

Minutes of the meeting of Board of Studies in Computer Science & Electronics held on 28.10.07 at 10:30 a.m. in Conference Room, Vidya Mandir, Banasthali Vidyapith.

Present

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| 1. Prof. Yogesh Singh (External Member) | 20. Ms. Naresh Kuwar |
| 2. Prof. Vineet Sahula (External Member) | 21. Mr. Chandra Kumar Jain |
| 3. Prof. G. N. Purohit | 22. Dr. Seema Verma |
| 4. Mrs. Yogeshwari Kankheria | 23. Mr. Ajay Kumar Srivastava |
| 5. Mr. Chandra Kumar Jha | 24. Ms. Shailly Sharma |
| 6. Mrs. Geetali Banerji | 25. Dr. Kusum Gupta |
| 7. Dr. Reena Dadhich | 26. Mrs. Pratishtha Mathur |
| 8. Mr. Sanjay Kumar Sharma | 27. Mrs. Sudha Morwal |
| 9. Mr. Pradeep Kumar Sharma | 28. Ms. Manisha |
| 10. Mr. Vikas Pareek | 29. Mrs. Manisha Bhatia |
| 11. Mrs. Manisha Jaijiya | 30. Mr. Sanjay Bhargava |
| 12. Ms. Manisha Agarwal | 31. Mrs. Manjusha Kamboj |
| 13. Mr. Ajit Kumar Jain | 32. Ms. Usha Badera |
| 14. Ms. Reena Agrawal | 33. Smt. S. Taruna |
| 15. Ms. Archana Mangal | 34. Mr. Vivek Purohit |
| 16. Ms. Shalini Mishra | 35. Ms. Preeti Harsh |
| 17. Ms. Neelam Gupta | 36. Ms. Pratishtha Gupta |
| 18. Dr. Ritu Vijay | 37. Mr. Anurag Singh Baghel |
| 19. Mrs. Iti Mathur | 38. Prof. Rekha Govil (Convener) |

Prof. M.C. Govil, Dr. Brijendra Joshi (External Members), Dr. Neeta Khare, Mrs. Usha Landge, Ms. Poonam Kshatriya, Ms. Gunjan Aggarwal and Mrs. Sunita Chaudhary, (Internal Members) could not attend the meeting.

The meeting started with a warm welcome to the new external members.

1. The board confirmed the minutes of its last meeting of the Board of Studies held on October 8, 2006.

It was noted that the revised scheme of examination, courses and syllabi of MCA & M.Sc. (CS) proposed by the Board in its last meeting had been referred back to BoS by the Academic Council for need of reconsideration.

The convener informed the external members that Bachelors programmes in Engineering have been introduced in Banasthali University from the session 2007-08 in three disciplines viz. Computer Science, Electronics and Communication, and, Information Technology. M.Tech. in (IT) has also been started. We already have M.Tech. in CS, SE and VLSI design.

2. The board examined the existing panel of examiners for each examination upto and inclusive of all Master's Degree Examinations keeping in view the Bye-law 15.03.02 of the Vidyapith and updated the same.
3. The board considered introducing semester scheme in the Undergraduate Programmes as per the decision of the Academic Council.

It was noted that the structure to be adopted to maintain uniformity across various faculties is as under:

- In case of a subject having lab component, each semester should have one theory course of 6 contact hours/week and one laboratory course with 4 contact hours/week.

The weightage of lab be half that of theory, thus totaling to 8 credits per subject per semester.

- In case of a subject having only theory courses, e.g. Mathematics, there should be two courses of 4 contact hours/week per semester.

The external members expressed their opinion that with the structure as above, moving to semester scheme has not affected the total content in lab based subjects, whereas in general the benefits of moving to semester scheme are seen in terms of enhanced content. They were in favor of keeping the structure:

Theory - 1 3 hours

Theory - 2 3 hours

Lab 4 hours

The convener told that the scheme proposed by Academic Council also aims at optimizing the examination time and achieving a target of more than 210 teaching/learning days in an academic session, and hence, we must adhere to the uniform scheme, as has been finalized by the Academic Council.

Accordingly the board recommended the semester scheme of examination, courses and syllabi of the following undergraduate programmes:

1. B.Sc. (Computer Science – Pass and Honors) (I (a) Pages -10 - 27)
2. B.Sc. (Electronics) (I (b) Pages -28 - 34)
3. BCA (I (c) Pages – 35 - 48)
4. BA (Computer Applications – Pass and Honors) (I (d) Pages – 49 - 57)

The course structure as against the existing annual scheme, scheme of examination, and syllabi of courses are enclosed in **Annexure I** (Pages 6-9).

4. The board recommended the scheme of examination, curricula and syllabi of various PG programmes and B. Tech. Programme of Apaji Institute. The scheme of all the regular programmes

Annexure V: M. Tech. (CS/EC/IT/VLSI) (2008-2010) (Pages 101 - 118)

- No change in the structure of schemes of these programmes. However, the list of electives were closely examined and limited for each specialization.

The following syllabi for the core courses of M. Tech. (IT) were examined and approved

- (i) Information Theory & Coding
- (ii) Distributed Systems
- (iii) Information Security Systems

- For M. Tech. (VLSI design), one of the external experts, Dr. Vineet Sahula suggested to consider the possibility of creating a slot for two electives instead of one, where students can opt for courses such as 'Computer Architecture' or 'Operating Systems'. The matter was suggested to be considered and was latter deferred for the next BoS.

10. The board considered the syllabi of various part time programs run by Apaji Institute as under.

- (i) Certificate Course in Computer Programming & Applications – 2008
- (ii) Diploma in Computer Maintenance & Hardware – 2008
- (iii) Certificate Course in Internet & Web Applications – 2008
- (iv) Certificate Course on IT Localization – 2008
- (v) Advanced Diploma in Networking – 2008

While, no change is recommended in the syllabi, it was felt that the mode and weightage of Continuous Assessment need to be made uniform in all the programmes. The matter is referred to the faculty for consideration.

11. The syllabus for the foundation course at III year B.Sc./B.A. 'Introduction to Computers' is a matter to be discussed alongwith all foundartion courses, in a separate BoS in Foundation Courses.
12. The board reviewed the reports received from the examiners of different examinations. The external members appreciated the format of the report and suggested that if analysed properly in conjunction with the grievances, the report can reveal important information regarding Question Papers, Syllabus and coverage.

This report should also be considered while designing model question papers.

As the matter concerns all the subjects, it should be discussed at length at faculty level to come out with a framework of relevance.

13. The board considered the report submitted by faculty members on the suitability of question papers of last year/semester for this year (**Annexure VI** (Pages 121 - 127) and noted that a total of 19 model question papers were needed to be designed out of 76 question papers. However, about half of them were due to syllabi updates and hence about 10 – 12 % was the actual proportion of not acceptable question papers. Even this is not a satisfactory fact. The question papers require a critical analysis. The matter is referred to faculty to be discussed alongwith point 7 as above.
14. The board reviewed the two cases of grievances reported in the agenda. Both seem to concern the syllabus and its coverage /interpretation by, in the first case examiner and in the second one, the teacher.

In fact, both these grievances are due to the fact that the course is meant for such students who are not studying the core subject e.g. in the first case 'Mathematics' for those who have not studied it at 10 + 2 level, and in the second case Management for those who are not 'Management /Economics' students.

A preventive course of action for such cases is to explicitly mention in the syllabus facts about

- objective of the course
- prerequisite knowledge
- coverage

As the course concerns Mathematics, the matter is referred to be discussed in BoS 'Mathematics' and then subsequently at the faculty level.

