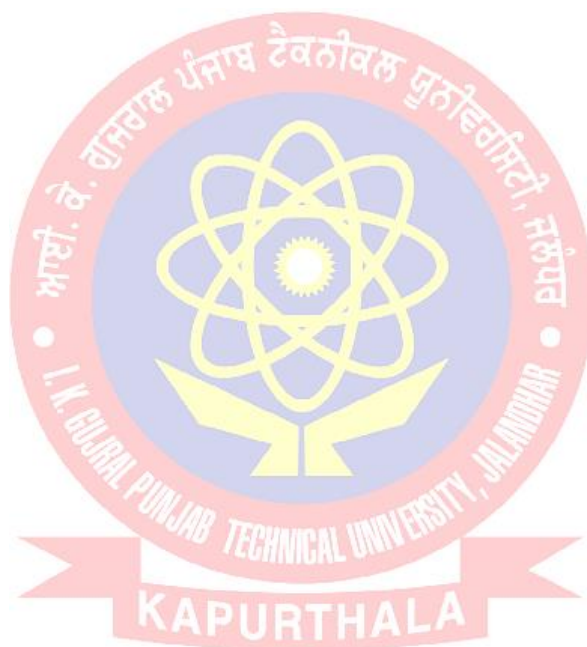


## Supporting Documents

1.1.2 & 1.2.2

### Department of Computer Science Engineering

S. No.	Documents attached
1	Approved Minutes of BOS Meeting / Academic Council Highlighting Relevant Agenda





## IKG PUNJAB TECHNICAL UNIVERSITY, JALANDHAR

### Minutes of Meetings

A meeting of Board of Studies, Computer Science Engineering, was scheduled on 6<sup>th</sup> July 2017 at 11.30 a.m. in Seminar Hall, 2<sup>nd</sup> floor, Dept. of Academics, IKGPTU, Kapurthala. The agenda of the meeting was to discuss and finalize:

- Scheme and syllabi for M.Tech. (Big Data Analytics) 2016 batch
- Scheme and syllabi for M.Tech. (Computer science and Engineering) 2017 batch
- Scheme for B. Tech. (Computer science and Engineering) 2017 batch
- Equivalence of Ph. D. in Computer Applications with Ph. D in Computer Sc. and Engineering
- Any other matter with the permission of chair

#### Following Members were Present at the meeting:

Dr. Monika Sachdeva, IKGPTU Main Campus, *Chairman (Ex-officio)*  
 Dr. Akshay Girdhar, Professor, GNDEC, Ludhiana  
 Dr. Baljit Singh, Professor, BBSEC, Fatehgarh Sahib  
 Dr. Rajesh Bhatia, Panjab Technology University, Chandigarh, *outside Expert*  
 Dr. Krishan Saluja, Panjab University, Chandigarh, *outside Expert*  
 Dr. R.C. Gangwar, Associate Professor, BCET, Gurdaspur  
 Dr. S.K. Gupta, Associate Professor, BCET, Gurdaspur  
 Dr. Dinesh, Associate Professor, DAVIET, Jalandhar  
 Dr. Anshu Bhasin, IKGPTU Main Campus, *Member*  
 Dr. Sumesh Sood, IKGPTU Dinanagar campus, *Member*  
 Dr. Raman, IKGPTU Dinanagar Campus, *Member*  
 Mr. Vipin, Industry Expert, *Special Invitee*

#### Following members could not attend the meeting:

Dr. Parminder Singh, Professor, GNDEC, Ludhiana  
 Dr. Harsh Verma, NIT, Jalandhar, *outside Expert*  
 Mr. Navdeepak Sandhu, Training and Placements, IKGPTU, Kapurthala

The Board took the agenda and following decisions were taken.

1. The scheme and syllabi for M Tech (Big Data Analytics) has been approved.
2. The scheme for M Tech (CSE) for the batch 2018 has been finalized.
3. Every student has to earn 20%-25% credits through MOOCs courses. The department will decide the equivalency of existing courses with the MOOCs courses for online learning.
4. An open elective may be introduced in third semester of M. Tech. (CSE).
5. Evaluation criteria for evaluating M. Tech. dissertation may be as follows:
  - a. Papers published in SCI/SCIE journals may be assigned grade 'O'.
  - b. Papers published in SCOPUS indexed journals may not be assigned above grade 'A+'.
  - c. Papers published in UGC approved journal list not covered above and IEEE/Springer/ACM/Procedia may not be assigned above grade 'A'.
  - d. Other grades may be assigned based on the performance of students below grade 'A'.
6. Due to shortage of time the scheme of B. Tech. (CSE) could not be taken up. However, the board was of opinion that a course "Soft Skills (covering all placement pre-requisites)" may be introduced from third semester onwards.
7. The committee strongly recommended workshops/short term courses on latest technologies due to major revisions in both B. Tech. and M. Tech. curriculum.
8. The board was of view that Ph.D. in Computer Applications may be considered equivalent to Ph.D. in Computer Science. However, it should be considered under Faculty of Sciences.

