INDIAN INSTITUTE OF TECHNOLOGY GANDHINAGAR

NORMS FOR TWO YEAR MSc PROGRAMME

(As approved by Senate in its 13th meeting held on 11th March 2013, updated in the 24th/36th/39th/41st/44th/55th/63rd meetings of the Senate)

1. Two-Year MSc Programme: Introduction

Indian Institute of Technology Gandhinagar (IITGN) introduced two-year Master of Science (MSc) programme from the academic year 2013-2014. The MSc programme in Chemistry, Mathematics and Cognitive Science was initiated in 2013 followed by the inclusion of Physics to the fold in 2014. The chief motivators for introducing the Two-Year MSc programme are as follows:

- Create a unique educational experience for students, especially those who may be interested in research careers.
- Exploit the broad span of current faculty's teaching and research expertise.
- Create another layer of engaged and research-active post-graduate scholars in the institute, in addition to those that are part of MTech/MA programmes.

2. Philosophy of Two-Year MSc Programme

The Two-Year MSc programme at IITGN strives to create a niche for itself, in a world that is flooded with MSc degree offerings. The proposed structure of the programme includes the following features that echo the core philosophies of the institute:

- Enable students to acquire substantial breadth and depth in their areas of study.
- Orient and enable student attitudes towards scientific research.
- Expose students to areas beyond their core subjects.
- Mandatory curriculum components originating from humanities and social sciences.

3. Admission/Selection Procedure

Admission to the Two-Year MSc programme will be on the basis of qualification in Joint Admission to Masters (JAM) examination being administered by the IIT system. Students may also join via Early-admit MSc. The emphasis on scholarly and research activities in IITGN's Two-Year MSc programme may be factors for considering the following possibilities in future:

- Conducting interviews on JAM qualifiers.
- Allowing students in one discipline who have qualified national level examination in that discipline to pursue a Master's in another discipline.

Disciplines that do not fall under the current purview of JAM may develop an appropriate selection strategy comprising viva voce and /or written examinations at the institute.

4. Curriculum Structure

- The Physics, Chemistry and Mathematics disciplines have a two-track structure for their MSc programs – a "coursework" track and a "research" track.
- The coursework track emphasizes a larger number of core courses in the respective disciplines, while still including a flavor of research through project work. In contrast, the research track will

emphasize fewer core courses but greater research depth. It is generally expected that research done in the research track will be of publishable/patentable quality.

- All students at the end of their second semester will be given an option to choose the track they wish to pursue. Any student with a CPI of greater than or equal to 7.0 will be allowed to choose the track of his/her choice. Students whose CPI is below 7.0 may be given their choice after suitable consultations with the discipline faculty.

- The Cognitive Science MSc program will continue along a single track, but will, in spirit be aligned with the research track of the other three disciplines.

- Completing PG Orientation Programme Aarohan (2 Credits) is a mandatory graduation requirement for all MSc students. It is a two-week long programme that all the newly joined students are expected to successfully complete before they commence the first semester in their academic programme. In cases where a student fails to clear Aarohan, they must clear an additional two credits worth of HSS courses for graduation (applicable for all students who join from Semester – II, 2022-23 onwards).

- Students joining the MSc programme (from semester – I, 2021-22 onwards) must complete two Physical Education (PE) courses, one each in their first two semesters, as part of their graduation requirements. These courses will be evaluated on a Pass/No Pass grade basis.

A. Credit structure:

The Physics, Chemistry, and Mathematics disciplines have the following detailed breakup of credit structure within the two tracks. The Cognitive Science discipline has the following credit structure and will only have the research track.

	Coursework Track credits			**Research Track credits**			
	Chemistry	Physics	Math	Chemistry	Physics	Math	Cognitive Science
Core	40	44	44	32	36	36	24
Elective	20	12	16	20	12	16	24
HSS*	12	12	12	08	08	08	08
Research	08	12	08	20	24	20	20+4[#]
Total	80	80	80	80	80	80	80
Aarohan	2	2	2	2	2	2	2
PE (02 courses)	0	0	0	0	0	0	0
Total Credits	**80 + 2**	**80 + 2**	**80 + 2**	**80 + 2**	**80 + 2**	**80 + 2**	**80 + 2**

#Summer Internship; *One of the HSS courses will be compulsory “Writing” course.

B. Course Structure: Basic framework of the curriculum will include the following:

1. **Core courses:** These are courses deemed essential to be part of the Master’s curriculum in the specified discipline.

2. **Elective courses:** These courses include those that are either offered by the parent discipline or aligned disciplines in the general area of the programme of study. In some cases, appropriate undergraduate courses could also be offered as electives for the MSc programme. However, electives could also be taken from the entire pool of post-graduate as well as undergraduate courses offered by any discipline in the institute.

3. **HSS courses:** In keeping with the institute’s philosophy of emphasizing the role of humanities and social sciences, students are required to take at least 8 (research track) or 12 (coursework track) credits of courses arising from those disciplines. The 4-credit “Writing” course will be required for all

students.