10. **Table Item:** The board discussed the table item on the pattern of options in the question paper and resolved to recommend that in PG programmes answering six questions, taking two from each section would be an optimum decision. It will distribute the option of attempt uniformly across all the three sections, not disturbing the sectionwise structure of the syllabus. However, the board recommended that the matter be discussed at length in the faculty meeting.

The meeting ended with a vote of thanks to the chair.

Scheme of Examination
B. Sc. (Computer Science)

Existing (Annual Scheme) (2007-08)			Proposed (Semester Scheme) (2008-09)			
Year	Course	Contact hours	Semester I	Contact hours	Semester II	Contact hours
I	1. Computer Fundamentals & Programming	3	1.1 Computer Fundamentals & Programming	6	2.1 Computer Architecture & Computer Programming	6
	2. Computer Architecture	3				
	3. Laboratory Practices	4	1.2 Laboratory Practices	4	2.2 Laboratory Practices	4
II			Semester III		Semester IV	
	1. Data Structures & Programming Methodology	3	3.1 Data Structures & Programming Methodology	6	4.1 Business Data Processing	6
Pass	2. Business Data Processing	3				
	3. Laboratory Practices	4	3.2 Laboratory Practices	4	4.2 Laboratory Practices	4
Hons	4. Systems Programming	3	3.3 Microprocessors and Microcomputer Systems	6	4.3 System Programming	6
	5. Microprocessor and Microcomputer System	3	3.4 Laboratory Practices	4	4.4 Laboratory Practices	4
II			Semester V		Semester VI	
	1. Computer Oriented Numerical and Statistical Methods	3	5.1 Data Base Management Systems	6	6.1 Computer Oriented Numerical and Statistical Methods	6
Pass	2. Data Base Management Systems	3				
	3. Laboratory Practices	4	5.2 Laboratory Practices	4	6.2 Laboratory Practices	4
Hons	4. Computer and Communication	3	5.3 Object Oriented Methodology	6	6.3 Communication and Networking	6
	5. Object Oriented Methodology	3	5.4 Laboratory Practices	4	6.4 Laboratory Practices (Project)	4

Scheme of Examination
B. Sc. (Electronics)

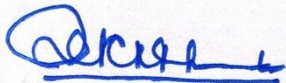
Existing (Annual Scheme) (2007-08)			Proposed (Semester Scheme) (2008-09)					
Year	Course	Contact hours	Semester I		Contact hours	Semester II		Contact hours
I	1. Electrotechnology	3	1.1	Basic Electronics	6	2.1	Circuits and Signals	6
	2. Electronics Devices & Linear Circuits	3	1.2	Laboratory Practices	4	2.2	Laboratory Practices	4
	3. Laboratory Practices	4						
II Pass	1. Digital Electronics	3	Semester III			Semester IV		
	2. Electronic Instrumentation	3	3.1	Digital Electronics	6	4.1	Electronic Instrumentation	6
	3. Laboratory Practices	4	3.2	Laboratory Practices	4	4.2	Laboratory Practices	4
III Pass	1. Microprocessors	3	Semester V			Semester VI		
	2. Communication Systems	3	5.1	Microprocessors	6	6.1	Communication Systems	6
	3. Laboratory Practices	4	5.2	Laboratory Practices & Project	4	6.2	Laboratory Practices & Project	4

Scheme of Examination BCA

Existing (Annual Scheme) (2007-08)			Proposed (Semester Scheme) (2008-09)							
Year	Course	Contact hours	Semester I			Contact hours	Semester II			Contact hours
I	1. Mathematics – I	3	1.1	Mathematics – I	6	2.1	Probability & Statistics	6		
	2. Accounting and Financial Management	3	1.2	Accounting and Financial Management	6	2.2	Principles of Management	6		
	3. Computer Fundamentals and Programming	3	1.3	Computer Fundamentals and Programming	6	2.3	Computer Architecture & Computer Programming	6		
	4. Computer Organization & Architecture	3		Laboratory Practices I (Digital Electronics)	6	2.4	Laboratory Practices I (Probability & Statistics)	6		
	5. Principles of Management	3	1.4	Laboratory Practices I (Computer Fundamentals and Programming)	4	2.5	Laboratory Practices II (Computer Programming)	6		
	6. Probability & Statistics	3		Laboratory Practices II (Computer Organization & Architecture)	4					
	7. Laboratory Practices I (Computer Fundamentals and Programming)	4	1.5	Laboratory Practices III (Probability & Statistics)	4					
	8. Laboratory Practices II (Computer Organization & Architecture)	4								
	9. Laboratory Practices III (Probability & Statistics)	4								
II			Semester III			Semester IV				
	1. Mathematics – II	3	3.1	Mathematics – II	6	4.1	Business Data Processing	6		
	2. Data Structures and Programming Methodology	3	3.2	Data Structures and Programming Methodology	6	4.2	System Programming	6		
	3. Computer Oriented Numerical and Statistical Methods & Statistical Method	3	3.3	Computer Oriented Numerical and Statistical Methods & Statistical Method	6	4.3	Application Software & Visual Computing	6		
	4. Application Software & Visual Computing	3		Laboratory Practices I (Business Data Processing)	6					
	5. BDP & MIS	3	3.4	Laboratory Practices I (Data Structures and Programming Methodology)	8	4.5	Laboratory Practices II (Application Software & Visual Computing)	6		
	6. System Programming	3		Laboratory Practices II (Computer Oriented Numerical and Statistical Methods & Statistical Method)	4					
	7. Laboratory Practices I (Data Structures)	4	3.5	Laboratory Practices II (Computer Oriented Numerical and Statistical Methods & Statistical Method)	4					
	8. Laboratory Practices II (Computer Oriented Numerical and Statistical Methods & Statistical Method)	4								
9. Laboratory Practices III (Application Software & Visual Computing)	4									
III			Semester V			Semester VI				
	1. Object Oriented Programming	3	5.1	Quantitative Techniques	6	6.1	Discrete Mathematics	6		
	2. Data Base Management System	3	5.2	Object Oriented Methodology	6	6.2	Multimedia and Web Designing	6		
	3. Discrete Mathematics	3	5.3	Data Base Management System	6	6.3	Communication & Networking	6		
	4. Computer & Communication	3	5.4	Laboratory Practices I (Object Oriented Methodology with Java)	8	6.4	Laboratory Practices I (Multimedia and Web Designing)	6		
	5. Multimedia and Web Designing	3		Laboratory Practices II (Data Base Management System)	4	6.5	Laboratory Practices II (Project)	6		
	6. Quantitative Techniques / Marketing Practices	3	5.5							
	7. Laboratory Practices I (Object Oriented Programming with Java)	4								
	8. Laboratory Practices II (Data Base Management System)	4								
9. Laboratory Practices I (Multimedia and Web Designing, Design and Development of a Software Project)	4									

*Students have to choose from any of the five options – (i), (ii), (iii), (iv), (v)

Vocational Course I in V Sem.		Vocational Course II in VI Sem.
(i) Entrepreneurship & Motivation	&	Dynamics of Entrepreneurship
(ii) Library Science I	&	Library Science II
(iii) Basic Dress Making Skills	&	Dress Designing
(iv) Computer Fundamentals	&	Computer Programming
(v) Analytical Laboratory Practice-I	&	Analytical Laboratory Practice-II

Verified

Dean Administration
Banasthali Vidyapith
Banasthali Vidyapith-304022
(Rajasthan)

M.Tech. (Information Technology) Scheme of Examination

Semester-I (July 2008 – December 2008)

Course	Contact Hrs/week	Cont. Ass. Marks	End Term Marks	Total Marks
Core Course-				
1. Information Theory and Coding	4	20	40	60
2. Distributed Systems	4	20	40	60
3. Elective-I	4	20	40	60
4. Elective-II	4	20	40	60
5. Elective-III	4	20	40	60
6. Lab(s)	12	30	60	90
Total:	32	130	260	390

Semester-II (January 2009 – May 2009)

Course	Contact Hrs/week	Cont. Ass. Marks	End Term Marks	Total Marks
Core Course-				
1. Software Architecture and Project Management	4	20	40	60
2. Information Security Systems	4	20	40	60
3. Elective-I	4	20	40	60
4. Elective-II	4	20	40	60
5. Minor Project *	8*	20	40	60
6. Seminar	2	10	20	30
7. Lab(s)	12	30	60	90
Total:	38	140	280	420

* The students are required to make and present a minor project in this semester (practical).

