NAAC

Revised Format of Self-Study Report

(As per the NAAC Manual for Universities effective from July, 2017)

Qualitative Metrics to seek Descriptive data from Department

CRITERION I – CURRICULAR ASPECTS		
Key Indicator- 1.1 Curriculum Design and Development		
Metric No. (as per NAAC Manual)	**Description (as per NAAC Manual, July 2017, for Reference purposes)**	**Data Requirement from Department (For Academic years 2012-13 to 2016-17)**
1.1.1	**Curricula developed/adopted relevant to local/national/global needs; program outcomes, course outcomes.**	**Supporting Document required:** A description in not more than 200 words of any Curricula developed/adopted from 2012-13 to 2016-2017 in the Department/Centre which is relevant to local / national / global needs. The department developed and adopted a dynamic curriculum for its Master's course that reflects the needs of changing times, incorporates the rapid growth in knowledge as well as the requirements leading to output of trained manpower that can easily soak in higher education (Ph.D and beyond) fulfilling both national and global needs. The curriculum focuses on development of basic concepts with emphasis on hands-on training. The department fosters knowledge transfer through discussions and self-learning. It ensures personal care for students and caters to their quest for knowledge appropriately. The stress is on analytical learning. The courses are research focused and allow for changes in curriculum without actually changing the framework dramatically. A year-long research project in an allotted lab allows the student to imbibe knowledge with a hands-on-approach simultaneously developing analytical skills, while the first year of practical classes allows them to learn the diverse classical techniques and research methods quickly. The open-ended term paper allows both teachers and students to soak in emerging new knowledge through seminars and thorough reading of research papers. New areas are included in the curriculum following time-to-time revision of the same. The Ph.D course prepares students for the rigors of research and trains them in various

		tools and techniques while inculcating in them good research practices that include knowledge in intellectual property rights, plagiarism, ethical and regulatory issues, radioactive safety, guidelines to handle toxic chemicals and waste, the art of oration and project and paper writing.
Key Indicator- 1.3 Curriculum Enrichment		
1.3.1	**Integration of cross-cutting issues relevant to Gender, Environment and sustainability, Human values, Professional Ethics into curriculum.**	**Supporting Documents required:** A description of courses, which address Gender, Environment and Sustainability, Human Values and Professional EthicsListin not more than 200 words. The list of Core Courses offered by the Department. The core courses are: 1. M.Sc. Biochemistry (a) Proteins – Structure, Folding and Engineering (b) Essentials of Cell Biology (c) Membrane Biology (d) Immunology and Immunotechniques (e) Enzymes and Techniques in Biochemistry (f) Molecular Biology : Gene Structure, Expression and Regulation (g) Bioinformatics (h) Seminar Paper - I

		(i) Cellular Signalling (j) Recombinant DNA Technology and Applications (k) Molecular Biology : Genome Replication, Repair and Eukaryotic Transcription (l) Seminar Paper - II (m) Developmental Biology (n) Advanced Techniques in Genomics (o) Microbial Pathogenicity (p) Proteomics and Metabolomics (q) Dissertation 2. Ph.D. Biochemistry: (a) Research Methodology (b) Tools and Techniques in Biochemistry Our courses are not applicable for gender bias and do not relate to environment and sustainability directly. Our courses are open to all genders and there is no bias in admission or evaluation either. It emphasizes on merit and the goal is to train everyone on the same footing. We follow reservation policy in strict adherence to government of India guidelines. The Ph.D. course work emphasizes on human values and all aspects of professional ethics. Both the courses instill sufficient disciplinary knowledge and