*Mo*

Page 1 of 2

*Sumesh Sood*

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*AD*

HOD  
 Department of Computer Science & Engineering  
 IKG PTU Main Campus  
 Kapurthala



**IKG PUNJAB TECHNICAL UNIVERSITY, JALANDHAR****Minutes of Meeting**

A meeting of Board of Studies, Computer Science Engineering, was scheduled on 9<sup>th</sup> November, 2017 at 11.30 AM in Seminar Hall, 2<sup>nd</sup> floor, Department of Academics, IKGPTU, Kapurthala.

The agenda of the meeting was to discuss and finalize:

- Syllabi for M.Tech (Computer Science and Engineering) 2018 Batch, IKGPTU
- Scheme for B.Tech (Computer Science and Engineering) 2018 Batch, IKGPTU
- Revise syllabus of Fundamentals of Computer Programming and Information Technology (FCPIT), for B.Tech (Computer Science and Engineering) 2018 Batch, IKGPTU
- Any other matter with the permission of chair

**Following Members were Present at the meeting:**

Dr. Monika Sachdeva, IKGPTU Main Campus, *Chairman (Ex-officio)*

Dr. Harsh Verma, Professor, NIT, Jalandhar, *outside Expert*

Dr. Krishan Saluja, Professor, Panjab University, Chandigarh, *outside Expert*

Dr. Parminder Singh, Professor, GNDEC, Ludhiana

Dr. Akshay Girdhar, Professor, GNDEC, Ludhiana

Dr. R.C. Gangwar, Associate Professor, BCET, Gurdaspur

Dr. Dinesh Kumar, Associate Professor, DAVIET, Jalandhar

Dr. Anshu Bhasin, IKGPTU Main Campus, *Member*

Dr. Sumesh Sood, IKGPTU Dinanagar campus, *Member*

Dr. Raman, IKGPTU Dinanagar Campus, *Member*

**Following members could not attend the meeting:**

Dr. Surjit Singh, Retd. Professor, GNDU, Amritsar (Ex-Chairman)

Dr. S.K. Gupta, Associate Professor, BCET, Gurdaspur

Dr. Baljit Singh, Professor, BBSEC, Fatehgarh Sahib

Dr. Rajesh Bhatia, Panjab Technology University, Chandigarh, *outside Expert*

Mr. Navdeepak Sandhu, Training and Placements, IKGPTU, Kapurthala



# IKG PUNJAB TECHNICAL UNIVERSITY, JALANDHAR

## Minutes of Meetings

A meeting of Board of Studies, Computer Science Engineering, was scheduled on 27<sup>th</sup> April, 2018 at 11.00 a.m. in Seminar Hall, 2nd floor, Dept. of Academics, IKGPTU, Kapurthala.

The agenda of the meeting was to discuss and finalize:

1. To discuss adoption of scheme and syllabi, as proposed by AICTE for M.Tech (Computer Science and Engineering) 2018 batch, IKGPTU
2. To discuss adoption of scheme and syllabi, as proposed by AICTE for B.Tech (Computer Science and Engineering) 2018 batch, IKGPTU
3. To discuss adoption of scheme and syllabi, for M.Tech (Information Technology) 2018 batch, IKGPTU
4. To finalize POS and COS for B.Tech, 2016
5. To finalize POS and COS for M.Tech, 2016
6. To finalize Vision and Mission of the department ( under the special permission of Chairperson, due to urgency of the matter)

Following Members were Present at the meeting:

Dr. Monika Sachdeva, IKGPTU Main Campus, Chairman (Ex-officio)  
Dr. Akshay Girdhar, Professor, GNDEC, Ludhiana  
Dr. Baljit Singh, Professor, BBSEC, Fatehgarh Sahib  
Dr. Rajesh Bhatia, Panjab Technology University, Chandigarh, outside Expert  
Dr. Krishan Saluja Panjab University, Chandigarh, outside Expert  
Dr. S.K. Gupta Associate Professor, BCET, Gurdaspur  
Dr. Dinesh, Associate Professor, DAVIET, Jalandhar  
Dr. Anshu Bhasin, IKGPTU Main Campus, Member  
Dr. Sumesh Sood, IKGPTU Dinanagar campus, Member  
Dr. Raman, IKGPTU Dinanagar Campus, Member  
Dr. Harsh Verma, NIT, Jalandhar, outside Expert