Semester-III & IV (July 2009 – May 2010)

Course/Exam	Marks
Reading Elective- I	40
Reading Elective- II	40
Thesis/ Project (duration 30 weeks)	
Part- I	100
Part- II	100
Part- III	100
Part- IV	
I. Dissertation & Project	100
II. Interim Report	50
III. Seminar	60
IV. Viva Voce	100
Total:	690

Grand Total: 1500

Electives:

1. Advanced Communication Networks
2. Advanced Computer Architecture
3. Artificial Intelligence
4. Data Communication & Networks
5. Database Management Systems
6. Electronic Commerce
7. Embedded Systems
8. Enterprise Resource Planning
9. Geographical Information Systems
10. Knowledge Management and Data Mining
11. Microprocessors and Microcomputer Applications
12. Mobile Computing
13. Natural Language Processing
14. Pattern Recognition and Image Processing
15. Real Time Systems
16. Modeling and Simulation
17. Software Engineering
18. Visual Programming
19. Web Technologies & Java Programming

M.Tech. (IT) 1.1 Information Theory and Coding

Section A

Information theory: Origin, concept and review of probability. Definition and implications of entropy. Shannon's entropy. Discrete information source: Discrete memoryless information source, Source coding, coding strategies, Most probable messages. Discrete information source with memory, Markov processes, coding aspect. *Discrete communication channel*: capacity of noiseless and noisy channels, error probability and equivocation, coding theorem.

Section B

Continuous information sources: stochastic signals, continuous information measures, Information power. *Continuous communication channel* : capacity, capacity in the case of additive gaussian white noise, capacity bound in the case of additive gaussian white noise, *Channel coding theorem*.

Section C

Rate distortion theory: Discrete rate distortion function and their properties, Source coding and information transmission theorems. The continuous rate distortion function. *Network information theory*: multi-access communication channel, Broadcast channels, Two-way channels.

Text Books:

1. Lubbe, J.C.A. vander; Information Theory, Cambridge University Press, 1988.
2. Cover, T.M. and Thomas, J.A.; Elements of Information Theory, Wiley Inter science, 1991.

Reference books:

1. Ash, R.B.; Information Theory, Dover Publications, 1990.
2. Shannon, C.E. and Weaver, W.; The Mathematical Theory of Communication, University of Illinois Press, 1963.
3. Csiszar, I. and Koerner, J.; Information Theory: Coding Theorems for Discrete Memoryless Systems (2nd ed.), Akademiai Klado, Budapest, 1997.

M.Tech. (IT) 1.2 Distributed Systems

Section A

Characterization of Distributed Systems: Introduction, Examples of distributed systems, Distributed system models, Issues in design of distributed operating system, message passing, synchronization, process management, resource management.

Section B

Communication: Remote Procedure Calls, Remote Object Invocation, Message oriented Communication, Stream oriented Communication, Distributed file systems: Concurrency control, replicated files, consistency, Introduction to distributed data-base, Naming: Names, Identifiers, and Addresses, Name Resolution, The Implementation of Name Space, The Domain Name System.

Section C

Fault tolerance: Basic Concepts, Failure Models, Failure Masking by Redundancy, Security : Threats, Policies, and Mechanisms, Design Issues, Secure Channels, Access Control, Security Management, Introduction to Parallel Distributed Processing: General Framework, Methods of Learning.

Text and Reference Books:

1. PK Sinha, Distributed Operating System, PHI, 1997.
2. AS Tanenbaum, Distributed Systems, PHI, 2002.
3. Coulouris, Dollimore and Kindberg, Distributed Systems: Concepts and Design, Addison Wesley, Pearson Education 2001
4. DF Rumelhart, JI Mc Clelland & PDP group, Parallel Distributed Processing vol I&II, MIT Press, 1995.
5. V.K. Garg, Principles of Distributed Systems, Kluwer Academic, 1996.

M.Tech. (IT) 2.2 Information Security Systems

Section A

Foundations of Cryptography and Security, Ciphers and Secret Messages, Security Attacks and Services, Mathematical Tools for Cryptography, Substitutions and Permutations, Modular Arithmetic, Euclid's Algorithm, Finite Fields, Polynomial Arithmetic, Discrete Logarithms, Conventional Symmetric Encryption Algorithms, Theory of Block Cipher Design, DES and Triple DES, Modes of Operation (ECB,CBC, OFB,CFB), Strength of DES, Modern Symmetric Encryption Algorithms, IDEA, CAST, Blowfish, Twofish, RC2, RC5, Rijndael (AES), Key Distribution, Stream Ciphers and Pseudo Random Numbers, Design of Stream Cipher, One Time Pad, Cryptanalysis.

Section B

Public Key Cryptography, Prime Numbers and Primality testing, Factoring Large Numbers, RSA, Cryptanalytic attacks on RSA, Diffie-Hellman, ElGamal, Key Exchange Algorithms, Public-Key Cryptography Standards, Hashes and Message Digests, Message Authentication, MD5, SHA, RIPEMD, HMAC, Digital Signatures, Certificates, User Authentication Digital Signature Standard (DSS and DSA), Security Handshake Pitfalls, Elliptic Curve Cryptosystems.

Section C

Authentication of Systems, Kerberos (V4 and V5 X.509) and VeriSign, Electronic Mail Security (Pretty Good Privacy, S/MIME) X.400, IPSec and Web Security, Intrusion detection systems, Secure Sockets and Transport Layer (SSL and TLS), Electronic Commerce Security, Electronic Payment Systems, Secure Electronic Transaction (SET), Cyber Cash, i-Key Protocols, E-Cash (DigiCash), Digital Watermarking and Steganography.

Text/Reference Books:

1. Schneier, Bruce, Applied Cryptography, John Wiley & Sons, 1996
2. Stallings, W., Cryptography and Network Security: Principles and Practice, 4th Ed., Prentice Hall.
3. Alfred J. Menezes, Paul C. van Oorschot and Scott A. , Vanstone ,Handbook of Applied Cryptography, Web Resource: <http://www.cacr.math.uwaterloo.ca/hac>
4. Schneier, Bruce, Secrets and Lies: Digital Security in a Networked World, John Wiley and Sons, 2004.

