



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 M.Phil/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-**
 - **M. Phil/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
 - 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 M Phil. /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).

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 May.

(ii) M. Phil./Ph.D (Life Sciences)

Each year students are admitted to the M.Phil/Ph.D. (Life Sciences) program under two categories of admission viz., **Category I and Category II (see below).**

Category I: M.Phil./Ph.D. Integrated Programme

Candidates with M. Sc. or equivalent degree must appear in the written examination conducted by the University at centres across the country in the month of May. Based on the written test, short-listed candidates are invited for an interview. Candidates are finally selected for admission as per the University rules.

Category II: M.Phil./Ph.D. Integrated Programme (for NET-JRF/Fellowship holders)

Candidates who have qualified a Fellowship through a national-level written test i.e. the JRF category under the CSIR/UGC National Eligibility Test (NET)-JRF, DBT-JRF (Category-I), ICMR-JRF, or any other Fellowship awarded from Government of India for the purpose of pursuing Ph.D. degree are eligible for application under this category. M.Sc. Bioinformatics students appearing for the final examination or those already qualified and awarded a research fellowship after clearing the Bioinformatics National Certification (BINC) Examination (conducted by DBT) are also eligible to apply.

Candidates who have already initiated their fellowship in some other institution and are interested to get it transferred may also apply, provided the period of available fellowship (activated after **August 2016**) is more than four years; JNU will not be responsible for the transfer of fellowship.

Candidates who have appeared in the CSIR/UGC-NET-JRF, DBT-JRF and ICMR-JRF etc. but results are awaited may also apply under this category. However, if they are qualified in the written test, they would be interviewed only upon submission of documentary evidence of having qualified for the fellowship (JRF) to the Dean, School of Life Sciences, JNU (through Email: dean.sls201@gmail.com), by **May 31, 2017**.

Candidates with a valid proof of JRF will only be interviewed and be entitled for travel allowance as per rules to attend the interview.

Selection process: Aspirants under category I and II have to submit an application for the entrance examination through a single form wherein options for applying under category I or II would be given. Aspirants under both categories will have to appear for the same entrance test conducted nationwide on a designated date.

Entrance test would involve two parts, A and B. Part A would contain MCQ on research methodology (50%) and remaining 50% will be subject-specific. Candidates need to obtain minimum prescribed marks in Part A for eligibility. Part B would contain descriptive-type questions of analytical/ reasoning/ aptitude with multiple choice answers.

Candidates applying under the two categories would be separately short-listed for interview based on their rank in Part B. The final list of selected candidates would be declared based on the performance in the interview and the written test.

Procedure for selecting the area of research (effective Academic Year 2017-2018):

Students would be admitted into the M.Phil./Ph.D. programme into one of the four research areas (see Table below).

Key Features of this change:

- **Each candidate has to indicate their choice of any Two of the four research areas in order of their priority in the application form for admission.**
- The entrance exam question paper admission would cover all aspects of Life Sciences.
- Eligible candidates from both Category I and Category II would be interviewed by a competent interview board on the basis of their choice of research areas indicated in the application form.

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 M.Phil./Ph.D. programme, the course work would commence by the first week of August 2017.
- There would be an orientation session in the form of faculty colloquim, 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.
- 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)].
- 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.
- Students who complete an M. Phil. degree can continue for her/ his Ph.D. degree in the integrated mode.

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.

M.Sc.

Sl. No.	Name of Centre	Sub. Code & Sub. Code Number	Intake	Eligibility	Viva/Non Viva	Course outline/guidelines	Paper will be objective/ subjective/ both
1	School of Life Sciences (SLS)	Life Sciences- SLSM (225)	38	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.	Non-Viva	See SLS website www.jnu.ac.in/sls	Objective

M.Phil/Ph.D.