Following members could not attend the meeting:

Dr. R.C. Gangwar, Associate Professor, BCET, Gurdaspur

1 of 3

*[Handwritten signatures and initials]*  
Sumesh Sood  
27/4/18

HOD  
Department of Computer Science & Engineering  
IKG PTU Main Campus  
Kapurthala



IKGPTU | 30 July 2018

IKGPTU (CE)  
30/7/18

## IKG PUNJAB TECHNICAL UNIVERSITY, JALANDHAR

### Minutes of Meetings

A meeting of Board of Studies, Computer Science Engineering, was scheduled on 30<sup>th</sup> July, 2018 at 10.30a.m. in Seminar Hall, 2nd floor, Dept. of Academics, IKGPTU, Kapurthala.

The agenda of the meeting was to discuss and finalize:

1. Adoption of scheme & syllabi of M. Tech (Cyber Security) 1st sem for 2018 batch.
2. Adoption of scheme & syllabi of B. Tech (IT) 3rd sem onwards for 2018 batch.
3. Revised scheme of M. Tech (Big Data Analytics) for 2016 batch.
4. Credit transfer scheme for "Swayam" based MOOCs.

Following Members were present at the meeting:

Dr. Monika Sachdeva, IKGPTU Main Campus, Chairman (Ex-officio)

Dr. Parminder Singh, Professor, GNDEC, Ludhiana

Dr. Baljit Singh, Professor, BBSEC, Fatehgarh Sahib

Dr. Harsh Verma, NIT, Jalandhar, outside Expert

Dr. Dinesh Kumar, Associate Professor, DAVIET, Jalandhar

Dr. Anshu Bhasin, IKGPTU Main Campus, Member

Dr. Sumesh Sood, IKGPTU Dinanagar campus, Member

Dr. Raman, IKGPTU Dinanagar Campus, Member

Following members could not attend the meeting:

Dr. Rajesh Bhatia, Panjab Technology University, Chandigarh, outside Expert

Dr. Akshay Girdhar, Professor, GNDEC, Ludhiana

Dr. Krishan Saluja Panjab University, Chandigarh, outside Expert

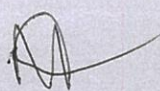
Mr. Navdeepak Sandhu, Training and Placements, IKGPTU, Kapurthala

Dr. Surjit Singh, Retd. Professor, GNDU, Amritsar, Ex- chairperson

Dr. R.C. Gangwar, Associate Professor, BCET, Gurdaspur

Dr. S.K. Gupta, Associate Professor, BCET, Gurdaspur

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HOD  
Department of Computer Science & Engineering  
IKG PTU Main Campus  
Kapurthala



1677.

31/7/2018

The Board took the agenda and following decisions were taken

The members deliberated and agreed on the adoption of scheme and syllabi presented for M.Tech-CSE specialization in Cyber security 2018 onwards, based on the base model proposed by AICTE. The evaluation criteria was finalised along with course codes. The board also deliberated on the detailed syllabus of First Semester and finalised the same. The Scheme and syllabi for the First Semester is submitted along.

After deliberations, consent was achieved on the adoption of scheme presented for B.tech (Information Technology) 2018 onwards, based on the model proposed by AICTE. The evaluation criteria was finalised along with course codes.

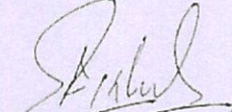
The board also deliberated on the inclusion of 6-8 week industrial training after the sixth semester and included the same in the scheme. The complete Scheme is submitted along.

The Revised scheme of M.Tech(Big Data Analytics), 2016 was approved, considering that the DMCs for the earlier semesters were already released to the students and students should not face problem in their final degree results.


The members discussed the mapping between the courses offered through Swayam and institutions' curriculum and suggested that the feedback from other institutes should be sought to understand the current status of its implementation. Details will be hence, taken up in next BoS.

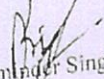
The meeting ended with a vote of thanks.