Department of Computer Science
Banasthali Vidyapith, Banasthali

**Minutes of the Board of Studies held on 26.12.2018 at 04.00 p.m. in the
Conference Hall, Vidya Mandir, Banasthali Vidyapith**

Present

1. Mrs. Abha Purohit	:	Internal Member
2. Dr. Abhay Kumar Rai	:	Internal Member
3. Dr. Ajay Kumar Yadav	:	Internal Member
4. Dr. Ajit Kumar Jain	:	Internal Member
5. Ms. Amrita	:	Internal Member
6. Mrs. Anjali Verma	:	Internal Member
7. Dr. Anup Kumar Bhola	:	Internal Member
8. Mr. Ashok Kumar	:	Internal Member
9. Mrs. Bharti Nathani	:	Internal Member
10. Dr. Deepak Kumar	:	Internal Member
11. Ms. Deepti Goswami	:	Internal Member
12. Mrs. Deepti Saxena	:	Internal Member
13. Mrs. Dipanwita Thakur	:	Internal Member
14. Mrs. Divya	:	Internal Member
15. Mrs. Karuna Sharma	:	Internal Member
16. Ms. Kirti Pandey	:	Internal Member
17. Prof. Kusum Gupta	:	Internal Member
18. Mr. Lat Sahab	:	Internal Member
19. Dr. Mainaz Faridi	:	Internal Member
20. Dr. Manisha Agarwal	:	Internal Member
21. Dr. Manisha Jailia	:	Internal Member
22. Dr. Manjeet Kumar	:	Internal Member
23. Mrs. Monika	:	Internal Member
24. Ms. Monika Saxena	:	Internal Member
25. Ms. Monika Narang	:	Internal Member
26. Dr. Neelam Sharma	:	Internal Member
27. Dr. Nisheeth Joshi	:	Internal Member
28. Ms. Pooja Asopa	:	Internal Member
29. Mrs. Pooja Gupta	:	Internal Member
30. Dr. Pradeep Kumar Sharma	:	Internal Member
31. Dr. Rajiv Singh	:	Internal Member

32. Mrs. Richa Jain	:	Internal Member
33. Mr. Roopesh Kumar	:	Internal Member
34. Dr. Sanjay Kumar Sharma	:	Internal Member
35. Dr. Saurabh Mukherjee	:	Internal Member
36. Ms. Sneha Asopa	:	Internal Member
37. Dr. Sudha Morwal	:	Internal Member
38. Mr. Sushil Buriya	:	Internal Member
39. Ms. Uma Sharma	:	Internal Member
40. Mr. Vivek Purohit	:	Internal Member
41. Dr. Yogesh Kumar Gupta	:	Internal Member
42. Prof. Chandra Kumar Jha	:	Convener
43. Prof. P. K. Mishra	:	External Member

Note: Prof. Shashikala Tapaswi, Gwalior, M.P. (External Member), Dr. Aditi Paul, Dr. Archana Mangal, Ms. Deepika Sainani, Dr. Iti Mathur Joshi, Dr. Khandakar F. Rahman, Dr. Kuldeep Kumar Yogi, Ms. Meenakshi Pareek, Ms. Sakshi Indolia, Dr. Vaibhav Vyas (Internal Members) could not attend the meeting.

The meeting started with a welcome of the members, by the convener of Board of Studies for Computer Science, Prof. C. K. Jha, Head, Department of Compute Science, Banasthali Vidyapith, Rajasthan.

1. The board confirmed the minutes of its last meeting held on 30th April, 2016.
2. The board reviewed the existing panel of examiners and suggested to update the address and phone numbers of the existing examiners for each examination up to and inclusive of all Master's Degree examination keeping in view the by-law 15.03.2002 of the Vidyapith. Updated panel is sent to the examination and secrecy section.
3. The board reviewed the Study/ Curricula, scheme of examination and proposed revisions in various courses of study as follows:

3 I BCA:

i.	First Semester (2019-20)	No Change
ii.	Second Semester (2019-20)	No Change
iii.	Third Semester (2020-21)	No Change
iv.	Fourth Semester (2020-21)	Minor Change ^a
v.	Fifth Semester (2021-22)	Change in Nomenclature ^{b, c, d}
vi.	Sixth Semester (2021-22)	Change in Nomenclature ^e

In the scheme of BCA following changes were suggested:

- (a) In BCA IV, weekly practical hours of **CS 201L “Application Software and Visual Computing”** were proposed to be raised to 6 hrs./ week from 4 hrs./ week raising the credits of the course to 9 credits from 8 credits.
- (b) In BCA V Semester, nomenclature of the course **CS 305 “Java Programming Applications”** was proposed to be changed to **“Programming in Java”** as the contents of the syllabus do not reflect Java programming applications.
- (c) In BCA V Semester, nomenclature of the course **CS 305L “Java Programming Applications Lab”** was proposed to be changed to **“Programming in Java Lab”** as the contents of the Lab syllabus do not reflect Java programming applications.
- (d) In BCA V Semester, core course **CS 303 “Database Management Systems”** and **CS 303L “Database Management Systems Lab”** were proposed to be replaced by **Discipline Elective - I** and **Discipline Elective – I Lab** courses (the list of Discipline Elective – I and Discipline Elective – I Lab courses are provided as part of the scheme).
- (e) In BCA VI Semester, core course **CS 301 “Communication and Networking”** was proposed to be replaced by **Discipline Elective – II** course (the list of Discipline Elective – II courses is provided as part of the scheme).

The Board reviewed the Programme Educational Objectives, Programme Outcomes, and Learning Outcomes for Courses. The board also recommended modifying the format of *Suggested Books*, and inclusion of *Suggested E-Resources* in all the courses of BCA.

Programme Educational Objectives, Program Outcomes and Programme Scheme of BCA is attached and marked as **Annexure-I**.

The Course Details, including Course Code, Course Name, Learning Outcomes, Existing Syllabus, Revised Syllabus (if required) with Suggested Books and E-Resources, and Remarks for BCA courses is attached and marked as **Annexure-II**.

3 II B.Sc.:

i.	First Semester (2019-20)	No Change
ii.	Second Semester (2019-20)	No Change
iii.	Third Semester (2020-21)	No Change
iv.	Fourth Semester (2020-21)	No Change
v.	Fifth Semester (2021-22)	Change ^a
vi.	Sixth Semester (2021-22)	Changes ^{b, c}

In the scheme of B.Sc. following changes were suggested for courses related to Computer Science.

- (a) In B.Sc. V Semester, core course **CS 316 “Business Data Processing and Database Management System”** and **CS 316L “Business Data Processing and Database Management System Lab”** were proposed to be replaced by **Discipline Elective - I** and **Discipline Elective – I Lab** courses (the list of Discipline Elective – I and Discipline Elective – I Lab courses are provided as part of the scheme).
- (b) In B.Sc. VI Semester, core course **CS 301 “Communication and Networking”** was proposed to be replaced by **Discipline Elective – II** course (the list of Discipline Elective – II courses is provided as part of the scheme).
- (c) In B.Sc. VI Semester, nomenclature of the course **CS 301L “Communication and Networking Lab”** is suggested to be changed to **“Project”** and accordingly new course code is suggested to be assigned.

The Board reviewed the inclusion of Learning Outcomes for all the Courses. The board also recommended modifying the format of *Suggested Books*, and inclusion of *Suggested E-Resources* in all the courses of B.Sc.

Programme Scheme of B.Sc. is attached and marked as **Annexure-III**.

The Course Details, including Course Code, Course Name, Learning Outcomes, Existing Syllabus, Revised Syllabus (if required) with Suggested Books and E-Resources, and Remarks for B.Sc. courses is attached and marked as **Annexure-IV**.

3 III BA:

i.	First Semester (2019-20)	No Change
ii.	Second Semester (2019-20)	No Change
iii.	Third Semester (2020-21)	No Change
iv.	Fourth Semester (2020-21)	No Change
v.	Fifth Semester (2021-22)	Change ^a
vi.	Sixth Semester (2021-22)	Change ^b

In the scheme of BA following changes were suggested for courses related to Computer Science.

- (a) In BA V Semester, core course **CS 303 “Database Management System”** and **CS 303L “Database Management System Lab”** were proposed to be replaced by **Discipline Elective - I** and **Discipline Elective – I Lab** courses (the list of Discipline Elective and Discipline Elective Lab courses are provided as part of the scheme).

(b) In BA VI Semester, core course CS 306 “Multimedia and Web Designing” and CS 306L “Multimedia and Web Designing Lab” were proposed to be replaced by Discipline Elective - II and Discipline Elective – II Lab courses (the list of Discipline Elective and Discipline Elective Lab courses are provided as part of the scheme).

