk on"Noble Prizes in Chemistry"	One day; 31st Jan. 2012	Convenor, Seminar Committee
4	School of Sciences, IGNOU	Lecture-cum-Panel Discussion on Future Earth: Challenges for Sustainability inContext to Indian Subcontinent	22nd April 2012 (on Earth Day)	Convenor, Seminar Committee
5	Seminar Committee, School of Sciences, IGNOU	"e-Enriched SLM"	25th September 2013	Convenor and resource person
6	Seminar Committee, School of Sciences, IGNOU	"SLM-LIVE"- an innovative intervention in SLM	15th September 2015	Convenor and resource person

B. Conferences participated

S. No.	Role	Title of session	Organizing institute	Conference	City	Date
1	Member, Rapporteur team	Session on "Purposeful Research-Research for Degree to Research for Resurgence"	Research for Resurgence Foundation (RRF) and IGNOU	Conference of Academic Leadership on Education for Resurgence	Delhi	29th Sept. 2018
2	Session Chair	Session on "environmental pollution"	SOITS, IGNOU	International Conference on Environmental and ecological sustain-ability: engaging the stakeholders	Delhi	4-5th Oct. 2018

C. Seminars/Workshops participated as resource person

S No.	Title of Lecture /presentation / Role	Organizing institute	Topic of Seminar / workshop	Date (s)
1	Resource person	CSEC and Hansraj	" Experiments for Chemistry	6th to 10th April

		College, University of Delhi.	education"	1992.
2	Convenor and Resource person	CSEC and Deshbandhu College, University of Delhi.	" Fabrication of digital thermometer and electronic thermostat"	5th to 10th Oct., 1992.
3	Resource person	DCETA, NCERT Delhi	"Workshops on Development of Multimedia package for Senior Secondary level"	10-14th December 2001
4	Resource person	DCETA, NCERT Delhi	Workshop on "Review of Multimedia package for Senior Secondary level"	20-22nd January 2003
5	Resource person	DESM, NCERT Delhi	Workshop on, "Development of Multimedia Package on Organic Chemistry for Senior Secondary level."	23rd to 27th Aug. 2004
6	Resource person	DESM, NCERT Delhi	Development of ICT based support for Higher Secondary curriculum in Chemistry	25-27th Oct. 2010
7	Resource person	Institute of Competency Advancement of Teachers (i-CAT), Gwahati	Workshop on "Technology integration in Science teaching at College level)	5th-6th Feb 2011
8	Resource person	DESM, NCERT Delhi	Development of ICT based support for Higher Secondary curriculum in Chemistry	17th Nov 2011
9	Resource person	NCIDE, IGNOU	Workshop on 'Identifying and Inculcating Creative Practices in Teaching and Learning'	5th-6th Dec, 2012
10	Resource person	NCIDE, IGNOU	Workshop on 'Creative Use of Technology and Tools for teaching learning'	20th- 21st Feb. 2013
11	" SLM- LIVE"	STRIDE, IGNOU, Delhi	Refresher Programme on ICT in ODL	19th Apr. 2017