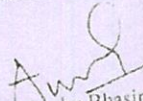
List of members for signature:

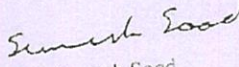
  
Dr. Baljit Singh

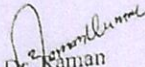
  
Dr. Dinesh Kumar

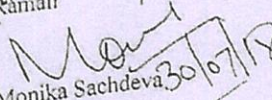
  
Dr. Harsh Verma

  
Dr. Parminder Singh

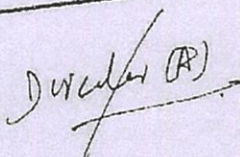
  
Dr. Anshu Bhasin

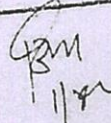
  
Dr. Sumesh Sood

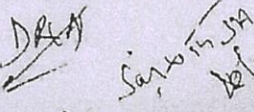
  
Dr. Raman

  
Dr. Monika Sachdeva  
(Chairman)

2 of 3

  
Dr. Anshu Bhasin

  
Dr. Harsh Verma

  
Dr. Sumesh Sood

  
Dr. Raman



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6/3/19

## IKG PUNJAB TECHNICAL UNIVERSITY, JALANDHAR

## Minutes of Meetings

A meeting of Board of Studies, Computer Science Engineering, was scheduled on 1<sup>st</sup> March, 2019 at 10.30a.m. in Seminar Hall, 2nd floor, Dept. of Academics, IKGPTU, Kapurthala.

**The agenda of the meeting was to discuss and finalize:**

1. Syllabi of B.Tech (CSE), 3<sup>rd</sup> and 4<sup>th</sup> sem for 2018 batch onwards.
2. POs and PSOs for the Dept. of CSE
3. Decide the list of courses for Minor degree in Computer Science Engg.

**Following Members were present at the meeting:**

Dr. Monika Sachdeva, IKGPTU Main Campus, Chairman (Ex-officio)  
Dr. Krishan Saluja Panjab University, Chandigarh, outside Expert  
Dr. Baljit Singh, Professor, BBSEC, Fatehgarh Sahib  
Dr. Harsh Verma, NIT, Jalandhar, outside Expert  
Dr. R.C. Gangwar, Associate Professor, BCET, Gurdaspur  
Dr. S.K. Gupta, Associate Professor, BCET, Gurdaspur  
Dr. Anshu Bhasin, IKGPTU Main Campus, Member  
Dr. Sumesh Sood, IKGPTU Dinanagar campus, Member  
Dr. Raman, IKGPTU Dinanagar Campus, Member  
Dr. Ashish Arora, IKGPTU Main Campus, Special Invite  
Sh. Devinder Kumar, Special Invite (parents)  
Sh. Balvir Singh, Special invite (parents)  
Mr. Rajat Khurana, Special Invite (Student)  
Sr. Sikander Singh, Special Invite (Student)

**Following members could not attend the meeting:**

Dr. Rajesh Bhatia, Panjab Technology University, Chandigarh, outside Expert  
Dr. Akshay Girdhar, Professor, GNDEC, Ludhiana  
Dr. Parminder Singh, Professor, GNDEC, Ludhiana  
Mr. Navdeepak Sandhu, Training and Placements, IKGPTU, Kapurthala  
Dr. Surjit Singh, Retd. Professor, GNDU, Amritsar, Ex- chairperson  
Dr. Dinesh Kumar, Associate Professor, DAVIET

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# IKG PUNJAB TECHNICAL UNIVERSITY, JALANDHAR

## Minutes of Meetings

A meeting of Board of Studies, Computer Science Engineering, was scheduled on 16<sup>th</sup> July, 2019 at 12.30 p.m. in Seminar Hall, 3rd floor, Dept. of Academics, IKGPTU, Kapurthala.

The agenda of the meeting was to discuss and finalize:

- 1) To finalize B. Tech (Software Engineering) scheme and syllabi for first year of 2019 batch.
- 2) To finalize B. Tech (Computer Science and Engineering) scheme and syllabi for first year of 2019 batch.
- 3) To finalize and offer same scheme and syllabi as of affiliated colleges to B. Tech (Computer Science and Engineering) students of Main campus and constituent campuses for the batches before 2019.
- 4) To finalize and offer same scheme and syllabi as of affiliated colleges to M. Tech (Computer Science and Engineering) students of Main campus and constituent campuses for the batch 2018 and 2019.
- 5) To finalize syllabus of Fundamentals of Computer and C Programming course of B.Sc. (Hons.) Mathematics.
- 6) To finalize MOOCs courses for B.Tech CSE Honors and Minor degree
- 7) To finalize Vision and Mission of the CSE department.
- 8) To finalize PEOs, POs, COs for B.Tech and M.Tech Programs.

