HBNI Board of Studies, Mathematical Sciences.
Meeting held virtually on 18 May 2022
(following extensive discussion over email
and in an earlier (virtual) meeting held on 27 April 2022)

Members present

1. Meena Mahajan, IMSc. (Convenor)
2. Surya Ramana, HRI. (co-Convenor)
3. Mahuya Datta, ISI-Kolkata
4. K N Raghavan, IMSc.
5. Brundaban Sahu, NISER.
6. B Sury, ISI-Bangalore.
7. Jugal K Verma, IIT-Bombay.

Agenda

Discussion: Proposal to start an Integrated MSc-PhD programme in Mathematics at NISER.

Decisions

1. The BoS recognises that the integrated MSc-PhD program, which aims to catch exceptionally bright students young, directly after their bachelor's degree, and train them through a Masters program for PhD and research, is worth introducing.
2. The BoS recommends that the program be started this academic year 2022 itself.
3. The proposed course structure and syllabi for Semesters 1 to IV are fine.
4. The proposal for Semesters V and VI needs to be reconsidered. There are some reservations regarding the requirements in Semesters V and VI. The reservations, and proposed recommendations to overcome them, are summarized below. These may be discussed within NISER and a suitable revised proposal for Semesters V and VI sent to HBNI central office for consideration as soon as possible.

Reservations

1. On completion of course work, students of this program should be on par with students of the PhD program who have completed course work. This requires some more advanced courses to be included in the program, in Semesters V and VI.
2. A Master's level dissertation stretching across an entire year is not desirable or appropriate in the integrated MSc-PhD program for Mathematics.

Recommendations

1. In Semester V, replace the "40 credits for dissertation" with "24 credits for dissertation, 8 credits for Elective-III, 8 credits for Elective-IV".

2. In Semester VI, replace the "40 credits for dissertation work" with "24 credits for dissertation, 8 credits for Core Course Topology-II (MA 606 of the PhD program), 8 credits for Elective-V".

Other optional suggestions

(These may be considered at NISER and, if suitable, incorporated in the next curriculum revision.)

1. MA 702: Include reference "A primer of real functions", fourth edition, R. P. Boas (Carus monograph, The Mathematical Association of America, 1960).

2. M704 (typo; meant to be MA 704): Include reference "Advanced mathematical methods by scientists and engineers", C. M. Bender and S. A. Orszag (Springer Verlag, 1999).

3. MA 803: Include reference "First concepts of topology", W. G. Chinn and N. Steenrod (The Mathematical Association of America, 1978).

4. MA 861: The suggested book by Vera Pless may be replaced by "Fundamentals of error-correcting codes" by W. C. Huffman and V. Pless (Cambridge University Press, 2003).

5. MA 868: Include reference "Probability theory", S. R. S. Varadhan (Courant Institute of Mathematical Sciences Lecture Notes vol. 7, AMS, Providence, Rhode Island, 2001).

6. MA 883: Include reference "Harmonic analysis on symmetric spaces - Euclidean space, the Sphere, and the Poincare Upper Half-Plane", Second ed., A. Terras (Springer Verlag, 2013).

7. Design and include an elective course entitled "Dynamical systems" along the lines of "Dynamical systems" by J. E. Marsden, and, "Mathematical methods of classical mechanics" by V. I. Arnold. (Subject to availability of faculty to offer such a course.)

(Meena Mahajan
Convener,
BoS Mathematical Sciences, HBNI)