

# Proposal for a Bachelor of Science (BS) Programme in the Department of Biological Sciences and Biological Engineering

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With the adoption of the new ARC regime in 2011, the Institute has normalized its degree programmes across all Departments offering Undergraduate degrees, whether Engineering or Science. Thereby, the BTech programme is functionally equivalent to the 4 year BS programme - the only difference between the two in terms of course template lies in the Department core part of the template. Given this, it is now, in theory, possible for Departments that straddle the line between Science and Engineering (such as, say, BSBE, MSE or CSE) to offer a Science-based programme [this would not be possible earlier as they would have to introduce an MSc (Integrated) programme, which differs widely enough from the BS/BTech paradigm that a Department couldn't really run both].

The proposal is to convert what is currently the BTech programme being offered in Biological Sciences and Biological Engineering into a programme that may either yield a BTech degree or a BS degree according to the wishes of the student, and based on the course-work that he/she wishes to take.

## Motive of the Proposal:

The fundamental motive of the proposal is to provide for the BSBE Department to compete with 4 year/5 year Science programmes in Biology in the rest of the country - including, for example, the IISERs, IISc and some of the other IITs. At present,

there are several factors that make the IIT Kanpur programme unappealing to students who are interested in the scientific aspects of Biology, especially those students who intend to pursue graduate education in the subject. The presumed reasons for this are the following:

- Presumed focus on Engineering (due to the name of the degree - BTech over BS, even though MTH, ECO, CHM, PHY and ES all offer BS programmes).
- Ineligibility of BTech students to receive Science-related scholarships, in particular, and most importantly, the KVPY (Kishore Vaigyanik Protsahan Yojana) Fellowship given by the Department of Science and Technology: only students enrolled in BS/BSc/MS/MSc degrees may get this fellowship if they are studying Biology.
- General apathy of the Department and the Institute in terms of attracting students who wish to pursue higher education.

In this context, it should be noted that despite the degree being awarded, the curriculum of the programme is heavy on Science courses within the broad spectrum of Biology, and in theory the same template could be used for a BS programme which has a slight emphasis on the Engineering aspects of the Department as well.

This proposal would mitigate some of the factors given above: the students will be directly eligible for Science scholarships, including KVPY. Furthermore, unlike India, where three year Science programmes are more prevalent, the concept of a four year BS is well-established outside of India, and hence this degree could be better acceptable for graduate institutions abroad when they take in students who complete the BS programme at IITK. This is a fact that has already benefited the Science departments: the students

who graduate after four years seem to be getting into the same sorts of schools that the students graduating with an MSc (Intg) were getting into.

### **Specifics of the Proposal**

The proposal is as follows - the current BTech programme in BSBE should be retooled into two separate programmes, a BTech programme and a BS programme.

The difference between the two programmes can be variable depending on what seems feasible - the difference could merely be in the name, while in effect the template is exactly the same, or there could be minor differences (such as, say, a higher SO requirement for BS and a higher ESO requirement for BTech), or there could be major differences (such as a higher emphasis on Science and Engineering respectively in the Department core curriculum for the BS and BTech programmes respectively).

Furthermore, it is strongly believed that the choice of which degree a student wants to obtain must be left to the student - some students, for example, may be more interested in obtaining a job. In theory (though not necessarily in practice), BTech degrees are more useful in terms of obtaining a job, whether in the industry or otherwise. Hence, in a particular year, there may be students who are more interested in doing a BS than a BTech or vice-versa, and hence the Institute should not straitjacket the students who have taken admission into a particular programme.

Thus, it is not proposed that there be an increase in the total number of seats in the BSBE Department. Instead, the current BTech seats should be converted into a floating figure that would comprise the combination of the BTech as well as BS intake.

Furthermore, the student must decide which degree he/she wishes to obtain at the time of joining the Institute. Exactly what time this declaration is to be made is an implementation issue - if the Joint Seat Allocation can handle this decision at the level of counselling, then it should be done there, else it may be done once the students come to campus for the Orientation. For practical purposes, it makes most sense to list the programme as BTech/BS during seat allocation, and then let students choose once they are allocated a seat in the BSBE Department.

Finally, whether or not students can switch from BS in BSBE to BTech in BSBE or vice-versa should depend upon how similar the templates of the two programmes are. Ideally, the student should be allowed to switch at least once, so long as doing so does not extend their degree.

Other aspects of this proposal include how this introduction will interact with the Double Major and the Dual Degree programmes.

### **Double Major**

The most sensible way to deal with Double Major is to treat it similar to a student entering the Institute. The number of Double Major seats in the BSBE Department ought to remain the same, and a student who has gotten allocated BSBE may choose BS or BTech depending on their own interests.

### **Dual Degree: MS Programme and other issues**

While the BS and BTech degrees are functionally equivalent, at this point in time, the MTech and MS parts respectively of the BTech-MTech and BS-MS Dual Degree programmes are not equivalent. There are some major differences between the PG parts of the Dual Degree programmes of Engineering and Science

departments; in particular, the thesis component is widely different.

The following proposal, though contingent on the above BS proposal, is independent of it, insofar that the Institute may reject the below proposal even while it approves the above proposal.

The proposal is to begin an MS degree as part of the Dual Degree programme in the BSBE Department. This MS degree shall be like those offered by the PHY and MTH Departments - the thesis component shall be reduced and the PG level course-work will be increased and emphasized. The exact details of the programme will, of course, have to be designed by the Department, but it is proposed that any student of BSBE may convert to this programme (irrespective of whether they are pursuing a BTech or a BS), and similarly, any student should be allowed to convert to the existing MTech programme irrespective of their UG degree. Thus, a BSBE student may do a five year programme which is BS-MS, BT-MT, BS-MT or BT-MS. This would offer a great deal of flexibility to students in terms of employability, usage of the degree outside of India, and in terms of whether they wish to emphasize research or course-work.

In case the Institute/Department does not agree to the above proposal, it is at least recommended that the BS students be allowed to convert to the existing MTech programme and graduate in a BS-MTech Dual Degree (Category A).

For Category B, a similar treatment as described for Double Majors should be applied.

## Conclusion

In conclusion, if the Students' Senate believes that the above proposal has merit, it may be forwarded to the Department and the SUGC for consideration. Furthermore, if the SUGC considers such a proposal favourably, and the programme is a success relative to its goals then similar proposals may be introduced for other Departments that may be conducive to such treatment (such as, say, CSE).