Following Members were present at the meeting:

1. Dr. Monika Sachdeva, Associate Professor, Main Campus, IKGPTU
2. Dr. Sandeep Sood, Outside Expert, Deptt. of CSE, GNDU, Regional Campus, Gurdaspur
3. Dr. Manju Bala, Professor, Khalsa College of Engg. & Tech., Amritsar
4. Dr. Geeta Sikka, Associate Professor, Deptt. of CSE, NIT, Jalandhar
5. Dr. Anshu Bhasin, Assistant Professor, Main Campus, IKGPTU
6. Dr. Pankaj Deep Kaur, Assistant Professor, Deptt. of CSE, GNDU Regional Campus, Jalandhar
7. Dr. Sumeet Kaur Sehra, Assistant Professor, Deptt. CSE, GNDEC, Ludhiana
8. Dr. Alok Kumar Singh Kushwaha, Assistant Professor, IKGPTU
9. Er. Mohit Jain Er. Mohit Jain, Database Administrator, IRC-UHVE, IKGPTU
10. Er. Rajat Khurana, M.Tech Student, IKGPTU Main Campus
11. Mr. Ankit Gautam, B.Tech Student, IKGPTU Main Campus

Following Members could not be present at the meeting

- Dr. Maninder Singh, Professor, Outside Expert, HOD CSE, Thapar Institute of Engineering & Technology, Patiala
- Mr. Rajeev Bansal, Industry Expert, Deptt. of CSE, Senior Consultant, Tata Consultancy, Gurgaon, Haryana
- Dy. Director, Assistant Director CR&A, Deptt. of CR&A, IKGPTU
- Dr. Rama Krishna, Professor, Deptt. of CSE, NITTTR, Chandigarh
- Dr. Lakhwinder Kaur, Professor, Pbi. Univ., Patiala
- Dr. Narotam Chaudhary, Associate Professor, Deptt. of CSE, NIT, Hamirpur
- Dr. Jasbir Singh Saini, Associate Professor, GNDEC, Ludhiana

The Board took the agenda and following decisions were taken:

- BOS has Approved that candidates who are eligible to go to Thompson Rivers University, Candana under MoU of BE (Software Engineering) will undertake the scheme and syllabi

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HOD

Department of Computer Science & Engineering  
IKG PTU Main Campus  
Kapurthala



# IK GUJRAL PUNJAB TECHNICAL UNIVERSITY, JALANDHAR

## Minutes of Meetings

A meeting of Board of Studies, Computer Science Engineering, was scheduled on 20<sup>th</sup> April, 2020 at 12.00 to 01:00 p.m conducted using online platform through Zoom bearing Meeting ID: 649 141 6705, Password: 8Tgqcm..

### The agenda of the meeting was to discuss and finalize:

1. To update B. Tech (Computer Science and Engineering) scheme for 2018 batch onwards for IKGPTU Main Campus and constituent campuses.
2. To finalize B. Tech (Computer Science and Engineering) syllabi for 5<sup>th</sup> Semester (2018 batch onwards) for IKGPTU Main Campus and constituent campuses.
3. To finalize scheme and syllabi of 3<sup>rd</sup> and 4<sup>th</sup> semester for B. Tech (Computer Engineering), 2019 batch of IKGPTU Main Campus.
4. To finalize scheme and syllabi of 3<sup>rd</sup> and 4<sup>th</sup> semester for B. Tech (Software Engineering), 2019 batch of IKGPTU Main Campus.
5. To finalize internal evaluation criteria of the courses BTCS 801 (Software Training): Internal Marks 150 and BTCS 802 (Industry Oriented Project Training): Internal Marks 200 of IKGPTU Main Campus.

### Following Members were present at the meeting:


1. Dr. Monika Sachdeva, Associate Professor, Head and Board of Studies Chairman, Deptt. CSE, Main Campus, IKGPTU
2. Dr. Manju Bala, Professor, Khalsa College of Engg. & Tech., Amritsar Dr. Rama Krishna, Professor, Deptt. of CSE, NITTTR, Chandigarh
3. Dr. Rama Krishna, Professor, Deptt. of CSE, NITTTR, Chandigarh
4. Dr. Sandeep Sood, Outside Expert, Deptt. of CSI, Central University of Himachal Pradesh
5. Dr. Geeta Sikka, Associate Professor, Deptt. of CSE, NIT, Jalandhar
6. Dr. Anshu Bhasin, Assistant Professor, Main Campus, IKGPTU
7. Dr. Pankaj Deep Kaur, Assistant Professor, Deptt. of CSE, GNDU Regional Campus, Jalandhar
8. Dr. Raman Kumar, Assistant Professor and Board of Studies Coordinator, Deptt. of CSE, Main Campus, IKGPTU

