

# **MTech-Information Science and Technology (IST): Possibilities and challenges with proposed Five Year Integrated model for building Technology *vis-à-vis* Society**

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## **ABSTRACT**

Information Science as a subject is an important interdisciplinary knowledge cluster and is very much close to Information Technology and Computer Science. But Information Science also deals with some other knowledge gradients such as Information Studies, Knowledge Management and hence Management Science. Still, MTech or BTech programme is mainly popular in India, it's neighbouring countries and some UK Asian countries. As far as Information Science with MTech is concerned, not a single programme available on this nomenclature; but huge possibilities are there to introduce such programme with mixing up Engineering faculties with existing Information Science schools. Thus, this paper discusses about Information Science, it's changing nature, and also about need and potentiality of five years integrated MTech- Information Science programme.

**Keywords:** Information science, informatics, MSc, MTech, education sector, educational systems, AICTE, India

Information Science is an Applied Science deals with several technologies such as Database Technology, Multimedia Technology, Communication and Networking Technology and so on for Information Processing and Management. Information Science initially treated as information field and some with manual knowledge organization tools. Information Science is now a day's associated with so many broad domains such as Science, Engineering, Humanities and Management. Still, Information Science offers mainly in Science Faculty and in some universities in Business and Management Science. In India,

Information Science is in developing stage and only some educational institutes offer Information Science programme. The most important educational institute which started Information Science programme is BIT Mesra, Ranchi with flagship nomenclature of MSc- Information Science.

## Objective

This paper actually talks about several aspects and but not limited to following aim and objectives:

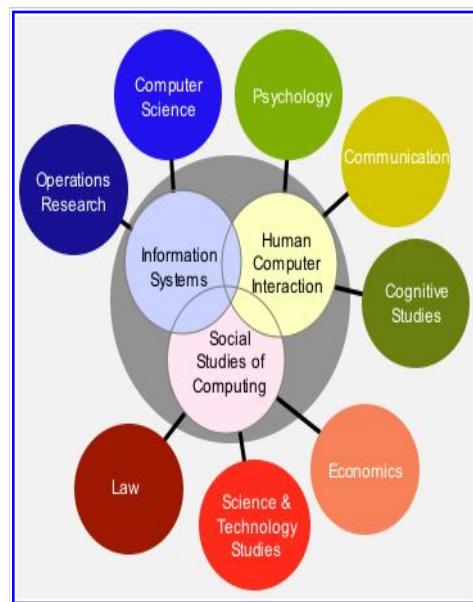
- ❖ To know basic about Information Science including its need, characteristics, and combining subjects and educational programme at a glance in India and abroad;
- ❖ To know a brief about possibilities of Information Science with the help of Engineering academics and future possibilities with career prospects;
- ❖ To know about the need and potentiality of proposed MTech- Information Science Degree with the five-year integrated norms.

## Methodology

This is a conceptual and theoretical study and hence the main approach is used as case studies with a review of Information Science material such as books, journals, in this field. To learn about the latest of educational programme available on Information Science. India's leading organization such as UGC, AICTE and MHRD's website is used and analyzed. To design MTech programme, we analyzed general MTech programme structure and also traditional MSc- Information Science programme; and such a way the Model of MTech- Information Science with five year integrated curriculum is proposed to keep in mind Indian educational system.

## Information Science and changing scenario with Educational Scenario

Information Science [IS] is a field of study and practice for information dealing which includes collection, selection, organization, processing, management and dissemination of information. Information Science initially practiced in Library Science school and by the Library Scientist and Librarian. However, over the period the development of IT and computing and some other domain which are related with information processing activities; directly and indirectly, changes Information Science domain and make as an Applied Science domain. Hence, today Information Science is practice in the Computer Science, Information Technology, Communication Science and Technology professionals and departments and makes Information Science as an interdisciplinary domain with huge job and research potentials which is depicted in Fig. 1. Information Science initially started as a module and paper in some of



**Fig. 1:** Interdisciplinary Gradients of IS

the western universities in Library Information Science (LIS) and Communication Science degree and educational programme and generally developed as a full-fledged programme with BS/BSc/MS/MSc Information Science programme. Some universities also established full-fledged Information Science school or simply I-Schools. Recently some universities are stated domain based Information Science programme such as Health Informatics, Geo Informatics, Bio Informatics, and Quantum Informatics and so on. However, in some universities, programmes are also offered with some technology and tools based specialization.