		prepare them to engage in public discussions on the subject of learning. The students consume scientific and technological information in the right spirit in their day-to-day life and are able to continue learning even after the courses are done. Above all, at the end of the course work each student is skilled to make a choice of his or her future careers.
Criterion II-Teaching -Learning and Evaluation		
Key Indicator - 2.2 Catering to Student Diversity		
Metric No. (as per NAAC Manual)	**Description (as per NAAC Manual , July 2017, for Reference purposes**	**Data Requirement from Department (For Academic years 2012-13 to 2016-17)**
2.2.1	**The institution assesses the learning levels of the students, after admission and organizes special programs for advanced learners and slow learners**	**Supporting Document required:** Describe the initiatives taken by the Department in not more than 200 words. Assessment is continuously done throughout the year for a better understanding of a student's potential and weaknesses, which can later be discussed and improved. Written, oral, assignments, seminars etc. are modes of examination and assessment. The opportunity for one-to-one discussion, association with research scholars and accessibility of teachers allows students to learn outside the classroom as well. Slow learners are given special attention in order to help them improve their performance and often counseled to boost their confidence level as well. Several rounds of discussion, assignments and evaluations ensure that no student is left behind. They are encouraged to speak, interact and discuss their problems. Several extra-curricular events are organized for a holistic learning and to help students ease into their relationship with a teacher, which fosters facile interchange of ideas, knowledge and updates. Advanced learners are encouraged to undergo summer training in institutes of national importance. Seminars are organized by inviting experts in diverse areas of life sciences research to

		help students update knowledge. Advanced students get an opportunity to interact with prominent scientists. They also attend symposiums and conferences and present their own work as well.
Key Indicator-2.3 Teaching- Learning Process		
2.3.1	**Student centric methods, such as experiential learning, participative learning and problem solving methodologies are used for enhancing learning experiences**	**Supporting Document required:** Describe the student centric methods taken by the Department in 200 words. The emphasis is on mutual learning amongst students and teachers. Teaching involves blended learning and is carried out by a combination of the following: • PowerPoint and Chalk and Board lectures by teachers • Interactive discussion with students during the lectures • Periodic question-answer sessions during the classroom teaching • Writing assignments given to students • Seminars (research papers, case studies, reviews) by the students during classroom teaching • Lecture videos by Nobel Laureates and experts • Quiz, Puzzles, Analytical problem solving • Presentations by students on current science topics and new discoveries • Hands on training in different aspects of the subject in laboratories • Short projects on topics of biochemistry assigned to students • After class one-on-one discussion with teachers to clarify doubts • Students are allowed to organize several scientific and extra-curricular events to improve their skills.

Key Indicator- 2.6 Student Performance and Learning Outcomes		
2.6.1	**Program outcomes, program specific outcomes and course outcomes for all programs offered by the institution are stated and displayed on website and communicated to teachers and students**	**Supporting Documents required:** (i) COs for all courses (Examples can be seen from attached Glossary-Notes) (ii) A description of Mechanism of Communication in not more than 100 words. M.Sc. curriculum includes both 3–credit courses (theory) (at least 4 in each semester) and 6-credit courses (Practical/Dissertation) in every semester. Ph.D. curriculum includes two 4-credit courses **(i) *Course outcome* (CO) –** It is expected at the end of a course that each student passes with a minimum of 55% marks in all subjects. The outcomes for each course are as follows: (a) Proteins – Structure, Folding and Engineering Student should be able to get insight into protein structures and folding given any structure file; should be able to identify motifs, domains and active sites; should be able to predict properties and 3D structure of proteins and understand structure-function relationship. Student should be able to use the knowledge in engineering proteins for translational value. (b) Essentials of Cell Biology This should update students about various essential functions of the cell and its organelles, concepts of protein trafficking, signal transduction, cell-cell communication, iron and cholesterol homeostasis and related diseases. (c) Membrane Biology Students should develop better understanding of the cellular membrane structure and functions, significance of various transport mechanisms and their alterations in disease conditions. Students should also learn about cell-cell fusion and cell-virus fusion