### Following Members could not be present at the meeting

- Dr. Lakhwinder Kaur, Professor, Pbi. Univ., Patiala
- Dr. Narotam Chand, Associate Professor, Deptt. of CSE, NIT, Hamirpur
- Dr. Jasbir Singh Saini, Associate Professor, GNDEC, Ludhiana
- Dr. Sumeet Kaur Sehra, Assistant Professor, Deptt. CSE, GNDEC, Ludhiana
- Dr. Maninder Singh, Professor, Outside Expert, HOD CSE, Thapar Institute of Engineering & Technology, Patiala
- Mr. Rajeev Bansal, Industry Expert, Deptt. of CSE, Senior Consultant, Tata Consultancy, Gurgaon, Haryana
- Dy. Director, Assistant Director CR&A, Deptt. of CR&A, IKGPTU
- Er. Mohit Jain Er. Mohit Jain, Database Administrator, IRC-UHVE, IKGPTU
- Er. Rajat Khurana, Former M.Tech Student, IKGPTU Main Campus

### The Board took the agenda and following decisions were taken:

- BOS has approved B. Tech (Computer Science and Engineering) scheme for 2018 batch onwards for IKGPTU Main Campus and constituent campuses. In essence, BOS has finalized the subject entitled "Block Chain" will be retitled as "Block Chain Technologies" in electives.





HOD  
Department of Computer Science & Engineering  
IKG PTU Main Campus  
Kapurthala



# **I K GUJRAL PUNJAB TECHNICAL UNIVERSITY, JALANDHAR**

## **Minutes of Meetings**

A meeting of Board of Studies, Computer Science Engineering, was scheduled on 20<sup>th</sup> May, 2020 at 12.00 to 01:00 p.m conducted using online platform through CISCO WebEx Meeting link: <https://meetingsapac21.webex.com/meetingsapac21/j.php?MTID=m8585f87396442b4b11e25d4db504ce92>, Meeting number: 917 244 107, Password: 7tmYMwuv53p (78696988 from phones and video systems), Host key: 656424

### **The agenda of the meeting was to discuss and finalize:**

1. The change of pattern of Question paper.
2. Propose the Names of Paper Setters for each subject.
3. To give directions and approval for BCA and MCA Syllabus for IKGPTU Main Campus will be same as approved Syllabus of IKGPTU Affiliated Institutes.

### **Following Members were present at the meeting:**

1. Dr. Monika Sachdeva, Associate Professor, Head and Board of Studies Chairman, Deptt. CSE, Main Campus, IKGPTU
2. Dr. Rama Krishna, Professor, Deptt. of CSE, NITTTR, Chandigarh
3. Dr. Sandeep Sood, Outside Expert, Deptt. of CSI, Central University of Himachal Pradesh
4. Dr. Geeta Sikka, Associate Professor, Deptt. of CSE, NIT, Jalandhar
5. Dr. Anshu Bhasin, Assistant Professor, Main Campus, IKGPTU
6. Dr. Pankaj Deep Kaur, Assistant Professor, Deptt. of CSE, GNDU Regional Campus, Jalandhar
7. Dr. Sumeet Kaur Sehra, Assistant Professor, Deptt. CSE, GNDEC, Ludhiana
8. Dr. Raman Kumar, Assistant Professor and Board of Studies Coordinator, Deptt. of CSE, Main Campus, IKGPTU

### **Following Members could not be present at the meeting**

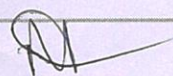
- Dr. Manju Bala, Professor, Khalsa College of Engg. & Tech., Amritsar
- Dr. Lakhwinder Kaur, Professor, Pbi. Univ., Patiala
- Dr. Narotam Chand, Associate Professor, Deptt. of CSE, NIT, Hamirpur
- Dr. Jasbir Singh Saini, Associate Professor, GNDEC, Ludhiana
- Dr. Maninder Singh, Professor, Outside Expert, HOD CSE, Thapar Institute of Engineering & Technology, Patiala
- Mr. Rajeev Bansal, Industry Expert, Deptt. of CSE, Senior Consultant, Tata Consultancy, Gurgaon, Haryana
- Dy. Director, Assistant Director CR&A, Deptt. of CR&A, IKGPTU

### **The Board took the agenda and following decisions were taken:**

- BOS has approved the change of pattern of Question paper.
- BOS has approved the proposed Names of Paper Setters for each subject.
- BOS has approved BCA and MCA Syllabus for IKGPTU Main Campus will be same as approved Syllabus of IKGPTU Affiliated Institutes.

The meeting ended with a vote of thanks.