## Information Science and possibilities with Engineering Domain

Information Science and its interaction with some domain such as Computer Science, Information Technology, Management Science, Cognitive Science changes the traditional nature of Information Science; and come close to Engineering and Technological Science several ways. As far as course curriculum is concerned, Information Science deals with several Engineering department gradients such as Computer Science and Engineering, IT, ECE, Mechanical Engineering and so on and thus Information Science specialization may be started in conventional Engineering and Computing degree programmes listed in Fig. 2.

<b>Semester / Year</b>	<b>Name of the Proposed Paper/ credit/ Lab Requirement</b>
<b>Semester I/ Year 1</b>	Information and Knowledge [2/No], Computer Skill [2/Yes], Knowledge Organization-I [3/Yes], DBMS [3/Yes], Management Basics [2/No]
<b>Semester II/ Year 1</b>	IT Application [2/Yes], Knowledge Organization-II [3/Yes], MIS [2/Yes], RDBMS [2/Yes], Knowledge Society and Economy [2/No]
<b>Semester III/ Year 2</b>	IBM-DB2 [3/Yes], Computer Networks [3/Yes], IACR [2/Yes], Web Systems [2/No], DHTML and XML [3/Yes]
<b>Semester IV/ Year 2</b>	Multimedia Systems and Software [3/Yes], Knowledge Management [2/No], Advance Information Retrieval [3/Yes], WAN Protocol [3/Yes], Web Systems and Engineering [3/Yes]
<b>Semester V/ Year 3</b>	Information Networks [2/No], Operating Systems [3/Yes], Information Literacy [2/No], Programming with C [3/Yes], Digitalization [3/Yes],
<b>Semester VI/ Year 3</b>	Data Structure [2/No], System Analysis [2/No], Information Management Systems [3/Yes], Record Management [2/No], Visual Basic [3/Yes]
<b>Semester VII/ Year 4</b>	Meta Data [2/No], E-Learning [2/Yes], Content Development [2/No], Web Based Content Designing [3/Yes], Professionalism [2/No]
<b>Semester VIII/ Year 4</b>	Information Foundation Management [2/No], Information Technology Management [2/ No], Digital Divide [2/NO], PHP [3/Yes], Domain Based Information Science [2/Yes]
Semester IX/ Year 5	See specialization Diagram -4
Semester 1/ Year 5	See specialization Diagram-4

**Fig. 2:** Showing Proposed Structure of Five Year integrated MTech-IS Programme

In India, some Science subjects are offer with Science and Technological point of view [BS/BSc/MS/ MSc and BE/ME/BTech/MTech] and thus subjects like Computer Science/IT/ECE is also offer as MSc/ MTech Degree. As far Information Science is concerned, the most common and flagship programme is MSc-IS and mainly offered in Science and Engineering Faculty. Though Information Science has so many knowledge gradients related to Computing and Technological Sciences related with Information Processing and Management but still Information Science is only offered as MSc-IS rather than BTech/ MTech. In India, as MTech Engineering Studies mainly offered in Universities and these huge possibilities

are there to introduce IS with MTech Degree with existing college/ university infrastructure. In such proposed schools, the mentor Information Science team may integrate with CS, ECE, IT and Management Department and some guest and the adjunct professor may be recruited for Core Information matters.

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**Common MSc-Information Science general course component at BIT Mesra, Madras University and WBUT**

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**BIT Deemed University:** 1. Foundation of Information Science; 2. Theory & Practices of Knowledge Organization and Information Processing; 3. Fuzzy Logic & Neural Networks Applications; 4. Internet and Web Technology; 5. Data Structures; 6. Data Base Management System; 7. Operating Systems; 8. Computer Communication Networks; 9. Management of Information System & Centers; 10. Information Psychology & Information Architecture; 11. Research Methodology & Quantitative Techniques; 12. Digital Library and Multimedia; and Other 2 Electives.

**Madras University:** 1. Evolution of information science; 2. Information sources; 3. Knowledge organization; 4. Introduction to information technology; 5. Soft skill; 6. Management of information centre Information service; 7. Information processing-classification; 8. Information and Communication technology; 9. Information storage and retrieval; 10. Information processing-cataloguing, 11. Research methods; 12. Preservation of information material; 13. Knowledge management; 14. Marketing of information; 15. Digital libraries and electives; 16. Internship.

**WB University of Technology:** 1. Mathematics for information science; 2. Data structure with C/ C++; 3. Computer organization; 4. Business communication; 5. Library and information science; 6. Object technology; 7. Operating system and system programming; 8. Software engineering; 9. Information theory; 10. Soft computing; 11. Digital image processing; 12. Values & ethics in profession; 13. e-commerce.