		events and its applications in developments of anti-viral drugs. (d) Immunology and Immunotechniques Student should get an insight into the components of an immune system, their functions and their mechanisms to combat any infection or altered self. The student should be able to apply this knowledge in the processes of immunization, antibody engineering, vaccine development, transplantation and cancer therapy. (e) Enzymes and Techniques in Biochemistry Students are expected to understand the nomenclature and mechanism of enzyme action and their relation to enzyme structure. They are expected to solve quantitative problems independently pertaining to determination of enzyme parameters and design experiments and assays to decipher such parameters for any given enzyme. They are expected to be able to purify enzymes and get insight into the various tools and techniques to characterize enzymes and proteins. The goal is to have them investigate enzymes for academic purpose as well as for industrial and biomedical applications. (f) Molecular Biology : Gene Structure, Expression and Regulation Students should be able to understand the concept of genome and transcriptome, the mechanisms of gene expression through transcription and translation in prokaryotes and eukaryotes, the modulators of these mechanisms as well as their regulation. They should be able to apply this knowledge in their work for cloning, protein expression and production of proteins, and development of inhibitors (g) Bioinformatics Students are expected to get introduced to basic fundamentals of computers, types of operating systems, concept of networking, biological databases, and principles of various algorithms that drive bioinformatics softwares. They are expected to be able to identify databases, retrieve data, analyze and compare sequences, mine genomes, predict structures of nucleic acids and proteins, annotate data and understand the generation and

		analysis of high-throughput data. (h) Seminar Paper - I The seminar paper involves in-depth reading and understanding of a particular field/ topic of research by each student and preparation of a presentation and subsequent oration. It allows both teachers and students to soak in emerging new knowledge through thorough reading of research papers and presentation. (i) Cellular Signalling Students should be able to understand the concepts of signal transduction associated in response to various stimuli as well as the regulation of the various pathways. They should be able to understand the mechanisms ofhow cells are behaving under different situations and how defects in signaling processes are related to various diseases. This course also helps them to understand how these pathways were discovered and should also help them apply this knowledge to design experiments to decipher unknown mechanisms. (j) Recombinant DNA Technology and Applications Students should understand the mechanisms for isolation and manipulation of DNA and RNA and be able to apply these concepts in their research work. They should be able to understand the methods for creation of cDNA libraries, their applications and use. They should be able to understand the methods for protein production and their application in industrial production systems. (k) Molecular Biology : Genome Replication, Repair and Eukaryotic Transcription Students should be able to understand the concepts and significance of DNA Replication, Repair and Eukaryotic Transcription. This course allows them to learn about important discoveries related to Replication, Repair and Eukaryotic Transcription and their implications in medical field. Moreover, learning various useful techniques applied for research in the above mentioned areas also help students in enhancing their

		analytical and research problem solving skills. (l) Seminar Paper - II The seminar paper involves in-depth reading and understanding of a particular field/ topic of research by each student and preparation of a presentation and subsequent oration. It allows both teachers and students to soak in emerging new knowledge through thorough reading of research papers and presentation. (m) Developmental Biology The students should gain knowledge about the significant processes of development, various model organisms and their applications in research, modern implications of developmental biology in understanding and treatment of human diseases. (n) Advanced Techniques in Genomics The students should get insight into the latest trends and technologies available for genome sequencing, gene expression studies, protein interaction, and their applications in research and industry. (o) Microbial Pathogenicity Students are expected to acquire insight into the principles of pathogenicity and virulence by microbes. They are expected to understand quantitative measures of virulence and several parameters that define virulence and their relation to human diseases. They are expected to have a general knowledge of various human pathogens, their mechanism of action and adaptation. They will also gain knowledge about various diagnostic procedures, new vaccines and mechanism of antibiotic resistance. (p) Proteomics and Metabolomics The students should understand various techniques as well as the applications involved in the proteomics and metabolomics studies that are helpful for the whole proteome and metabolome analysis. They should be able to apply this knowledge for biomarker