12	e-enriched SLM	STRIDE, IGNOU, Delhi	Refresher Programme on ICT in ODL	19th April 2017
13	“Circular Dichroism: Principle and applications	DIPSAR, Delhi	AICTE sponsored XXIV QIP on "Recent updates in pharmaceutical Chemistry"	21st Feb 2018
14	“Digital learning: What, Why, and How?”	State University of Performing & Visual Arts (SUPVA)	Digital Learning Workshop	28th Jul 2018
15	“Circular Dichroism: Principle and applications	DIPSAR, Delhi	Continuing Education program	27th Sep. 2018
16	“Research: What, Why and How”	Human Resource Develop-ment Centre, HAU	UGC sponsored Refresher Course on Research Methodology	30th Nov. 2018.
17	“Presenting Research”	Human Resource Development Centre, HAU	UGC sponsored Refresher Course on Research Methodology	30th Nov. 2018.
18	SLM – Live: An Innovative Intervention in SLM	STRIDE, IGNOU	Refresher Programme/ FDP in Distance Education	12th Dec. 2018
19	“MOOCs: What Whyand How?”	RTDC, Sharda University	One day interactive workshop on “MOOC: WHAT WHY AND HOW?”	30th Mar. 2019
20	“Circular Dichroism: Principle and Applications”	Delhi Institute of Pharmace-utical Sciences and Research (DIPSAR)	AICTE Sponsored XXXI Quality Improvement Programme,	4th Apr. 2019
21	“NMR: Principle and Applications”	Delhi Institute of Pharmaceutical Sciences and Research (DIPSAR)	AICTE Sponsored XXXI Quality Improvement Programme	4th Apr. 2019
22	“MOOCs: What, Why and How?”	Organised Jointly by Hemchand Yadav University, Durg and Science College, Durg	Online, FDP	**24th July 2020**
23	"Electronic Structure of Atom: Conceptual Development"	organised by Human Resource Development Centre, Pandit Ravishankar Shukla University (PRSU), Raipur	Online Refresher Course in chemistry –new trends of teaching and research in chemistry,	16th September, 2020

24	" NMR spectroscopy: principle and applications"	organised by Human Resource Development Centre, Pandit Ravishankar Shukla University (PRSU), Raipur	Online Refresher Course in chemistry –new trends of teaching and research in chemistry,	24th September, 2020
25	"Electronic Structure of Atom"	Jointly organized by Commissionerate of College Education Rajasthan Jaipur & Smarat Prithviraj Chauhan Government College, Ajmer	GYAN GANGA PROGRAMME 2021 State level training workshop under subject specific short term programme	16th January 2021

D. Seminars/Workshops / Conferences attended

S.No.	Topic of the Seminar/ workshop/ symposium	Organised by	Dates
1	"Open and Distance Learning in the New Millennium"	ICDE Asian Regional Conference	3-5th Nov.,2000
2	"Latest Trends in Raman Spectroscopy"	Indian society of Analytical scientists (ISAS)	17th Nov.,2000
3	National Symposium on, " Biotechnology: Expanding Horizons"	Acharya Narendra Dev College, University of Delhi	17-18thOct. 2003
4	One-day seminar on, " Quality system, MRA and WTO in present Indian Scenario".	Indian Society of Analytical Scientists and National Physical Laboratory	23rdJanuary 2004
5	One day seminar on, "Restructuring of the Bachelor of Science Three Year Degree Programme: Towards Flexibility and Multidisciplinary Courses"	Centre for Science Education and Communication (CSEC), University of Delhi	17th Sept., 2004
6	National seminar on " Recent Trends in Chemistry"	Maitreyi College, University of Delhi	22-24th Sept., 2004
7	National Symposium on, " Emerging Areas of Forensic Science"	SGTB Khalsa College, University of Delhi	4-6th Dec. 2004
8	Two-day national seminar on "Chemistry–Industry Interface",	ARSD College, University of Delhi	8-9th Dec. 2005
9	One-day seminar on "Frontier	Delhi Chapter of Indian Society	20th Dec.2005

	Technologies in Chemical, Biological and Horticultural Sciences"	of Analytical Scientists.	
10	Two day workshop on "NMR spectroscopy and its applications"	Indian Society of Analytical Scientists	18-19th Aug. 2006
11	One–Day National Seminar on "Forty Years of Kothari Commission Recommendations and Quality Science Education and Research"	University of Delhi	4th Dec.2006
12	National Symposium on " Emerging Trends in Biotechnology"	Deshbandhu College, University of Delhi	16-17th Nov.2006
13	Orientation Programme in Open and Distance Learning: Dynamics of course Design, Development and Delivery.	STRIDE, IGNOU	9-19th June 2008
14	Workshop on "Working on skill development using ICT tools for Innovative learning solution"	NCIDE, and IUC, IGNOU	16-17th Oct.2008
15	Training programme on Development of Interactive multimedia course materials	IUC, IGNOU	1-12th Dec. 2008
16	"National workshop on Scientific computing"	IIITM-K Trivandrum	30-31st Jan.2009
17	Training programme on ICT capacity building of college and university teachers,	IUC-TEFED (IGNOU) and MHRD	9-20th Feb. 2009