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**HOD**  
Department of Computer Science & Engineering  
IKG PTU Main Campus  
Kapurthala



# IK GUJRAL PUNJAB TECHNICAL UNIVERSITY, JALANDHAR

## Minutes of Meetings

A meeting of Board of Studies, Computer Science Engineering, was scheduled on 18<sup>th</sup> January, 2021 at 02.00 to 03:30 p.m conducted using online platform through Zoom bearing Meeting ID: 729 1047 3541, Password: ikgptu.

### The agenda of the meeting was to discuss and finalize:

1. To finalize scheme of B.Tech (Computer Science & Engineering) and syllabi of 6<sup>th</sup> semester for B. Tech (Computer Science and Engineering), 2018 batch onwards for IKGPTU Main Campus and constituent campuses.
2. To finalize syllabi of 4<sup>th</sup> semester for B. Tech (Computer Engineering), 2019 batch of IKGPTU Main Campus.
3. To finalize syllabi of 4<sup>th</sup> semester for B. Tech (Software Engineering), 2019 batch of IKGPTU Main Campus.
4. To finalize scheme and syllabi of Minor Degree & Honours Degree for B. Tech courses running in department of Computer Science and Engineering, 2020 batch of IKGPTU Main Campus and constituent campuses.

### Following Members were present at the meeting:

1. Dr. Monika Sachdeva, Associate Professor, Head and Board of Studies Chairman, Deptt. CSE, Main Campus, IKGPTU
2. Dr. Manju Bala, Professor, Khalsa College of Engg. & Tech., Amritsar
3. Dr. Rama Krishna, Professor, Deptt. of CSE, NITTTR, Chandigarh
4. Dr. Sandeep Sood, Outside Expert, Associate Professor, NIT, Kurukshetra
5. Dr. Geeta Sikka, Associate Professor, Deptt. of CSE, NIT, Jalandhar
6. Dr. Jasbir Singh Saini, Associate Professor, GNDEC, Ludhiana
7. Dr. Sumeet Kaur Sehra, Assistant Professor, Deptt. CSE, GNDEC, Ludhiana
8. Dr. Pankaj Deep Kaur, Assistant Professor, Dept. of CSE, GNDU Regional Campus, Jalandhar
9. Dr. Anshu Bhasin, Assistant Professor, Main Campus, IKGPTU
10. Dr. Raman Kumar, Assistant Professor and Board of Studies Coordinator, Deptt. of CSE, Main Campus, IKGPTU

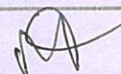
### Following Members could not be present at the meeting

- Dr. Lakhwinder Kaur, Professor, Pbi. Univ., Patiala
- Dr. Maninder Singh, Professor, Outside Expert, HOD CSE, Thapar Institute of Engineering & Technology, Patiala
- Dr. Narotam Chand, Associate Professor, Deptt. of CSE, NIT, Hamirpur
- Mr. Rajeev Bansal, Industry Expert, Deptt. of CSE, Senior Consultant, Tata Consultancy, Gurgaon, Haryana
- Dy. Director, Assistant Director CR&A, Deptt. of CR&A, IKGPTU
- Er. Mohit Jain Er. Mohit Jain, Database Administrator, IRC-UHVE, IKGPTU
- Er. Srishty, Former B.Tech Student, IKGPTU Main Campus
- Mehul Kansal (B.Tech 2017 Batch), Divyanshu Singh (B.Tech 2017 Batch)
- Shri. Davinder Kumar, Assistant Registrar, IKGPTU

### The Board took the agenda and following decisions were taken:

- BOS has approved scheme of B.Tech (Computer Science & Engineering) and syllabi of 6<sup>th</sup> semester for B. Tech (Computer Science and Engineering), 2018 batch onwards for IKGPTU Main Campus and constituent campuses.
- BOS has approved syllabi of 4<sup>th</sup> semester for B. Tech (Computer Engineering), 2019 batch of IKGPTU Main Campus.

Ganaraj Kumar



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## **IKG PUNJAB TECHNICAL UNIVERSITY, JALANDHAR**

### **Minutes of Meetings**

A meeting of Board of Studies (CSE/ IT), was scheduled on 16<sup>th</sup> June, 2021 at 11.00 a.m. through online( Zoom) mode, with the due permission of the concerned office.