		discovery against various diseases, identification of drug targets, characterization of strains, determining the sequence of unknown proteins and identity of various metabolites. Learning of these latest approaches would also help them in their research work. (q) Dissertation This is a year-long research project in an allotted lab to each student. The student should be able to imbibe knowledge with a hands-on-approach simultaneously developing analytical skills, learn the diverse techniques and research methods and also develop competence to read and understand published research articles and literature. They also develop fine analytical and troubleshooting skills. (r) Practicals – The student is expected to get familiarized with diverse tools, techniques, equipments, methods and protocols that are basic to the biochemical understanding of life. They are expected to get hands-on-training in several basic experiments in biochemistry and exposure to sophisticated instruments. They are expected to understand the importance of controls in experiments and learn the art of design, execution and analysis of experiments. They are expected to learn the tricks of record keeping and presentation of data. ***Program outcome* (PO)** –It is expected that each student is independent in their thought processes after the course and can make a choice of their subsequent career. *Program specific outcome* (PSO) – 1. It is expected at the end of the program that a student will be able to apply biochemical principles to understand various complex processes in life sciences and relate them to heath, well being and strategies to combat various human diseases. 2. It is expected that students will be able to assimilate and analyze existing literature and identify problems in biology and formulate innovative means to provide solutions to the problems with far reaching implications. 3. It is expected that students will have developed creative thinking, analytical skills and a acceptable level of independence. 4. It is expected that students will imbibe ethical principles of biochemistry and use

		professional ethics to solve complex biological problems for the society. 5. It is expected that students will learn to work individually as well as a team and develop skills for effective communication in the field of biochemical research. (ii) The mechanism of communication is mostly through group discussions and one-on-one interactions. The CO and PO outcomes will also be part of the departmental website.
2.6.2	**Attainment of program outcomes, program specific outcomes and course outcomes are evaluated by the institution**	**Supporting Documents required:** A description of the method of measuring attainment of POs, PSOs and COs and the level of attainment of POs, PSOs and COs in not more than 200 words. The COs are evident in our assessment procedures which includes multiple assignments, written exams, orals, seminar presentations etc. Questions are designed in a way that is reflective of the COs. Several seminars during the entire duration of the course also reflect the same. We also are aware of the COs from our regular interactions with students. The ability of the students to quickly admit themselves in programs or jobs outside the department also provides an assessment of the outcome. In addition feedback by the students is also evaluative of their state of learning.
Criterion III- Research, Innovations and Extension		
Key Indicator - 3.6 Extension Activities		
Metric No. (as per NAAC Manual)	**Description (as per NAAC Manual , July 2017, for Reference purposes**	**Data Requirement from Department (For Academic years 2012-13 to 2016-17)**

3.6.1	**Extension activities in the neighbourhood community, if any, in terms of impact and sensitising students to social issues and holistic development during the last five years.**	**Supporting Document Required:** A Description in not more than 200 words mentioning the impact of the activities in sensitising students to social issues and holistic development. We undertake extension activities as and when needed. We train several students during the summer or winter breaks in the art of research. We also conduct open houses where we expose students from various colleges to sophisticated instruments in the department. Faculties teach and deliver lectures in schools, colleges, workshops, academic camps, etc. Recently we conducted a Blood Pressure measurement campaign across Delhi including institute campuses and public areas like markets, dharamshalas, hospitals, train stations and amongst the economically weaker section.
Criterion IV – Infrastructure and Learning Resources		
Key Indicator - 4.1 Physical Facilities		
Metric No. (as per NAAC Manual)	**Description (as per NAAC Manual , July 2017, for Reference purposes**	**Data Requirement from Department (For Academic years 2012-13 to 2016-17)**
4.1.1	**Facilities for teaching - learning available in Dept. / Centre as per the minimum specified requirements by the statutory bodies.**	**Supporting Document Required:** A Description in 200 words on the adequacy of facilities for teaching learning as per the minimum specified requirements by statutory bodies. Facilities may include Classrooms (mention number and room size in mtr. / square, Laboratories (mention number and room size in mtr. / square), Computing equipment (mention only number), etc. The classrooms are well equipped with black/white boards as well as projection systems for teaching using multimedia and PowerPoint presentations. In addition to the theoretical knowledge, our M.Sc. programme provides considerable emphasis on the