RESEARCH PROJECTS NIL

Sponsoring Agency	Period	Grant	Project Title	P. I./Co-Investigator(s)

HONOURS/AWARDS/DISTINCTIONS

- Awarded Gold medal for "Innovation in Open and Distance Learning" along with Prof. Lalita S Kumar, by NCIDE, IGNOU. (2011)
- Nominated as Member, Academic Advisory Council (AAC) by CEC, National Coordinator, UG MOOCs (2019)

PROFESSIONAL ASSOCIATIONS

- Life member, Indian Association of Analytical Scientists (ISAS)
- Life member, National Magnetic Resonance Society of India (NMRS)

Other contributions at IGNOU:

i. Devised and implemented the concept of 'e-enriched SLM' in Vedhyadhara-an Open Learning Environment created by erstwhile Advanced Centre for Informatics and

Innovative Learning (ACIIL), IGNOU.

ii. Conceptualised SLM-LIVE: Self-learning material with ICT intervention in the form of augmented reality. It is an initiative to provide accessible learning support.

iii. Associated with the development of Technology Enabled Learning and Support solutions including online LMS, e-learning policy etc., as member of Technology Enabled Education Group (TEEG)

iv. Contributed towards the Design and Development of 'e-samagri' – digitised learning material package for the learners

v. Compiled "e-Resources for Self Learning" http://www.ignou.ac.in/userfiles/e-Resources%20for%20Self%20Learning%20.pdf

Other activities

A. Development and Delivery of MOOC Courses through SWAYAM

Successively run three cycles of the MOOC titled, "Atomic Structure and Chemical Bonding" hosted at Study Webs of Active-Learning for Young Aspiring Minds (SWAYAM)- an indigenous IT platform of INDIA, developed by Ministry of Human Resource Development, Government of India. (Link for promotional Video: https://www.youtube.com/watch?v=1bImdIfQxN8)

Cycle 1:	21.11.2016 - 26.12.2016
Cycle 2:	05.09.2017 - 14.10.2017
Cycle 3:	06.08.2018 - 31.12.2018

B. Development of e-Content Modules for BSc Chemistry under NMEICT

Engaged with the development of e-content under the NMEICT project of MHRD. Under this activity, the Model Curriculum of UGC is being converted into 'e-content' in the form of modules. Each module of the e-content consists of about half an hour of video chunked into smaller packets. The video lecture is being supplemented with the objectives, transcript, frequently asked questions, self-assessment questions (quiz), glossary, summary etc.

(The video component of the e-content developed in four quadrants has been televised a number of times through Channel-8 of SWAYAMPRABHA and is archived at the YouTube (https://www.youtube.com/channel/UCBMvdXXJ7BcZcTKGPj9WxKg); the links of the archived lectures are given)

S. No.	B.Sc. 3rd Year	Paper Code: CH- 303 (Physical Chemistry-III; Paper-XI)
	UNIT-I: Elementary quantum mechanics	
1	Module -1	Inadequacy of Classical Mechanics-I https://www.youtube.com/watch?v=iS-e4BMmpF4