Sl. No.	Name of Centre	Sub. Code & Sub. Code Number	Eligibility	Additional eligibility	Viva/Non Viva	Course outline/guidelines	Paper will be objective/ subjective/ both
1	School of Life Sciences (SLS)	Research Area I – ONEP (185)	<p>Category I: M.Phil./Ph.D. integrated for candidates possessing Master's degree (Other Eligibility criteria as per conditions laid down by JNU and UGC regulations)</p> <p>M.Sc. or equivalent degree, with at least 55% marks or equivalent grades, 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.</p>	P.G. holders of AYUSH related subjects are also eligible to apply.	Viva - Voce	<p>New from Academic Year 2017-2018: Students would be admitted into the M.Phil./Ph.D. programme into one of the four research areas (see Table below). Key Features of this change:</p> <ul style="list-style-type: none"> o Each candidate has to indicate their choice of TWO of the four research areas in order of their priority in the application form for admission. <p>The entrance exam question paper would be prepared as per UGC Regulations 2016</p> <p>For detail please see SLS website www.jnu.ac.in/sls</p>	For detail please check JNU website
2		Research Area II – TWOP (186)					
3		Research Area III – THRP (187)					
4		Research Area IV – FORP (188)					

M.Phil./Ph.D. (Only JRF-NET/Fellowship Holders)

Sl. No.	Name of Centre	Sub. Code & Sub. Code Number	Eligibility	Additional eligibility	Viva/Non Viva	Course outline/guidelines	Paper will be subjective/objective/both
1	School of Life Sciences (SLS)	Research Area I – ONEJ (807)	<p>Category II: M.Phil./Ph.D. integrated for candidates possessing Master's degree and JRF-NET/Fellowship.</p> <p>Candidates who have qualified a Fellowship through a national-level written test i.e. the JRF category under the CSIR/UGC National Eligibility Test (NET)-JRF, DBT-JRF (Category-I), ICMR-JRF, or any other Fellowship awarded from Government of India for the purpose of pursuing Ph.D. degree can apply for admission through the same SLS entrance test as those of Category I. Candidates who have appeared in the CSIR/UGC-NET-JRF, DBT-JRF and ICMR-JRF etc. but results are awaited may also apply under this category. However, they will be called for the interview only upon submission of a valid documentary evidence of having qualified for the fellowship (JRF) to the Dean, School of Life Sciences, JNU (through post or Email ID dean.sls201@gmail.com), by May 31, 2017.</p> <p>Candidates who have already initiated their fellowship in some other institution and are interested to get it transferred may also apply, provided the period of available fellowship (after August 2017) is more than four years; JNU will not be responsible for the transfer of fellowship. Candidates who have appeared in the CSIR/UGC-NET-JRF, DBT-JRF and ICMR-JRF; but results are awaited may also apply under this category. However, they will be called for the interview only upon submission of a valid documentary evidence of having qualified for the fellowship (JRF) to the Dean, School of Life Sciences, JNU (through post or Email ID dean.sls201@gmail.com), by May 31, 2017. Candidates with a valid proof of JRF will only be entitled for the permissible travel allowances for attending the interview.</p> <p>M.Sc. Bioinformatics students appearing for the final examination or those already qualified and awarded a research fellowship based on the Bioinformatics National Certification (BINC) Examination (conducted by DBT) are also eligible to apply.</p>	P.G. holders of AYUSH related subjects are also eligible to apply.	Viva - Voce	<p>New from Academic Year 2017-2018: Students would be admitted into the M.Phil./Ph.D. programme into one of the four research areas (see Table below). Key Features of this change: o Each candidate has to indicate their choice of TWO of the four research areas in order of their priority in the application form for admission.</p> <p>The entrance exam question paper would be prepared as per UGC Regulations 2016</p> <p>For detail please see SLS website www.jnu.ac.in/sls</p>	For detail please check JNU website
2		Research Area II – TWOJ (808)					
3		Research Area III – THRJ (809)					
4		Research Area IV – FORJ (810)					

Ph.D.