		hand on experience in the forefront areas of biochemistry through a dissertation based on research work and thesis writing. Special emphasis on critical review of literature and presentation by way of training in seminars. Very well equipped international, standard laboratories expose students to cutting edge research activities. Students are given free access to libraries and journals. They have ample computer access and round the clock access to internet. We have central instrumentation facility and animal house on campus. We have sequencing and microarray facilities and several state-of-the art equipments.
4.1.2	**The institution has adequate facilities for sports, games (indoor, outdoor, gymnasium, yoga centre etc.) and cultural activities.**	**Supporting Document Required:** A Description in not more than 200 words on adequate facilities for sports, games and cultural activities which include specification about area/size, year of establishment and user rate. The university campus and the hostels provide various facilities for indoor and outdoor sports like badminton, table tennis, well-maintained grounds for playing cricket and football etc. Moreover, well-equipped gymnasiums are also there in both girl's and boy's hostels. Additionally, our department also organizes a sport's day every year. Lawns are also well kept for Yoga activities. This year, our department also celebrated Yoga day by inviting Yoga experts. Students and teachers participated in large numbers. Cultural activities are also organized by students of the department during teacher's day, fresher's welcome, Diwali, New Year, National Science Day and Hostel night celebrations. We also organize educational trips and field trips for students outside Delhi.
CRITERION V: STUDENT SUPPORT AND PROGRESSION		
Key Indicator- 5.4 Alumni Engagement		
Metric No.	**Description**	**Data Requirement from Department**

(as per NAAC Manual)	(as per NAAC Manual , July 2017, for Reference purposes	(For Academic years 2012-13 to 2016-17)
5.4.1	**The Alumni Association/Chapters (registered and functional) contributes significantly to the development of the institution through financial and non-financial means during the last five years**	**Supporting Document Required:** A Description in not more than 200 words on how the alumni association contributes to the institution There is no Alumni Association as such, but they stay in touch at individual level with the teachers and contribute towards improvement of the course structure through their constructive feedback. The alumni who are employed to teach Biochemistry course at undergraduate level in the Delhi University colleges regularly give feedback for improvement/revision of the curriculum. The alumni visit the department at regular intervals and interact with the current batch of students and share their experience in research and life outside the department. Often they deliver seminars and talks.
Criterion VI: Governance, Leadership and Management		
Key Indicator - 6.1 Institutional Vision and Leadership		
Metric No. (as per NAAC Manual)	**Description (as per NAAC Manual , July 2017, for Reference purposes**	**Data Requirement from Department (For Academic years 2012-13 to 2016-17)**
6.1.2	**The institution practices decentralisation and participative management**	**Supportive Documents Requirement:** Describe any one case study of practicing decentralisation and participative management in the institution in notmore than 200 words. All decisions in the department are taken jointly through faculty and staff meetings.

		Students are also involved as and when needed. Students are members of the Committee of courses for the Department, which finalizes and approves any modifications in the course curriculum.
Criterion VII – Institutional Values and Best Practices		
Key Indicator - 7.1 Institutional Values and Social Responsibilities		
Metric No. (as per NAAC Manual)	**Description (as per NAAC Manual , July 2017, for Reference purposes**	**Data Requirement from Department (For Academic years 2012-13 to 2016-17)**
7.1.1.2	**Institution shows gender sensitivity in providing facilities such as:** **a) Safety and Security** **b) Counselling** **c) Common Room**	**Supporting Document Required for uploading:** A Description of gender equity initiatives undertaken by the Department on the specified areas in not more than 200 words. a) We ensure safety for students by helping them in all possible ways. We have secured our department by installing fire safety measurements that are regularly serviced and maintained. Radioactive safety and disposal of waste is practiced as per rules and guidelines of the government of India. Drinking water facilities are provided. Books are provided to students. We have First-Aid facility and if needed students are taken to heath center. We have separate toilets for boys and girls that are impeccably maintained. We are also constructing special toilet for especially abled students and built a ramp for wheelchair access. b) Students are regularly counseled. Our excellent student: teacher ratio allows personal attention. c) We do not have dedicated common rooms.
7.1.2 Environmental Consciousness and Sustainability		

