



### BRIEF HISTORY AND PROFILE

The School of Life Sciences (SLS) established in the year 1970-71 has celebrated four decades of its existence.

The School offers M. Sc. and Ph.D. degree in Life Sciences. The teaching and research programme in the School was conceptualized as an interdisciplinary program unifying the disciplines of biological sciences from a molecular level to whole organismal level. The experimental approaches undertaken by different research groups include biochemistry, biophysics, cell biology, genetics and molecular biology in organisms representing bacteria, fungi, plants and mammals.

The teaching programme of the School of Life Sciences has earned a high reputation for its interdisciplinary nature for students from both biological and physical sciences at the Master's and Ph.D. levels. This is made possible by offering remedial courses in physical sciences for Master's students coming from the bioscience stream and in elementary biology for students entering biology after their first degree in physical sciences. The School has an in-house system of continuous review of its academic programmes that allows inclusion of newer areas into research and teaching. The M.Sc. practical laboratories are well equipped to give 'hands-on' training to students in the theory subjects taught to them. Graduates completing their degrees at the School are always sought after by research labs in India and abroad and have performed exceptionally well in the universities, institutes and industries.

### HIGHLIGHTS OF OUR TEACHING PROGRAMME

- Molecular, cellular and organismal biology with emphasis on a holistic understanding of the mechanisms operating in living systems
- Experienced Faculty Members with national and international recognition
- Continuous review of its academic programs that allows inclusion of newer areas into research and teaching
- Well equipped M.Sc. practical laboratories give 'hands on' training in the subjects taught in theory classes
- M.Sc. dissertation research carried out in SLS laboratories
- Strong Mentoring programme and successful placements of students in India and abroad
- **Two programmes of Study- Ph.D (Life Sciences)**
  - Student research fellowship: Each student can bring their own fellowship based on national tests or avail UGC Non-NET fellowship currently Rs. 5000 and Rs. 8000 p.m. for JRF and SRF respectively
  - Pre-Ph. D. courses covering various aspects of advanced research in life sciences
  - Modest support for travel/registration for senior students to attend conference and present their research covering various aspects of advanced research in life sciences
  - The School offers core/foundation courses as well as advanced courses for the Ph. D. students. Students are assessed and evaluated throughout the semester by a continuous system of tests, seminars, assignments, mid and end-semester examinations.

### ○ M.Sc. (Life Sciences)

The M. Sc. course lays emphasis on research and offers students the choice of a research career. Our M.Sc. students are encouraged to rejoin SLS through due admission procedure to pursue their doctoral studies, or seek admission in other institutions in India/abroad.

This program offers an in-depth theoretical as well as practical knowledge in all areas of Life Sciences. Students from both Physical Sciences as well as Biological Sciences backgrounds may join this program. Students have to take both core courses and optional courses spread over four semesters, and practical courses in the first two semesters. During the final two semesters, students also have to carry out a research project on a specific topic under the supervision of a faculty member in a laboratory and submit a dissertation for evaluation by a committee of experts followed by open oral presentation defending the project. Students also have to present a seminar and submit a term paper on a current topic in life sciences. The final evaluation for the grades is on a 9.0 point scale CGPA. Detailed information regarding the course structure can be obtained from the website ([www.jnu.ac.in/sls](http://www.jnu.ac.in/sls)).

### Funding:

School-level funding:

- From UGC
  - Departmental Special Assistance Programme in "Cell and Molecular Biology"
  - Resource Networking Program
  - University with Potential for Excellence (UPOE)
- From DST
  - FIST-I and FIST-II programmes
  - PURSE Grant

Faculty-level funding:

- Research grants from various national and international funding agencies such as the UGC, DST, DBT, CSIR, ICMR, The European Union, the Wellcome Trust (UK), Swiss Development, USDA, International Atomic Energy Agency (IAEA) etc.

### • Career and Aptitude Development of our Students

JNU and the SLS pro-actively support career and aptitude development of its students by the following:

- Students elected to the statutory Student Faculty Committee
- Student representation in the Special Committee (Board of Studies) of SLS
- Organization of the highly successful annual research festival 'BioSparks' by senior Ph.D. students
- Visiting Scholar seminar 'Meet the Speaker' anchored by students

### HIGHLIGHTS OF OUR RESEARCH PROGRAMME

SLS has been on the forefront of research in several important areas/field as reflected by high impact research articles published in peer-reviewed national and international journals of repute. The School has consistently maintained a high level of productivity in terms of publications in reputed peer reviewed journals and books.