Sl. No.	Name of Centre	Sub. Code & Sub. Code Number	Eligibility	Additional eligibility	Viva/Non Viva	Course outline/guidelines	Paper will be subjective/objective/both
1	School of Life Sciences (SLS)	Life Sciences- SLSH (893)	<p>Only those candidates shall be considered for admission to the Ph. D. program, who have obtained M.Phil. degree involving either a two-year programme including research work in a recognized University/ Institution (with dissertation/seminar/ Viva), or one-year M.Phil. involving research in a recognized University/ Institution. Candidates should have a minimum of one research publication in a peer reviewed journal. Moreover, candidates with at least two years research experience after Master's degree/BE/B.Tech. in reputed institutions with research publication(s) in a peer-reviewed journal comparable to M.Phil. standard are also eligible. In addition, all candidates should have obtained Master's Degree/BE/B.Tech. with 55% marks or equivalent FGPA.</p> <p>The School reserves the right to adopt additional criteria for shortlisting of applications, as eligibility alone would not ensure short-listing for interview.</p>	For detail please check JNU website	Viva - Voce	<p>The entrance exam question paper would be prepared as per UGC Regulations 2016</p> <p>See SLS website www.jnu.ac.in/sls</p>	For detail please check JNU website

Research Areas in the School of Life Sciences

Research in the School of Life Sciences is organized into four thematic research areas. **Candidates should indicate their choices for 2 (Two) research areas in the order of their preference in the application form.** Each faculty member is listed alongside one Research Group. However, as faculty members in the School of Life Sciences conduct inter-disciplinary research, they may be conducting research in other areas either independently or jointly with faculty members in the other groups.

Research Area		Topics (For a detailed list, see SLS website www.jnu.ac.in/sls)	Faculty Members where M.Phil./Ph.D. positions are available for 2017-2018
No. Code	Name		
I ONEP	Physico-chemical and Structural Biology	Bioinformatics; Dynamics and kinetics of macromolecules; Molecular Interactions; Protein Structure	AKS(02)*, SSK(01), SGN(02), KK(01)
II TWOP	Molecular and Cellular Biology of Microbes	Cellular and Molecular Signaling; Chromatin, Epigenetics and Transcription; Fungal Pathogenesis; GPI anchored proteins; Host-Pathogen interactions; Molecular Genetics; Molecular Parasitology; Vaccines	KN(02), AKM(01), AKJ(01), RMU(01)
III THRP	Plant Biology and Biotechnology	Crop biotechnology; Genomics, Genetics & Epigenetics; Photosynthesis & plant productivity; Plant-microbe interactions; Plant virus pathogenesis; Stress response; Biodiversity	SC(02), AKN(02), AP(01), NR(01), SP(01)
IV FORP	Mammalian Biology and Diseases	Cancer Biology and other Disease Models- Aging, skin biology, heart diseases; Genetics and genomics; Immune response; Molecular and Cellular Biology; Neurobiology; Non-coding RNA; Stem Cells	BNM(01), SKG(01), PCR(02), SS(01), DS(01), RPS(01), NM(02), SKJ(01), ACM(02), NP(01), ABT(01)

Faculty Members: Prof. Alok Bhattacharya (AB), Prof. Supriya Chakrabarty (SC), Prof. Sudha Cowsick (SMC), Prof. Shyamal Goswami (SKG), Prof. S. Gourinath (SGN), Dr. Sushil Jha (SKJ), Prof. Atul Johri (AKJ), Prof. R.K. Kale (RKK), Dr. Karunakar Kar (KK), Prof. Sneha Sudha Komath (SSK), Prof. R. Madhubala (RM), Prof. Biren Mallick (BNM), Prof. Alok Mondal (AKM), Dr. Neelima Mandal (NM), Dr. Amal Mandal (ACM), Dr. Rohini Muthuswami (RMU), Prof. Ashis Nandi (AKN), Prof. K. Natarajan (KN), Dr. Sneha Panwar (SLP), Prof. Ashwani Pareek (AP), Dr. Niti Puri (NP), Dr. Nirala Ramchiary (NR), Prof. Pramod Rath (PCR), Prof. Shweta Saran (SS), Prof. Neera Sarin (NBS), Prof. Ajay Saxena (AKS), Prof. Deepak Sharma (DS), Prof. Ranapratap Singh (RPS), Dr. Ashu Tiku (ABT), Prof. Baishnab Tripathy (BCT), Prof. P.K. Yadava (PKY), Dr. Jaishree Paul (JP), Dr. Soumya Prasad (SP)

* Number of vacancies available under each faculty member is indicated in parenthesis