The Board reviewed the inclusion of Learning Outcomes for all the Courses. The board also recommended modifying the format of *Suggested Books*, and inclusion of *Suggested E-Resources* in all the courses of BA.

Programme Scheme of BA is attached and marked as **Annexure-V**.

The Course Details, including Course Code, Course Name, Learning Outcomes, Existing Syllabus, Revised Syllabus (if required) with Suggested Books and E-Resources, and Remarks for BA courses is attached and marked as **Annexure-VI**.

3 IV MCA/ M.Sc. (Computer Science):

(A) MCA

i.	First Semester	Minor Change ^a
ii.	Second Semester	No Change
iii.	Third Semester	No Change
iv.	Fourth Semester	Minor Changes ^{b, c}
v.	Fifth Semester	Changes ^{d, e, f, g, h, i}
vi.	Sixth Semester	Changes ^{j, k}

(B) M.Sc. (Computer Science)

i.	First Semester	No Change
ii.	Second Semester	Minor Changes ^{b, c}
iii.	Third Semester	Changes ^{d, e, f, g, h, i}
iv.	Fourth Semester	Changes ^{j, k}

In the scheme of MCA/ M.Sc. (Computer Science) following changes were suggested.

(a) In MCA I Semester, weekly practical hours of CS 413L “Computer Oriented Numerical and Statistical Methods Lab” were proposed to be raised to 4 hrs./ week from 2 hrs./ week raising the credits of the course to 2 credits from 1 credit, and total semester credits to 26 credits from earlier 25 credits.

(b) In MCA IV/ M.Sc. (CS) II Semester, minor changes in the syllabus of CS 302 “Data Communications and Networks” were proposed.

(c) In MCA IV/ M.Sc. (CS) II Semester, weekly practical hours of CS 432S “Seminar” were proposed to be raised to 4 hrs./ week from 2 hrs./ week raising the

credits of the course to 2 credits from 1 credit, and total semester credits to 26 credits from earlier 25 credits w.e.f 2019-20.

(d) In MCA V/ M.Sc. (CS) III Semester, weekly practical hours of **CS 411L “Computer Graphics Lab”** were proposed to be reduced to 6 hrs./ week from 8 hrs./ week reducing the credits of the course to 3 credits from 4 credits (reducing total semester credits to 26 credits from earlier 28 credits) w.e.f 2019-20.

(e) In MCA V/ M.Sc. (CS) III Semester, weekly practical hours of **CS 508L “Big Data Analytics Lab”** were proposed to be reduced to 6 hrs./ week from 8 hrs./ week reducing the credits of the course to 3 credits from 4 credits (reducing total semester credits to 26 credits from earlier 28 credits). Also Lab Exercises were proposed to be added. w.e.f 2019-20.

(f) In MCA V/ M.Sc. (CS) III Semester, Elective – I was proposed to be replaced by **Discipline Elective** (the list of Discipline Elective courses is provided as part of the scheme). w.e.f 2021-22.

(g) In MCA V/ M.Sc. (CS) III Semester, Elective – II was proposed to be replaced by **Open Elective** to be chosen from other disciplines with prior permission of respective head and if the time table permits w.e.f 2021-22.

(h) In MCA V/ M.Sc. (CS) III Semester, minor changes in the syllabus **CS 511 “Cloud Computing”** (discipline elective course) was proposed w.e.f 2019-20.

(i) In MCA V/ M.Sc. (CS) III Semester, minor changes in the syllabus of **CS 601 “Cyber Security”** (discipline elective course) was proposed w.e.f 2019-20.

(j) Board recommended the following new reading elective courses (online) for MCA VI/ M.Sc. IV semester w.e.f 2019-20.

(i) **Agile Software Development**

(ii) **Organizational Behavior**

(iii) **Software as a Service**

(iv) **Blockchain**

(k) In MCA VI/ M.Sc. (CS) IV Semester, weekly practical hours of **CS 534P “UIL Project”** were proposed to be raised to 48 hrs./ week from 40 hrs./ week raising the credits of the course to 24 credits from 20 credits, and total semester credits to 26 credits from earlier 22 credits w.e.f 2019-20.

The Board reviewed the inclusion of Programme Educational Objectives, Programme Outcomes, and Learning Outcomes for all the Courses. The board also recommended modifying the format of *Suggested Books*, and inclusion of *Suggested E-Resources* in all the courses of MCA/ M.Sc. (CS).

Programme Educational Objectives, Program Outcomes and Programme Scheme of MCA/ M.Sc. (CS) is attached and marked as **Annexure-VII**.

The Course Details, including Course Code, Course Name, Learning Outcomes, Existing Syllabus, Revised Syllabus (if required) with Suggested Books and E-Resources, and Remarks for MCA/ M.Sc. (CS) courses is attached and marked as **Annexure-VIII**.

3 V M.Tech. (Computer Science)/ M.Tech. (Information Technology):

(A) M.Tech. (Computer Science)

i.	First Semester (2019-20)	Changes ^{a, b, f, g, h, i}
ii.	Second Semester (2019-20)	Changes ^{c, d, e, f, g, h, i}
iii.	Third Semester (2020-21)	Changes ^{j, k}
iv.	Fourth Semester (2020-21)	Changes ^{j, l}

(B) M.Tech. (Information Technology)

i.	First Semester (2019-20)	Changes ^{a, b, f, g, h, i}
ii.	Second Semester (2019-20)	Changes ^{c, d, e, f, g, h, i}
iii.	Third Semester (2020-21)	Changes ^{j, m}
iv.	Fourth Semester (2020-21)	Changes ^{j, n}

(a) Minor changes in the syllabus of CS 431 “Real Time Systems” of M.Tech. (CS) I Semester were proposed.

(b) In M.Tech. (CS/ IT) I Semester, Elective – I and Elective – II were proposed to be replaced by **Discipline Elective – I** and **Discipline Elective – II** (the list of Discipline Elective courses is provided as part of the scheme).

(c) Minor Changes in the syllabus of CS 505 “Advanced Topics in Algorithms” of M.Tech.(CS) II Semester were proposed.

(d) In M.Tech. (CS) II Semester, Elective – III and Elective – IV were proposed to be replaced by **Discipline Elective – III** and **Discipline Elective – IV**, and in M.Tech. (IT) II Semester, Elective – III was proposed to be replaced by **Discipline Elective – III** (the list of Discipline Elective courses is provided as part of the scheme).

(e) In M.Tech. (CS) II Semester, Elective – V was proposed to be replaced by **Open Elective**, and in M.Tech. (IT) II Semester, Elective – IV was proposed to be replaced by **Open Elective** (the Open Elective is to be chosen from other disciplines with prior permission of respective head and if the time table permits).

(f) Minor Changes in the syllabus of CS 511 “Cloud Computing” (discipline elective course) of M.Tech. (CS/ IT) were proposed.

(g) Minor changes in the syllabus of CS 302 “Data Communications and Networks” (discipline elective course) of M.Tech (CS/ IT) were proposed.

(h) The nomenclature of the course (discipline elective course) CS 429 “Pattern Recognition and Image Processing” of M.Tech.(CS/ IT) was proposed to be changed to “Digital Image Processing”.

(i) Board recommended the following new discipline elective courses for M.Tech. (CS/ IT):

(i) **Big Data Analytics**

(ii) Internet of Things

(j) Board recommended the following new reading elective courses (online) in M.Tech. (CS/ IT):

(i) Practical Machine Learning

(ii) Agile Software Development

(iii) Blockchain

(k) The nomenclature of the course **CS 604P “Project Part – I”** of M.Tech.(CS) III Semester was proposed to be changed to **“UIL Project Part – I”**.

(l) The nomenclature of the course **CS 605P “Project Part – II”** of M.Tech.(CS) IV Semester was proposed to be changed to **“UIL Project Part – II”**.