2	Module -2	Inadequacy of Classical Mechanics-II https://www.youtube.com/watch?v=-I2Rgij44_k
3	Module -3	Quantum Mechanics: Origin and Success https://www.youtube.com/watch?v=lBMpKvMu6iU
4	Module -4	Consequences of Quantum Mechanical Nature of microscopic World: Wave – Particle Duality and Uncertainty Principle https://www.youtube.com/watch?v=Wf_EyuTcEX0
5	Module -5	Introduction to Wave Mechanics https://www.youtube.com/watch?v=vPE4sydlZpg
6	Module -6	Particle in One Dimensional Box-I https://www.youtube.com/watch?v=b06A74JhSCg
7	Module -7	Particle in One Dimensional Box-II https://www.youtube.com/watch?v=wCOz9AOEDgM&list=PLOnJQiDsowohD6MyKtjSRoGOhHve834I4&index=7
8	Module -8	Particle in Three Dimensional Box https://www.youtube.com/watch?v=DzAeaTkaWc0
9	Module -9	Hydrogen atom-I (Designing and processing the SWE) https://www.youtube.com/watch?v=KXjMZ7rdfhg
10	Module -10	Hydrogen atom-II (Solutions of R, Θ and Φ equations) https://www.youtube.com/watch?v=agwhbQXQnSM
11	Module-11	Hydrogen atom-III (Shapes of orbitals) https://www.youtube.com/watch?v=TYrVXPIwBBY
12	Module-12	Hydrogen molecule ion-I https://www.youtube.com/watch?v=2SA47EnmMsU
13	Module-13	Hydrogen molecule ion-II
14	Module-14	Molecular Orbital Theory https://www.youtube.com/watch?v=5aBiceNNDfQ
15	Module-15	Valence Bond Theory https://www.youtube.com/watch?v=Linj6qZBcB8
16	Module-16	Valence Bond Theory (Hybridisation) https://www.youtube.com/watch?v=TwmnQ_9-bS8
	B.Sc. 3rd Year	Paper Code: CH- 303 (Physical Chemistry-III;
	Unit-II: Spectroscopy	
17	Module -1	Introduction to spectroscopy-I (Nature of radiation) https://www.youtube.com/watch?v=Bjo-XshGjKQ&t=58s

18	Module -2	Introduction to spectroscopy-II (Nature of matter and its interaction with radiation) https://www.youtube.com/watch?v=N7dA1qasa44
19	Module -3	Introduction to spectroscopy-III (Types of spectra and their characteristics) https://www.youtube.com/watch?v=-5N6mSaJImA
20	Module -4	Basic aspects of instruments for molecular spectroscopy-I https://www.youtube.com/watch?v=VimPE6Hh9Cg
21	Module -5	Basic aspects of instruments for molecular spectroscopy-II (Detectors and types of instruments) https://www.youtube.com/watch?v=BuxCSzHGUuE
22	Module -6	Rotational Spectrum-I (Origin and nature of spectrum) https://www.youtube.com/watch?v=_dK37SfHgYA
23	Module -7	Rotational Spectrum-II (Effects of non rigidity and isotopic substitution) https://www.youtube.com/watch?v=QLEQwgRbqvc
24	Module -8	Vibration Spectroscopy –I (Origin of vibration spectrum) https://www.youtube.com/watch?v=DgzjwBk2LgI
25	Module -9	Vibration Spectroscopy-II (Nature of spectrum and polyatomic molecules) https://www.youtube.com/watch?v=2Cww5FSYtZE
26	Module-10	Vibration Spectroscopy-III (Group frequencies and factors affecting them) https://www.youtube.com/watch?v=at4aqBAorxc
27	Module -11	Raman spectroscopy-I (Raman effect and origin of Raman Spectra)
28	Module-12	Raman spectroscopy-II (Pure rotation and pure vibration Raman spectra) https://www.youtube.com/watch?v=cbGZthdBsPs
29	Module-13	Electronic spectroscopy-I https://www.youtube.com/watch?v=U346AR6fr_c
	B.Sc. 3rd Year	Paper code: CH- 303 (Physical Chemistry-III; Paper-XI)
	Unit-III: Photochemistry	
31	Module-1	Introduction to Photochemistry https://www.youtube.com/watch?v=DC4J0t1z3e8