C. **Nature of Research During Two-Year MSc:** The nature of "research" performed during MSc is defined as:

i. Students will be required to select the general area and type of work at the end of the first semester and identify faculty member(s) willing to act as supervisor. Co- supervision by up to one faculty member may be permitted.

ii. Students may choose supervisor from outside their own disciplines and work under any advisor in the institute.

iii. Research project work can be research-oriented, developmental, industrially relevant, or a combination of these. The type of work selected would primarily depend on the interest of the student and the faculty supervisor(s).

iv. While, the nature of research/project work is mostly left to individual faculty supervisors, close ended projects will be preferred in the initial years. It is conceivable that within a few years of the programme, enough experience will be accumulated to permit open ended research projects with no deadline for submission.

v. Supervisors will award a letter grade for the total number of credits of research/project work.

vi. Towards the end of the programme, the student will be expected to submit a comprehensive report for assessment by an evaluation committee of at least 3 members with the supervisor chairing that committee.

vii. The students will be expected to register during the summer at the end of first year for up to 12 credits.

viii. The advisorship of research projects may change during the course of the programme. Such changes/switches will be assessed purely on the basis of performance in each project. In such cases, the student can compile all the work into one report for submission and evaluation.

ix. Mode of assessment of research projects is left at the discretion of disciplines. The assessment criterion being currently used for judging B.Tech. project progress may be used for guidance in this regard.

x. It is expected that engagement of students in research during the two-year MSc programme will translate into peer-reviewed publications.

D. **Criteria for Continuing in the Two-Year MSc Programme**

(Applicable for Students Admitted from AY 2023-24)

i. There will be no maximum permissible duration to complete the requirements of the programme. However, at any time, credits earned older than eight years will be deemed expired and will not count towards the graduation requirements. After 7 semesters, a request from the student is needed to extend the programme on a semester by semester basis.

ii. Any student failing to earn a minimum of 28 credits within one year from his/her start of the

first year programme (either due to admission or due to restart) should start his/her programme afresh or exit the programme. A student needs to secure a passing grade for earning the credits registered for the course.

iii. If the programme is restarted, then the credits earned and semesters registered prior to restart will not be carried over.

iv. Restart will be permitted only once.

v. In case the CPI of a student falls below 6.0 out of 10, the fellowship provided, if any, by the Institute will be stopped immediately and for the future.

(Applicable for Students Admitted before AY 2023-24)

i. A student who fails to earn a minimum of 8 credits at the end of his/her first active semester must ordinarily exit the programme. However, he/she may make an earnest request to continue into the second semester by submitting a strong justification and a clear work/graduation plan. Both of these must be vetted by the student's faculty advisor, who must also provide a detailed rationale for why the student may be allowed to continue. This request may be reviewed by the Dean (Academics), who will then present the case to the Senate for a decision. Favourable decisions are to be rare and given in exceptional circumstances.

ii. The request to continue must be received in time, i.e., well before the date of registration of the student's potential second semester. If the request is not received by this time, it will be presumed that the student is no longer interested and the student's programme will be terminated.

iii. If the request for continuation is approved by the Senate, the student may register for the second semester. If this student fails to earn at least 26 credits at the end of his/her first two active semesters, he/she must exit the programme. However, at this point, the student will have the opportunity to restart the programme afresh. The restart option can be exercised only once.

iv. If the programme is restarted, then the credits earned and semesters registered prior to restart will not be carried over.

v. Upon restarting, the student must earn a minimum of 12 credits in his/her first semester and 15 credits in the second semester or else his/her programme will be terminated and no further chance will be given.

vi. The maximum period allowed to complete the programme will be three years (the first year or first semester if repeated will not be counted).

vii. In case Institute fellowship/ scholarship has been provided during the failed semesters, it will be adjusted in the following semesters.

viii. Students may opt for the rules for termination as applicable for students admitted from AY 2023-24.

E. Other Provisions of the Two-Year MSc Programme

i. Students who have performed exceptionally in the two-year MSc programme may be offered direct entry into the Ph.D. programme at IITGN. Disciplines may decide criterion for judging exceptional performance (e.g. CPI) of students.

ii. Outstanding performers may also be considered for short internships in prominent institutes worldwide. Work performed in such internships may be applied towards research/project work credits. Disciplines may decide the number, duration and timing of such internships.

5. Discipline-Wise List of Core Courses for MSc Curriculum:

Chemistry	Physics	Mathematics	Cognitive Science
Interpretative Organic Spectroscopy	Classical Mechanics	Linear Algebra	Computation and Cognition
Physical Organic Chemistry	Quantum Mechanics I	Algebra I	Fundamental Neuroscience
Transition Metal Chemistry	Mathematical Methods in Physics	Topics in Real Analysis	Cognitive Psychology
Quantum Chemistry	Methods of Experimental Physics I	Topology	Research Methods in Cognitive Science
Organometallic and Bioinorganic Chemistry	Quantum Mechanics II	Complex Analysis	Experimental Techniques in Cognitive Science
Reactions and Mechanisms in Organic Chemistry	Classical Electrodynamics	Ordinary Differential Equations	Philosophy of Mind
Organic Chemistry Lab; Inorganic Chemistry Lab (2 credits each)	Computational Physics	Functional Analysis	
Physical Chemistry Lab; Analytical and Computational Chemistry Lab (2 credits each)	Methods of Experimental Physics II	Advanced Numerical Methods in Engineering	
Advanced Organic Chemistry – *only for coursework track*	Statistical Mechanics	Algebra II	
Solid State Chemistry and Applications – *only for coursework track*	Condensed Matter Physics – *only for coursework track*	Partial Differential Equations – *only for coursework track*	
	Atomic and Molecular Physics – *only for coursework track*	Introduction to Differential Geometry –*only for coursework track*	