- Over 1, 500 papers authored by the faculty of the school since its inception.
- Several national and international patents
- Over 450 students have been awarded Ph.D. degree.
- Some of our Ph.D. students have won the prestigious INSA Medal for Young Scientists
- International travel award and best poster and talk prize won by our Students in International Conferences
- SLS Alumni have obtained independent faculty and Scientist positions in India and Abroad
- Alumni of the SLS have also achieved success in biotechnology industry
- Alumni have been constantly accepted in top research institutions in India and abroad as post-doctoral fellows
- Our faculty members have been honoured with recognitions like Padma Awards, Shanti Swarup

Bhatnagar Prize, National Bioscience Award, Birla Award, J.C. Bose Award, Bhasin award, member of the Planning Commission of India, elected Fellows of various Academies, The World Academy of Sciences Award, Ranbaxy Award, J.C. Bose Fellowship and many others.

### RESEARCH INFRASTRUCTURE

- A well established 24x7 accessible Central Instruments Facility (CIF) with 'state of the art' instruments
- Equipments for Genomics and proteomics research: FACS, MALDI-TOF/TOF, Nano LC-ESI-MS/MS, and real time PCR.
- Equipments for Cell biology: Fluorescence microscopes, live cell microscope and whole animal imaging system
- Common Equipments: Ultra- and high-speed centrifuges, spectrophotometers, spectrofluorimeters, time-resolved single photon counting fluorescence spectrometer, atomic absorption spectrometer, isothermal titration calorimeter, phosphorimager, scintillation counter, PCR-machines, gel documentation system, imaging facilities, lyophilizer, ultra-low freezers, water purification system, brain-wave analyzer, oscilloscope, polygraph for electrophysiological measurements, gene gun, and gamma chamber.
- Plant cell culture, Glass House for experimental and transgenic plants and animal cell culture facilities and stereotaxic surgical facility for small animals.
- JNU's Advanced Instrumentation Research Facility (AIRF) (<http://www.jnu.ac.in/AIRF/>) is with sophisticated equipments are open to all SLS research scholars

#### In-house Training Opportunities

- Training in Animal Handling
- Training in Radiation Safety
- CIF orientation and equipment usage
- Equipment training in the JNU-AIRF
- English learning through JNU Linguistic Empowerment Cell
- Maths learning through JNU Maths Empowerment Cell
- Course on Plagiarism awareness and software training through JNU library

### ADMISSION PROCEDURE

#### (i) M.Sc. (Life Sciences)

Students are admitted to the M. Sc. (Life Sciences) program each year on the basis of their performance in the nation-wide written test conducted by JNU in the month of December. Candidates with an undergraduate degree in the relevant areas are eligible to apply. Those who are pursuing undergraduate studies in the relevant areas are also eligible to appear in the admission test. However, they can be admitted only if they have earned the undergraduate degree prior to the admission, as per the university rules.

#### (ii) Ph.D (Life Sciences)

Students are admitted to the Ph.D. (Life Sciences) programme on basis of their performance in the nation-wide written test conducted by JNU in the month of December.

Based on the written test, short-listed candidates are to be invited for an interview. Candidates are finally selected for admission as per the University rules.

### Selection Process:

Based on the performance of the candidates in the written test, certain number of students will be called for viva-voce (as per the University Guidelines). The final list of selected candidates would be declared based on the performance in the viva-voce examination.