32	Module-2	Photochemistry-II https://www.youtube.com/watch?v=pqSpb6Ms3pA
33	Module-3	Photochemistry-III https://www.youtube.com/watch?v=vtSMJiYOp1w
34	Module-4	Photochemistry-IV https://www.youtube.com/watch?v=TBYhphWLkyI
	B.Sc.3rd Year	Paper Code: CH- 303 (Physical Chemistry-III; Paper-XI)
	Unit-IV: Physical properties and molecular structure	
35	Module-1	Optical activity & dipole moment and structure https://www.youtube.com/watch?v=oCMcDsrTKFM
36	Module-2	Polarization of dielectric https://www.youtube.com/watch?v=ThkeRJw4yUY
37	Module-3	Measurement of Dipole moment and Magnetic properties of materials https://www.youtube.com/watch?v=rfifO5xSwMA
	B. Sc. 3rd Year	Paper Code: CH 302 (Organic chemistry-III; Paper-X)
	Unit-I: Spectroscopy	
38	Module -1	NMR Spectroscopy-I: Introductory aspects https://www.youtube.com/watch?v=CXKYRtZ5Xa4
39	Module -2	NMR Spectroscopy-II: Introductory aspects (contd.) https://www.youtube.com/watch?v=6xAvcwGl7m8
40	Module -3	NMR Spectroscopy-III: NMR spectrum and its Characteristics https://www.youtube.com/watch?v=YGPW1yrz7wY
41	Module -4	NMR Spectroscopy-IV: Measuring Chemical Shift & factors affecting https://www.youtube.com/watch?v=3c0YtQx_ZbI
42	Module -5	NMR Spectroscopy-V: Factors affecting Chemical Shift https://www.youtube.com/watch?v=Q2xXlJfYHdg&t=350s
43	Module -6	NMR Spectroscopy-VI: Equivalent protons and spin-spin coupling https://www.youtube.com/watch?v=xSVQZyvp2jA
44	Module -7	NMR Spectroscopy-VII: Structure –spectrum correlations: Spectra of simple molecules https://www.youtube.com/watch?v=ItshmuWOMmA
45	Module -8	NMR Spectroscopy-VIII: Interpretation of NMR spectra https://www.youtube.com/watch?v=V-pquBM9nJc&t=563s
46	Module -9	NMR Spectroscopy-IX: Interpretation of NMR spectra-II

		https://www.youtube.com/watch?v=WmsLxQiAa94
	B. Sc. 3rd Year	Paper Code: CH 302 (Organic chemistry-III; Paper-X)
	Unit-VII: Amino acids, peptides, proteins and nucleic acids	
47	Module -1	Amino acids-1: Nomenclature, Representation, and Classification https://www.youtube.com/watch?v=Ns6QnWhnq34&t=534s
48	Module -2	Amino acids-2: Acid-base properties and stereochemistry https://www.youtube.com/watch?v=bFfBWuFNGpY
49	Module -3	Amino acids-3: Chemical synthesis and reactions https://www.youtube.com/watch?v=k6leWseZtDY&t=14s
50	Module -4	Peptides-I: Structure, nomenclature and sequencing https://www.youtube.com/watch?v=gTpuD6ERZ0I&t=829s
51	Module -5	Peptides-II: Peptide synthesis https://www.youtube.com/watch?v=e7ZBY8r5nS8
51	Module -6	Proteins: Classification and structure https://www.youtube.com/watch?v=SfdqEGIK-Ww
53	Module -7	Nucleic acids: Components and structure https://www.youtube.com/watch?v=ZRg3QYNYi6s
	B. Sc. 2nd Year	Paper Code: CH 202 (Organic chemistry-II; Paper-VI)
	Unit-I: Electromagnetic spectrum: absorption spectra	
54	Module -1	Spectroscopy: an overview https://www.youtube.com/watch?v=RXI591Ch7pU
55	Module -2	UV-VIS Spectroscopy-1: Origin and characteristics of spectrum https://www.youtube.com/watch?v=xJRhaAWTeQA
56	Module -3	UV-VIS Spectroscopy-2: Factors affecting UV-VIS spectrum https://www.youtube.com/watch?v=foDro9N_3gE
57	Module -4	UV-VIS Spectroscopy-3: Recording the spectrum and principle of spectrophotometry https://www.youtube.com/watch?v=Dt68MzkrGmU
58	Module -5	UV-VIS Spectroscopy-4: Woodward-Fieser rules: dienes https://www.youtube.com/watch?v=V_nATdYF56U
59	Module -6	UV-VIS Spectroscopy-5: Woodward-Fieser rules for eneones https://www.youtube.com/watch?v=dF5qQyhB7Ok
60	Module -7	IR Spectroscopy-1: Basic aspects https://www.youtube.com/watch?v=uaU-eEWyCRw