(m) The nomenclature of the course **CS 602P “Project Part – I”** of M.Tech.(IT) III Semester was proposed to be changed to **“UIL Project Part – I”**.

(n) The nomenclature of the course **CS 603P “Project Part – II”** of M.Tech.(IT) IV Semester was proposed to be changed to **“UIL Project Part – II”**.

The Board recommended the inclusion of Programme Educational Objectives, Programme Outcomes, and Learning Outcomes for all the Courses. The board also recommended modifying the format of *Suggested Books*, and inclusion of *Suggested E-Resources* in all the courses of M.Tech. (CS)/ M.Tech. (IT).

Programme Educational Objectives, Program Outcomes and Programme Scheme of M.Tech. (CS)/ M.Tech. (IT) is attached and marked as **Annexure-IX**.

The Course Details, including Course Code, Course Name, Learning Outcomes, Existing Syllabus, Revised Syllabus (if required) with Suggested Books and E-Resources, and Remarks for M.Tech. (CS)/ M.Tech. (IT) courses is attached and marked as **Annexure-X**.

3 VI Certificate/ Diploma/ Advanced Diploma:

(A) Certificate Course in Computer Programming and Application

The board discussed the syllabus of the course and suggested minor changes like inclusion of topics related to functions and pointers in ‘C’ language.

(B) Certificate Course in IT Localization

The board found that the syllabus of the course is up to the mark and **no change** was proposed.

(C) Certificate Course in Android Application Development

The board discussed the syllabus of the course and suggested that the course should be run as a Half-Session Course with both Module – I and Module – II merged

together with one single examination. The board also suggested some changes in the syllabus of the course.

(D) Diploma in Internet and Web Applications

Board discussed the syllabus of the course and suggested inclusion of CSS, JavaScript, PHP and Ajax.

(E) Diploma in Computer Hardware and Maintenance

The board discussed the syllabus of the course and suggested changes to accommodate recent developments in hardware and remove obsolete technologies from the syllabus.

(F) Diploma in .NET(C#, ASP.NET)

The board discussed the syllabus of the course and suggested minor changes in the syllabus. Also Lab Exercises are included in the syllabus.

(G) Diploma in Medical Image Processing

The board found that the syllabus of the course and suggested minor changes in the syllabus. Lab Exercises are included in the syllabus.

(H) Advanced Diploma in Medical Image Processing

The board discussed the syllabus of the course and suggested changes like inclusion of introduction to machine learning in image analysis. Also Lab Exercises are included in the syllabus.

(I) Advanced Diploma in Networking Examination

The board redesigned the syllabus in sections.

The Board reviewed the scheme of examination of all Certificate, Diploma and Advanced Diploma Courses and proposed changes in the minimum qualification criteria for admission, duration (Theory and Practical hours) and marking scheme of courses so as to make them consistent.

The Board suggested that the syllabus of all Certificate, Diploma and Advanced Diploma Courses should be structured having three sections.

The Board reviewed the inclusion of Learning Outcomes for Courses. The board also recommended modifying the format of *Suggested Books*, and inclusion of *Suggested E-Resources* in all Certificate/ Diploma/ Advanced Diploma Courses.

Programme Scheme of Certificate/ Diploma/ Advanced Diploma Courses is attached and marked as **Annexure-XI**.

The Course Details, including Course Name, Learning Outcomes, Existing Syllabus, Revised Syllabus (if required) with Suggested Books and E-Resources, and Remarks

for Certificate/ Diploma/ Advanced Diploma Courses is attached and marked as **Annexure-XII**.

4. The board reviewed the Study/ Curricula, scheme of examination for the courses running in programmes under departments other than Computer Science. No changes were proposed by the concerned departments and as such no changes in these courses were proposed by the Board.

The Board recommended the inclusion of Learning Outcomes, *Suggested Books*, and *Suggested E-Resources* along with Existing Syllabus in all of these Courses which are attached and marked as **Annexure-XV**.

5. Board reviewed the reports received from the examiners of different examinations of 2017 and 2018. Most of the examiners reported that the answers were “to the point” and “satisfactory” with some examiners reporting vague and diffused answers (nine in number). The analysis of the reports received is enclosed in **Annexure–XIII**.
6. The board reviewed the report of question papers of periodical tests end semester (final) examinations held up to 2017-18. The questions were subjectively categorized based on their difficulty level as low, medium and high. It was found that in most of the question papers a balance was kept between the different difficulty levels of questions, with around 40% of questions labeled as easy, 40% as medium, and 20% as hard. The analysis is enclosed in **Annexure–XIVA and XIVB**.

Meeting ended with vote of thanks.

Name of Programme: Master of Technology (Computer Science)

Programme Educational Objectives

The main objectives of the programme are:

- Practice with an expertise in academics, entrepreneurship, design and development in computing technology, or research in a specialized area of computer science and Engineering to pursue higher studies.
- Exhibit analytical, decision making and problem solving skills by applying research principles for handling real life problems with realistic constraints.
- Communicate the findings or express innovative ideas in an effective manner with an awareness of professional, social and ethical responsibilities.
- Practice and promote computing technologies for societal needs.
- Contribute to advancement of computer technology by means of research and lifelong learning.

Programme Outcomes

After completion of the course, the student will achieve the following:

- PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to evaluate, analyze, synthesize, model and integrate technologies to solve complex engineering problems.
- PO2. Problem analysis: Analyze complex engineering problems critically, apply independent judgment for synthesizing information to make intellectual and/or creative advances for conducting research in a wider theoretical, practical and policy context.
- PO3. Design/development of solutions: Design and develop a system to provide a wide range of potential, feasible and optimal solutions for critical and challenging engineering problems to meet desired needs within social areas such as economics, environmental, and ethics.
- PO4. Conduct investigations of complex problems: Research Skill extract information pertinent to unfamiliar problems through literature survey and experiments, apply appropriate research methodologies, techniques and tools, design, conduct experiments, analyze and interpret data, demonstrate higher order skill and view things in a broader perspective, contribute individually/in group(s) to the development of scientific/technological knowledge in one or more domains of engineering.
- PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- PO6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- PO7. Environment and sustainability: Understand contemporary issues in providing technology solutions for sustainable development considering impact on economic, social, political, and global issues and thereby contribute to the welfare of the society.
- PO8. Ethics: Acquire professional and intellectual integrity, professional code of conduct, ethics of research and scholarship, consideration of the impact of research outcomes on professional practices and an understanding of responsibility to contribute to the community for sustainable development of society.
- PO9. Individual and team work: Possess knowledge and understanding of group dynamics, recognize opportunities and contribute positively to collaborative-multidisciplinary scientific research, demonstrate a capacity for self-management and teamwork, decision-making based on open-mindedness, objectivity and rational analysis in order to achieve common goals and further the learning of themselves as well as others.
- PO10. Communication: Communicate with the engineering community, and with society at large, regarding complex engineering activities confidently and effectively, such as, being able to comprehend and write effective reports and design documentation by adhering to appropriate standards, make effective presentations, and give and receive clear instructions.
- PO11. Project management and finance: Demonstrate knowledge and understanding of engineering and management principles and apply the same to one's own work, as a member and leader in a team, manage projects efficiently in respective disciplines and multidisciplinary environments after consideration of economical and financial factors.

- PO12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in life-long learning independently, with a high level of enthusiasm and commitment to improve knowledge and competence continuously.

