

discontinued, and resolved to recommend that the courses of study, curricula and scheme of examinations as given in Annexure-III may be adopted.

8. The board considered the courses of study, curricula and scheme of examinations for M.Sc.(Electronics) Course and resolved to recommend that the courses of study, curricula and scheme of examinations as given in Annexure-IV may be adopted.
9. Resolved to recommend that the courses of study, curricula and scheme of examinations for B.Sc. (Computer Science) as given in Annexure-V may be adopted.
10. Resolved to recommend that the courses of study, curricula and scheme of examinations for B.Sc.(Electronics) as given in Annexure-VI may be adopted.
11. Resolved to recommend that the courses of study, curricula and scheme of examinations for B.Sc.(Computer Maintenance) as given in Annexure-VII may be adopted.
12. Resolved to recommend that the courses of study, curricula and scheme of examinations for B.A.(Computer Applications) as given in Annexure-VIII may be adopted.
13. Resolved to recommend that the courses of study, curricula and scheme of examinations for M.Tech.(Computer Science) as given in Annexure-IX may be adopted.
14. The board considered the courses of study for B.Sc. (Honours) course and felt there are some difficulties with the Dual Honours scheme. It is not popular amongst students as well. Resolved to recommend that Dual Honours option may be discontinued and 20 hrs/week may be allotted to the Honours subject (with 12 hrs for theory & 8 hrs for practical). In case the Dual Honours scheme must be continued with 16 total contact hrs per week, the board resolved to recommend that 12 hrs may be allotted to theory and 4 hrs to practicals. The distribution of marks for honours, in that case, shall be 75 per theory paper and 75 for practicals adding up to 375.
15. The board considered the undergraduate courses of study and resolved to recommend that in B.Sc. one can opt :
 - (i) Either Computer Maintenance or Electronics (but not both)
 - (ii) Computer Maintenance only with Computer Science.

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

(ADITYA SHASTRI)
Convener

ANNEXURE-IX

DETAILED SEMESTER-WISE COURSE OF STUDY FOR
M.TECH. (COMPUTER SCIENCE)

I-Semester

Paper	Contact hrs./wk	Total marks	Cont. marks	Ass. marks	Annual Ass marks
1. Advanced Topics in Algorithms	3	50	10		40
2. Distributed Computing	3	50	10		40
3. Elective I	3	50	10		40
4. Elective II	3	50	10		40
5. Project	3	50	10		40
Laboratory Practices	10	100	20		80
		350	70		280

Semester-II

Paper	Contact hrs./wk	Total marks	Cont. marks	Ass. marks	Annual Ass marks
1. Complexity Theory	3	50	10		40
2. Advanced Communication Networks	3	50	10		40
3. Elective III	3	50	10		40
4. Elective IV	3	50	10		40
5. Seminar	3	50	10		40
Laboratory Practices	10	100	20		80
		350	70		280

II-Semester

Max Marks

1. UTL Project	
(i) Project, dissertation & Seminar	200
(ii) Continuous Assessment	50
(iii) Viva-Voce	100
	350

Electives are to be chosen from the following list:

1. Emerging Programming Paradigms
2. Neural Networks
3. Mathematical Logic & Logic Programming
4. Real-Time Systems
5. Natural Language Processing
6. Parallel Algorithms
7. Pattern Matching & Image Processing
8. Digital Signal Processing
9. Semantics

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

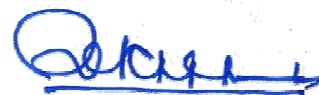
**Reading Elective - I & II
Existing**

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
Banasthali Vidyapith
P.O. Banasthali Vidyapith
Distt. Tonk (Raj.)-304022