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**Fig. 3:** Showing Running IS core paper of MSc-IS Programme in Indian Universities

## Indian Information Science Education and Running Curriculum

India is leading education hub around the world, and having more than 800+ Universities, 50+ Institutes of National Importance, 200+ Central R/D Institutes and 35000+ Government College and so on. But, still, Information Science [*biased free*] programme only offered in 8-10 Institutes with the main programme MSc. Some course gradients are listed in the Fig. 3 which deals with MSc-IS programme running in Indian Universities. Information Science MSc in Indian universities comes with computational gradients and also basics of Information and Knowledge Management. BIT Mesra is the leading University of MSc-IS dealing which prepare curriculum with both computing and information related gradients. Hence during the preparation of our proposed five-year integrated MTech-IS programme, the existing IS curriculum helps a lot.

## MTech-IS: Proposed Programme after 10+2 and with Lateral Entry Scheme

The proposed MTech is planned for 5 years duration of study and research for 10+2 qualified or equivalent in Indian education system. The programme may also offer to vocational stream and polytechnic Diploma holder or For IT/ LIS/Computer Science Diploma holders' equivalent to 10+2+3. However, the candidate with 10+2 qualification [*other than BSc/Diploma Engineering*] may offer to leave the programme with BTech-IS programme. The proposed programme deals with general Information Studies, core IT/ Computing studies and also follows bias-free approach up to 3<sup>rd</sup> year and in 4<sup>th</sup> year domain based specialization is proposed with the popular field of specialization like Cloud Informatics, HCI, Medical Informatics etc. are proposed. The following figure (Fig. 4) is illustrated such proposed paper names with possible credit [*as per Indian educational system and existing MSc/MTech study*], Lab requirement and so on. However, the 4<sup>th</sup> year and 5<sup>th</sup> year completely deals with domain based specialization and such papers are also proposed in Fig.4.

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**Proposed Papers for Specialization at semester VII and VIII**

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**Cloud Computing Specialization**

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[5 paper Each for semester VII and VIII]

Dynamic Computing  
Cloud Computing  
CISCO and Cloud Computing  
Cloud Service Provider and Management  
Cloud Security  
VPN and Cloud Computing  
Cloud in Information World  
Challenges in Cloud  
Big Data Management  
Cloud Based Software

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**Usability Engineering Specialization**

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[ 5 paper Each for semester VII and VIII]

Basics of Usability Engineering  
Human Computer Interaction through Usability Engineering  
UE for Information Systems  
UE Practice-Dynamic Web Development  
AJAX, PHP, Mobile Interface Designing  
Intelligent Interface  
Trends in HCI and Information World  
Information Foundation and Search Engine  
Android  
Trends of HCI

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**Medical Informatics Specialization**

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[5 paper Each for semester VII and VIII]

Medical Science Basic  
Human Anatomy  
MIS Software  
MIS and Health Policy  
Indian Health Policy  
UE for Medical  
Food Informatics  
MIS Computation and DSS  
ERP for Medical Centre  
Telemedicine

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**Fig. 4:** Showing Proposed Structure of some electives of MTech-IS Programme

## Findings

Information Science is most interdisciplinary programme combines with IT, Computing, Management Science, Cognitive Science and other domain which helps in Information activities;

- ❖ Information Science in India is available mainly with MSc-IS degree and only two institute offer BSc-IS programme;
- ❖ India has near about 5000+ technical institute and in many of such institute it is possible to offer MTech- Information Science programme;
- ❖ One institute i.e. BIT Mesra already planned and got approval from AICTE to run India's first MTech programme on IST with 2 year duration.

## Suggestion

- ❖ To keep in view Indian Engineering stream education it is essential to start 2 years or 5 years MTech-IS programme in existing infrastructure;
- ❖ Information Science may be started in IT, ECE, CSE department and for core information papers; some guest/adjunct teacher may solve the problem;
- ❖ Information Science with future demandable specialization such as Usability Engineering, HCI, Green Computing, and Quantum Informatics may be started.

## CONCLUSION

Information Science is needed in almost all type of organization and institutions and several sectors; such as Healthcare, Government, Education, Business and so on. Information and its importance are increasing day by day and thus several academic programmes are initiated by several universities and institutions around the world to keep Information Infrastructure healthy with technologically sound; hence as far as India is concerned, MTech-IS programme with full knowledge may be helpful to fulfill the ultimate aim.

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