7.1.2.3	**Waste Management steps**	**Supporting Document Required:** A Description of efforts towards waste management in departments in not more than 200 words. This may include Solid waste management, Liquid waste management and E-waste management. Bio-waste management regularly done in the department through Delhi Pollution Control Committee (DPCC) approved agency. The campus has placed bins at several specific points where waste can be segregated before disposal of both Biodegradable and Non-biodegradable waste.
7.1.2.4	**Rain water harvesting structures and utilization in the department**	**Supporting Document Required:** Provide a description of efforts towards rain water harvesting on the department in not more than 200 words.
7.1.2.5	**Green Practices**	**Supporting Document Required:** A Description of efforts towards green practices in departments in no more than 200 words .It may include students and staff using Bicycles, Public Transport, Pedestrian Friendly Roads, Plastic free campus, Paperless office, Green landscaping with trees. A lot of effort is made towards Green practices. Trees and plantations are maintained. Paperless practices are encouraged in the offices and labs to reduce paper wastage. Smoking is prohibited. The roads within campus are user friendly. The air is clean.
Key Indicator - 7.2 Best Practices		
7.2.1	**State at least two institutional best practices (as per NAAC format)**	**Supporting Document Required:** A Description in not more than 200 words on any two best practices successfully implemented by the Department as per NAAC format. • The students and faculty members observe very high standards in respect of ethics for publication, use of animals for research, biosafety etc. Any project involving radioactivity is monitored by departmental radiation safety officer. Every departmental member is regularly exposed to procedures to safeguard any type of malpractices.

		• All the laboratory supervisors ensure that the research work undertaken under their guidance and supervision is original. They also ensure that the work is carried out by the student(s) themselves. For writing the thesis/reports/scientific manuscripts the supervisors ensure that these are original writings. Plagiarism is avoided at all costs using appropriate softwares and alertness by supervisors. • It is also ensured that all research projects are routed through appropriate committees like Institutional Bio-safety Committee (IBSC) & Animal ethics committee and Institutional Ethics Committee. • The supervisors ensure that Good Microbiological Practices (GMP) and Good Laboratory Practices (GLP) are followed during research including the P3 level containment practices as and when appropriate. • The bio-waste is decontaminated prior to disposal. Biosafety guidelines as per DBT norms are being followed. Bio-waste management regularly done in the department through Delhi Pollution Control Committee (DPCC) approved agency.
Key Indicator - 7.3 Institutional Distinctiveness		
7.3.1	**Describe/Explain the performance of the institution in one area distinctive to its vision, priority and thrust.**	**Supporting Document Required:** A Description of the Department's performance in any one area distinctive to its vision, priority and thrust in not more than 200 words. Create, Innovate, Sustain and Promote high standards of academic excellence. To impart research based knowledge to students with emphasis on hands-on-training to motivate and inspire future citizens of India who will excel in their chosen area of interest. To imbibe the best practice in education and research and maintain the highest level of integrity and operate in the cutting edge of life sciences research. To translate the knowledge into meaningful outcome that will benefit human kind and alleviate their suffering. To create an all-inclusive vibrant academic programme that will attract the best minds and trigger their thought process.

		The department has a rich tradition of a vibrant research programme in both basic and innovative applied research. While basic research has resulted in large number of publications in high impact journals, applied research has resulted in patents (both national and international) and also successful transfer of developed technologies to Indian industry, which converted the leads from the department into commercialized products. Notable examples of technologies transferred and commercialized are: (1) Liposomal Amphotericin B - commercialized by Life Care Innovations, Gurgaon. (2) Monoclonal antibodies to M13 phage protein - commercialized by M/s GE HealthCare (multinational). (3) Rapid test for HIV (AIDS) - commercialized by M/s Cadilla Pharmaceuticals Limited, Ahmedabad (4) Detection of *M. tuberculosis* in culture - transferred to M/s SPAN Diagnostics Limited, Surat and is likely to be available in the market shortly as the product has received approval from Drug Controller General of India. (5) Virosome Technology for targeted delivery – transferred to Panacea Biotech. India, New Delhi. (6) In principle approval from DBT for a TB vaccine. Additionally, there are many leads in the area of vaccine and drug development, gene and drug delivery and diagnostics especially in relation to diseases like tuberculosis, malaria and jaundice/hepatitis, cancer and cardiovascular diseases some of which are in pre-clinical trials as well. Many of the faculty members are working in close collaboration with industry or institutions, which are responsible for taking leads to the next level in the process of products development.