Programme Scheme: M.Tech. (Computer Science)

Semester I

Existing					
Course Code	CourseName	L	T	P	C
CS 419	Distributed Computing	4	0	0	4
CS 431	Real Time Systems	4	0	0	4
CS 433	Soft Computing	4	0	0	4
CS 520L	Discipline Labs – I	0	0	12	6
	Elective – I	4	0	0	4
	Elective – II	4	0	0	4
Total		20	0	12	26

Proposed					
Course Code	Course Name	L	T	P	C
To be filled by the office	Distributed Computing	4	0	0	4
	Real Time Systems	4	0	0	4
	Soft Computing	4	0	0	4
	Discipline Labs – I	0	0	12	6
	Discipline Elective – I	4	0	0	4
	Discipline Elective – II	4	0	0	4
Total		20	0	12	26

Semester II

Existing					
Course Code	Course Name	L	T	P	C
CS 503	Advanced Computer Architecture	4	0	0	4
CS 505	Advanced Topics in Algorithms	4	0	0	4
CS 5211L	Discipline Labs – II	0	0	12	6
	Elective – III	4	0	0	4
	Elective – IV	4	0	0	4
	Elective – V	4	0	0	4
CS 523S	Seminar	0	0	2	1
Total		20	0	14	27

Proposed					
Course Code	CourseName	L	T	P	C
To be filled by the office	Advanced Computer Architecture	4	0	0	4
	Advanced Topics in Algorithms	4	0	0	4
	Discipline Labs – II	0	0	12	6
	Discipline Elective – III	4	0	0	4
	Discipline Elective – IV	4	0	0	4
	Open Elective	4	0	0	4
	Seminar	0	0	2	1
Total		20	0	14	27

Semester III

Existing					
Course Code	Course Name	L	T	P	C
	Reading Elective – I	0	0	4	2
CS 604P	Project Part – I	0	0	48	24
Total		0	0	52	26

Proposed					
Course Code	CourseName	L	T	P	C
To be filled by the office	Reading Elective – I	0	0	4	2
	UIL Project Part – I	0	0	48	24
Total		0	0	52	26

Semester: IV

Existing					
Course Code	CourseName	L	T	P	C
	Reading Elective – II	0	0	4	2
CS 605P	Project Part – II	0	0	48	24
Total		0	0	52	26

Proposed					
Course Code	CourseName	L	T	P	C
To be filled by the office	Reading Elective – II	0	0	4	2
	UIL Project Part – II	0	0	48	24
Total		0	0	52	26

Existing

Elective - I, II, III, IV & V

Course Code	Course Name	L	T	P	C
CS 302	Data Communications and Networks	4	0	0	4
CS 314	Systems Programming	4	0	0	4
CS 315	Theory of Computation	4	0	0	4
CS 406	Compiler Design	4	0	0	4
CS 411	Computer Graphics	4	0	0	4
CS 417	Database Management Systems	4	0	0	4
CS 423	Java Programming	4	0	0	4
CS427	Parallel Computing	4	0	0	4
CS 429	Pattern Recognition and Image Processing	4	0	0	4
CS 436	Web Development and .NET Framework	4	0	0	4
CS 501	Advanced Communication Networks	4	0	0	4
CS 504	Advanced Java Programming	4	0	0	4
CS 507	Artificial Intelligence	4	0	0	4
CS 511	Cloud Computing	4	0	0	4
CS 514	Computer Architecture and Organization	4	0	0	4
CS 519	Data Warehouse and Data Mining	4	0	0	4
CS 526	Machine Translation	4	0	0	4
CS 527	Mobile Computing	4	0	0	4
CS 528	Modeling and Simulation	4	0	0	4
CS 529	Natural Language Processing	4	0	0	4
CS 530	Neural Networks	4	0	0	4
ELE 502	Discrete Time Signal Processing	4	0	0	4
ELE 503	Embedded Systems	4	0	0	4
ELE 505	Microprocessor and Microcomputer Applications	4	0	0	4
IT 505	Geographic Information System	4	0	0	4
IT 506	Human Computer Interaction	4	0	0	4
IT 507	Information Retrieval	4	0	0	4
IT 511	System Testing	4	0	0	4

Proposed

Discipline Elective - I, II, III & IV

Course Code	Course Name	L	T	P	C
	Data Communications and Networks	4	0	0	4
	Systems Programming	4	0	0	4
	Theory of Computation	4	0	0	4
	Compiler Design	4	0	0	4
	Computer Graphics	4	0	0	4
	Database Management Systems	4	0	0	4
	Java Programming	4	0	0	4
	Parallel Computing	4	0	0	4
	Digital Image Processing	4	0	0	4
	Web Development and .NET Framework	4	0	0	4
	Advanced Communication Networks	4	0	0	4
	Advanced Java Programming	4	0	0	4
	Artificial Intelligence	4	0	0	4
	Cloud Computing	4	0	0	4
	Computer Architecture and Organization	4	0	0	4
	Data Warehouse and Data Mining	4	0	0	4
	Machine Translation	4	0	0	4
	Mobile Computing	4	0	0	4
	Modeling and Simulation	4	0	0	4
	Natural Language Processing	4	0	0	4
	Neural Networks	4	0	0	4
	Discrete Time Signal Processing	4	0	0	4
	Embedded Systems	4	0	0	4
	Microprocessor and Microcomputer Applications	4	0	0	4
	Geographic Information System	4	0	0	4
	Human Computer Interaction	4	0	0	4
	Information Retrieval	4	0	0	4
	System Testing	4	0	0	4
	Big Data Analytics	4	0	0	4
	Internet of Things	4	0	0	4

To be filled by the office

**Reading Elective - I & II
Existing**

Course Code	Course Name	L	T	P	C
IT 402R	Electronic Commerce	0	0	4	2
IT 403R	Enterprise Resource Planning	0	0	4	2
IT 601R	Information and Communication Technology	0	0	4	2
IT 604R	Semantic Web	0	0	4	2

**Reading Elective - I & II
Proposed**

Course Code	Course Name	L	T	P	C
To be filled by the office	Electronic Commerce	0	0	4	2
	Enterprise Resource Planning	0	0	4	2
	Information and Communication Technology	0	0	4	2
	Semantic Web	0	0	4	2
	Machine Learning	0	0	4	2
	Agile Software Development	0	0	4	2
	Blockchain	0	0	4	2

Name of Programme: Master of Technology (Information Technology)

Programme Educational Objectives

The main objectives of the programme are:

- Practice with an expertise in academics, entrepreneurship, design and development in information technology, or research in a specialized area of information technology to pursue higher studies.
- Identify and evaluate current and changing information system methodologies and assess their applicability in regulatory demands, strategic goals to address the clients' needs.
- Exhibit analytical, decision making and problem solving skills by applying research principles for handling real life problems with realistic constraints.
- Communicate the findings or express innovative ideas in an effective manner with an awareness of professional, social and ethical responsibilities.
- Practice and promote information technologies for societal needs.
- Contribute to advancement of information technology by means of research and lifelong learning.