61	Module -8	IR Spectroscopy-2: Origin and measurement of IR spectrum https://www.youtube.com/watch?v=m6oL9WsWUyw
62	Module -9	IR Spectroscopy-3: Factors affecting IR spectrum, Group frequencies & Fingerprint region https://www.youtube.com/watch?v=muSoME7W544
63	Module-10	IR Spectroscopy-4: Structure spectrum correlation https://www.youtube.com/watch?v=mbkjcYu7krQ
64	Module -11	IR Spectroscopy-5: Interpreting IR spectra https://www.youtube.com/watch?v=hyZzHj3lrLM
	B. Sc. 1st Year	Paper Code: CH 101 (Inorganic Chemistry-I, Paper-I)
	Unit-III: Chemical bonding	
65	Module -1	Introduction and classical theories https://www.youtube.com/watch?v=LoSMHNHg1cc&t=49s
66	Module -2	Shapes of molecules: VSEPR theory https://www.youtube.com/watch?v=w8rGFcWyf44
67	Module -3	Valence bond theory https://www.youtube.com/watch?v=XjSyel4Y_ZU&t=101s
68	Module -4	Hybridisation and molecular shape https://www.youtube.com/watch?v=8dzEm92V000&t=136s
69	Module -5	Molecular Orbital Theory-I https://www.youtube.com/watch?v=fl8mcKx_v-0
70	Module -6	Molecular Orbital Theory-II https://www.youtube.com/watch?v=jCGyspIJv08
71	Module -7	Molecular Orbital Theory-III: Heteronuclear diatomic molecules https://www.youtube.com/watch?v=HXdJA7YoSJU
72	Module -8	Ionic solids-I: Ionic structures, radius ratio rules and their limitations https://www.youtube.com/watch?v=ts3187z9Gss
73	Module -9	Ionic solids-II: Lattice defects https://www.youtube.com/watch?v=3URxZnZtfO0&t=221s
74	Module-10	Bonding in metals https://www.youtube.com/watch?v=dTkbbCftnkM&t=1088s
75	Module -11	Semiconductors: Structure & Conduction mechanism https://www.youtube.com/watch?v=VMarSQ61agA
76	Module -12	Lattice energy and its determination https://www.youtube.com/watch?v=EZknecH-bFI
77	Module -13	Weak (non-covalent) interactions https://www.youtube.com/watch?v=zAAq0HXMS-8