### Key Aspects of our M.Phil./Ph.D. Program

- Students selected by the due process are offered admission.
- Upon completion of provisional registration into the Ph.D. programme, the course work would commence by the first week of August 2018.
- There would be an orientation session in the form of faculty colloquium, following which the students would be offered a list of vacant positions available with individual faculty members in the chosen research group.
- Please note that upon assignment of a supervisor, students are not permitted to change their laboratories during their tenure of Ph.D. For details of the how the M.Phil./Ph.D. programme operates, please see [http://www.jnu.ac.in/SLS/SLS\\_Handbook.pdf](http://www.jnu.ac.in/SLS/SLS_Handbook.pdf).
- All students have to take pre-Ph. D. courses for the initial two semesters. [Detailed information regarding the course structure can be obtained from the website ([www.jnu.ac.in/sls](http://www.jnu.ac.in/sls))].
- Each student during their tenure in the SLS would be assigned to a Doctoral Committee (DC).
- For confirmation into the Ph. D. programme, a student has to secure the required qualifying marks. The student, in consultation with the respective Ph.D supervisor, has to submit a synopsis of the research proposal and defend it in an open seminar in the DC, and upon acceptance by the DC, the Special Committee of the School would approve the enrollment of the student into the Ph. D. programme.
- There would be an annual assessment of progress of each student.
- After sufficient amount of research work has been carried out by the student and with due approval of the supervisor, each student would make a presentation in an open seminar (called Pre-Ph.D. seminar as per UGC regulations) to the Doctoral Committee detailing their research work can submit their Ph. D. thesis. Although Ph. D. thesis can be submitted upon completion of at least 2 years of research work, normally it is between 2 to 4 years from the date of confirmation for the Ph. D. program.
- A student may apply, for consideration by the Special Committee, for an extension of one more year to submit the Ph. D. thesis, provided the research work has been examined and recommended by an expert committee including the supervisor for this purpose.

The Ph. D. degree is awarded on the basis of evaluation and recommendation of the thesis by two external examiners from within the country followed by successful oral defense of the research work by the candidate after fulfilling due requirements as per UGC regulations.

The e-Prospectus might be amended if required. Candidates are advised to follow the update version of the e-Prospectus periodically in the University website as well as the site for the School of Life Sciences (<https://www.jnu.ac.in/sls>) for additional information.

## Research Areas in the School of Life Sciences

Research in the School of Life Sciences is organized into following diverse research areas:

Topics
(For details, please see SLS website <a href="http://www.jnu.ac.in/sls">www.jnu.ac.in/sls</a> )
1. Non-coding RNA, Stem Cells
2. Chromatin transcription and Gene Regulation
3. Developmental biology with emphasis on autophagy in <i>Dictyostellium</i>
4. Biology of Plant-virus Interactions
5. Structural Biology
6. Brain Ageing and its counter strategies
7. Cancer Biology
8. Plant-microbe Interaction
9. Functional Genomics and Metabolomics of Abiotic stress in Crop Plants
10. Microbiology
11. Microbiology, Membrane Transporter
12. Biophysical Chemistry
13. Structural & Parasite Biology
14. Cell Signalling and Cancer Biology
15. Sleep, Learning and Memory
16. Epigenetics & Chromatin Remodelling
17. Neurodegenerative disorders
18. Radiation and Cancer therapeutics
19. Molecular Mechanisms and protein traffic during immune cell effector responses
20. Biophysics, Nanobiotechnology

**M. Sc.**

Sl. No.	Name of Centre	Sub. Code & Sub. Code Number	Eligibility
1.	School of Life Sciences (SLS)	Life Sciences –SLSM (225)	Bachelor's (B.Sc. or B.Tech or equivalent) in Biological, Physical or Agricultural Sciences or Biotechnology under the 10+2+3 pattern of education with at least 55% marks.

**Ph.D.**

Sl. No.	Name of Centre	Sub. Code & Sub. Code Number	Eligibility	Additional information
1	School of Life Sciences (SLS)	Life Sciences –SLSH (893)	Master's degree i.e. M.Sc. or equivalent with at least 55% marks or equivalent Grade 'B' in UGC 7-point scale (or an equivalent Grade in a point scale wherever Grading system is followed) in Biological Sciences, Bioinformatics or Physical Sciences, as well as to those with M.B.B.S. or M.Tech or M.Sc. (Agriculture) or M.Sc. (Veterinary Sciences) degree with 55% marks or equivalent.  OR  Master's degree in the fields given above with 55% marks (or equivalent) and obtained 2 years M.Phil Degree with at least 55% marks (or equivalent) of a recognized University/Institution (with dissertation/seminar/viva) or one year M.Phil with 55% marks (or equivalent) with additional one year research experience of a recognized University/Institution and one publication  Relaxation to SC/ST/OBC (Non creamy layer)/Differently abled as per the UGC Regulations 2016.	<b>P.G. holders of AYUSH related subjects are also eligible to apply.</b>