Programme Outcomes

After completion of the course, the student will achieve the following:

- PO1. Engineering knowledge: Apply knowledge of Information Technology, including wider and global perspective, with an ability to discriminate, evaluate, analyze and synthesize existing and new knowledge, and integration of the same for enhancement of knowledge to solve emerging IT based problems.
- PO2. Problem analysis: Analyze complex Information Technology related problems critically, apply independent judgment for synthesizing information to make intellectual and/or creative advances for conducting research in a wider theoretical, practical and policy context.
- PO3. Design/development of solutions: Design and develop a system to provide a wide range of potential, feasible and optimal solutions for critical and challenging information technology based problems to meet desired needs within social areas such as economics, environmental, and ethics.
- PO4. Conduct investigations of complex problems: Research Skill extract information pertinent to unfamiliar problems in information technology domain through literature survey and experiments, apply appropriate research methodologies, techniques and tools, design, conduct experiments, analyze and interpret data, demonstrate higher order skill and view things in a broader perspective, contribute individually/in group(s) to the development of scientific/technological knowledge in one or more domains of engineering.
- PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools of information technology including prediction and modeling to complex engineering activities with an understanding of the limitations.
- PO6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- PO7. Environment and sustainability: Understand contemporary issues in providing IT solutions for sustainable development considering impact on economic, social, political, and global issues.
- PO8. Ethics: Acquire professional and intellectual integrity, ethics of research and scholarship, consideration of the impact of research outcomes on professional practices and an understanding of responsibility to contribute to the community for sustainable development of society using information technology solutions.
- PO9. Individual and team work: Possess knowledge and understanding of group dynamics, recognize opportunities and contribute positively to collaborative-multidisciplinary scientific research.
- PO10. Communication: Communicate with the engineering community, and with society at large, regarding complex engineering activities confidently and effectively, such as, being able to comprehend and write effective reports and design documentation by adhering to appropriate standards, make effective presentations, and give and receive clear instructions.
- PO11. Project management and finance: Demonstrate knowledge and understanding of information technology and management principles and apply the same to one's own work, as a member and leader in a team, manage projects efficiently in respective disciplines and multidisciplinary environments after consideration of economical and financial factors.

- PO12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in life-long learning independently, with a high level of enthusiasm and commitment to improve knowledge and competence continuously.

Programme Scheme: Master of Technology (Information Technology)

Semester I

Existing					
Course Code	Course Name	L	T	P	C
CS 533	Software Engineering	4	0	0	4
IT5 01	Advanced Database Management Systems	4	0	0	4
IT 504	Distributed Systems	4	0	0	4
IT 502L	Discipline Labs – I	0	0	12	6
	Elective – I	4	0	0	4
	Elective – II	4	0	0	4
Total		20	0	12	26

Proposed					
Course Code	Course Name	L	T	P	C
To be filled by the office	Software Engineering	4	0	0	4
	Advanced Database Management Systems	4	0	0	4
	Distributed Systems	4	0	0	4
	Discipline Labs – I	0	0	12	6
	Discipline Elective – I	4	0	0	4
	Discipline Elective – II	4	0	0	4
Total		20	0	12	26

Semester II

Existing					
Course Code	Course Name	L	T	P	C
CS 525	Information Security Systems	4	0	0	4
IT 510	Software Architecture and Project Management	4	0	0	4
IT 503L	Discipline Labs – II	0	0	12	6
	Elective – III	4	0	0	4
	Elective – IV	4	0	0	4
IT 508P	Minor Project	0	0	8	4
IT 509S	Seminar	0	0	2	1
Total		16	0	22	27

Proposed					
Course Code	Course Name	L	T	P	C
To be filled by the office	Information Security Systems	4	0	0	4
	Software Architecture and Project Management	4	0	0	4
	Discipline Labs – II	0	0	12	6
	Discipline Elective – III	4	0	0	4
	Open Elective	4	0	0	4
	Minor Project	0	0	8	4
	Seminar	0	0	2	1
Total		16	0	22	27

Semester III

Existing					
Course Code	Course Name	L	T	P	C
	Reading Elective – I	0	0	4	2
IT 602P	Project Part – I	0	0	48	24
Total		0	0	52	26

Proposed					
Course Code	Course Name	L	T	P	C
To be filled by the office	Reading Elective – I	0	0	4	2
	UIL Project Part – I	0	0	48	24
Total		0	0	52	26

Semester IV

Existing					
Course Code	Course Name	L	T	P	C
	Reading Elective – II	0	0	4	2
IT 603P	Project Part – II	0	0	48	24
Total		0	0	52	26

Proposed					
Course Code	Course Name	L	T	P	C
To be filled by the office	Reading Elective – II	0	0	4	2
	UIL Project Part – II	0	0	48	24
Total		0	0	52	26

Existing
Elective - I, II, III & IV

Course Code	Course Name	L	T	P	C
CS 302	Data Communications and Networks	4	0	0	4
CS 314	Systems Programming	4	0	0	4
CS 315	Theory of Computation	4	0	0	4
CS 406	Compiler Design	4	0	0	4
CS 411	Computer Graphics	4	0	0	4
CS 417	Database Management Systems	4	0	0	4
CS 423	Java Programming	4	0	0	4
CS427	Parallel Computing	4	0	0	4
CS 429	Pattern Recognition and Image Processing	4	0	0	4
CS 436	Web Development and .NET Framework	4	0	0	4
CS 501	Advanced Communication Networks	4	0	0	4
CS 504	Advanced Java Programming	4	0	0	4
CS 507	Artificial Intelligence	4	0	0	4
CS 511	Cloud Computing	4	0	0	4
CS 514	Computer Architecture and Organization	4	0	0	4
CS 519	Data Warehouse and Data Mining	4	0	0	4
CS 526	Machine Translation	4	0	0	4
CS 527	Mobile Computing	4	0	0	4
CS 528	Modeling and Simulation	4	0	0	4
CS 529	Natural Language Processing	4	0	0	4
CS 530	Neural Networks	4	0	0	4
ELE 502	Discrete Time Signal Processing	4	0	0	4
ELE 503	Embedded Systems	4	0	0	4
ELE 505	Microprocessor and Microcomputer Applications	4	0	0	4
IT 505	Geographic Information System	4	0	0	4
IT 506	Human Computer Interaction	4	0	0	4
IT 507	Information Retrieval	4	0	0	4
IT 511	System Testing	4	0	0	4

Proposed
Discipline Elective - I, II & III

Course Code	Course Name	L	T	P	C
	Data Communications and Networks	4	0	0	4
	Systems Programming	4	0	0	4
	Theory of Computation	4	0	0	4
	Compiler Design	4	0	0	4
	Computer Graphics	4	0	0	4
	Database Management Systems	4	0	0	4
	Java Programming	4	0	0	4
	Parallel Computing	4	0	0	4
	Digital Image Processing	4	0	0	4
	Web Development and .NET Framework	4	0	0	4
	Advanced Communication Networks	4	0	0	4
	Advanced Java Programming	4	0	0	4
	Artificial Intelligence	4	0	0	4
	Cloud Computing	4	0	0	4
	Computer Architecture and Organization	4	0	0	4
	Data Warehouse and Data Mining	4	0	0	4
	Machine Translation	4	0	0	4
	Mobile Computing	4	0	0	4
	Modeling and Simulation	4	0	0	4
	Natural Language Processing	4	0	0	4
	Neural Networks	4	0	0	4
	Discrete Time Signal Processing	4	0	0	4
	Embedded Systems	4	0	0	4
	Microprocessor and Microcomputer Applications	4	0	0	4
	Geographic Information System	4	0	0	4
	Human Computer Interaction	4	0	0	4
	Information Retrieval	4	0	0	4
	System Testing	4	0	0	4
	Big Data Analytics	4	0	0	4
	Internet of Things	4	0	0	4

To be filled by the office

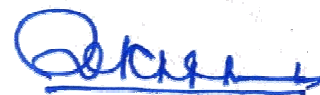
**Reading Elective - I & II
Existing**

Course Code	Course Name	L	T	P	C
IT 402R	Electronic Commerce	0	0	4	2
IT 403R	Enterprise Resource Planning	0	0	4	2
IT 601R	Information and Communication Technology	0	0	4	2
IT 604R	Semantic Web	0	0	4	2

**Reading Elective - I & II
Proposed**

Course Code	Course Name	L	T	P	C
To be filled by the office	Electronic Commerce	0	0	4	2
	Enterprise Resource Planning	0	0	4	2
	Information and Communication Technology	0	0	4	2
	Semantic Web	0	0	4	2
	Machine Learning	0	0	4	2
	Agile Software Development	0	0	4	2
	Blockchain	0	0	4	2

Verified



Offg. Secretary
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