78	Module -14	Covalency & energetics of dissolution https://www.youtube.com/watch?v=Ek9568j5M_E
	B. Sc. 1st Year	Paper Code: CH 103 (Inorganic Chemistry-I, Paper-I)
	Unit-IV: Solid State	
79	Module-1	Introduction to Solid State https://www.youtube.com/watch?v=yTDFl3vUoNo
80	Module-2	Internal structure of crystalline solids (Concepts of lattice and unit cell https://www.youtube.com/watch?v=ztw-osPIrSE
81	Module-3	Bravais Lattices and Cubic Unit Cells https://www.youtube.com/watch?v=ZXqjx0a1tBA
82	Module-4	Close packed structures https://www.youtube.com/watch?v=wGT7hjcwbBQ
83	Module-5	Structures of some crystalline solids https://www.youtube.com/watch?v=_-FSOQxHGiM
84	Module-6	Molecular symmetry https://www.youtube.com/watch?v=axzmqRHcmcI
85	Module-7	Crystal symmetry https://www.youtube.com/watch?v=4iDmOJW8cJM
86	Module-8	Crystal planes: Designation and X-ray diffraction https://www.youtube.com/watch?v=J-q3Wik6TtI
87	Module-9	Experimental determination of crystal structure https://www.youtube.com/watch?v=-OlqjK1Lw1I
	Additional modules for MOOC on "Atomic Structure and Chemical Bonding"	
88	Module 1	Development of concept of atom
89	Module 2	Concept of Quantisation and its importance
90	Module 3	Bohr's model of atom

C. I. List of Video programmes prepared at IGNOU

S.No.	Title of the programme	Course (Program)	Year
1	**Spectroscopy: Introductory Aspects-I (Nature of EM Radiation)** https://www.youtube.com/watch?v=eXf4dI4Pq-g&list=PLDCsGRRaAZqdlQV8u05zkwXNIkKgF0XhH	**MCH-003 (PGDAC)**	**2016**

2	**Spectroscopy: Introductory Aspects-II (Quantum Nature of Matter and its interaction with EM Radiation)** https://www.youtube.com/watch?v=hk_uj9E1MMI&list=PLDCsGRRaAZqdlQV8u05zkwXNIkKgF0XhH&index=5	**MCH-003 (PGDAC)**	**2016**
3	**Spectroscopy: Introductory Aspects-III (Types and Characteristics of Spectrum)** https://www.youtube.com/watch?v=7zwWgnerugA&list=PLDCsGRRaAZqdlQV8u05zkwXNIkKgF0XhH&index=2	**MCH-003 (PGDAC)**	**2016**
4	**UV-VIS Spectrometry-I: Origin of spectrum and Absorbing Species** https://www.youtube.com/watch?v=CXQu46WnJj4&list=PLDCsGRRaAZqdlQV8u05zkwXNIkKgF0XhH&index=3	**MCH-003 (PGDAC)**	**2016**
5	**UV-VIS Spectrometry-II: Principle of UV-VIS Spectrometry** https://www.youtube.com/watch?v=7iFH2paUcuo&list=PLDCsGRRaAZqdlQV8u05zkwXNIkKgF0XhH&index=4	**MCH-003 (PGDAC)**	**2016**
6	**UV-VIS Spectrometry-III: Deviations from Beer-Lambert's law** https://www.youtube.com/watch?v=UeLu49a0mWA&list=PLDCsGRRaAZqdlQV8u05zkwXNIkKgF0XhH&index=6	**MCH-003 (PGDAC)**	**2018**
7	**UV-VIS Spectrometry-IV: Instrumentation for UV-VIS Spectrometry** https://www.youtube.com/watch?v=HQ71ywxNfAY&list=PLDCsGRRaAZqdlQV8u05zkwXNIkKgF0XhH&index=7	**MCH-003 (PGDAC)**	**2018**
8	**Introduction to wave mechanics** **https://www.youtube.com/watch?v=kKplyYCGnQI&list=PLDCsGRRaAZqdlQV8u05zkwXNIkKgF0XhH&index=10**	**CHE-04 (BDP)**	
9	**Particle in One Dimensional Box-I** **https://www.youtube.com/watch?v=3m6LoT3NkWA&list=PLDCsGRRaAZqdlQV8u05zkwXNIkKgF0XhH&index=8**	**CHE-04 (BDP)**	
10	**Particle in One Dimensional Box-II** **https://www.youtube.com/watch?v=_mpopSym2yc&list=PLDCsGRRaAZqdlQV8u05zkwXNIkKgF0XhH&index=9**	**CHE-04 (BDP)**	