#### **The agenda of the meeting were:**

Agenda 1: Discuss the complete syllabus of 7th and 8th sem of B.Tech- CSE 2018 and 2019 batch for university campuses

Agenda 2: Discuss the scheme & syllabus of B.Tech- SE, 2019 batch onwards

Agenda 3: Discuss the scheme & syllabus of B.Tech CoE, 2019 batch onwards

Agenda 4: Discuss the complete syllabus for 3rd sem onwards of B.Tech- CSE (AI & ML), B.Tech-CSE( Data Science), B.Tech- CSE (IoT& Cyber security including BlockChain Technology) 2020 batch onwards

Agenda 5: Revisit the eligibility for M.Tech- CSE (Artificial Intelligence) and M.Tech- CSE (Cyber security) 2020 batch onwards

Agenda 6: Discuss the PhD scheme as per new guidelines of UGC.

Agenda 7: Mapping of proposed course of B.Sc.(CS) from Wilfrid Laurier University, Canada with B.Tech (CSE), IKGPTU

Agenda 8: Propose detailed summer training guidelines for batch 2019 in reference to the notification by university in this regard

#### **Following Members were present at the meeting:**

1. Dr. Monika Sachdeva, Prof., Mohali Campus, IKGPTU
2. Dr. Sandeep Sood, Prof., Central University
3. Dr. Krishan Saluja, Prof., UIET, Chandigarh
4. Dr. Geeta Sikka , Associate Prof., NIT, Jalandhar
5. Dr. Manju Bala, Prof., Khalsa College of Engg.& Tech., Amritsar
6. Dr. Ajay Sharma, ACET, Amritsar
7. Dr. Sunny Behal, SBSSTC, Ferozpur
8. Mr. Jatinder Bansal , Design Consultant, TCS
9. Dr. Sandeep Kad. ACET, Amritsar
10. Dr. Raman Kumar, MC, IKGPTU
11. Dr. Anshu Bhasin, Asstt. Prof. , BOS Coordinator, IKGPTU

#### **Following members could not attend the meeting:**



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- Dr. Parminder Singh, Professor, GNDEC
- Dr. Sumeet Kaur Sehra, GNDEC
- Dr. Navdeepak Sandhu, CR&A, IKGPTU

**The Board took the agenda and following decisions were taken:**

- The members deliberated on the scheme and detailed syllabus of **B.Tech-CSE, university campuses batch 2018** and finalized the same. The board proposed the revoke of semester courses, against 7<sup>th</sup> /8<sup>th</sup> semester training and suggested that the semester training can be offered at the institute level also for projects under learned faculty of university campuses, as per possibilities, along with the already prescribed forms, from time to time, of Industrial semester training.

Further, the list of OPEN ELECTIVES can also be covered through MOOCs of Swayam/ NPTEL courses of 12 weeks along with certification. The list of these MOOCs will be provided by MOOCs coordinator of the institute, duly approved by the Chairperson of the BoS, as applicable from time to time. It is pertinent to mention that students can also opt for open electives offered by other departments of the institute.

**The scheme and syllabus, B.TECH – CSE 2018, university campuses, is enclosed with the MoM.**

For the batch 2019, B.Tech- CSE 5<sup>th</sup> semester, University campuses, the syllabus will remain same as to what is proposed and finalized for all other campuses.

**The scheme and syllabus, B.TECH – CSE 2019, university campuses, is enclosed with the MoM.**

- The board discussed on the scheme of **B.Tech(Computer Engg.) 2019 onwards** and finalized the same.

The detailed syllabus of 5<sup>th</sup> semester was approved.

**The scheme and syllabus is enclosed with the MoM**

- The board discussed on the scheme of **B.Tech(Software Engg.) 2019 onwards** and finalized the same.

The detailed syllabus of 5<sup>th</sup> semester was approved.

**The scheme and syllabus is enclosed with the MoM**

- The members also reached on the consent that for all the New B.Tech – CSE specialized programs, started w.e.f. July 2020, as mentioned in agenda item no. 4, the scheme and syllabus will remain same as that of B.Tech –CSE, 2018 onwards scheme and syllabus till 4<sup>th</sup> semester. Further, from the 5<sup>th</sup> semester onwards the scheme will remain the same along with the list of all core courses mentioned, only the list of electives will be varied and provided specific to the specialized program.



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Based on the above decision the scheme and syllabus till 4<sup>th</sup> semester for B.tech- CSE (AI & ML), B.tech-CSE( Data Science), B.tech- CSE (IoT& Cyber security including BlockChain Technology) 2020 batch onwards, is enclosed with the MoM

- The board revisited on the **eligibility** of M.Tech- CSE(Cyber Security) and M.tech (Artificial Intelligence) and it was agreed that it will be:

**B.E. / B. Tech. (CSE/ IT/ Software Engg./ Computer Engg./ Software Systems/ Information Security/ Cyber Security/ Computational Engg./ Machine learning/ IoT/ Data Science) with atleast 50% (45% in case of candidate belonging to reserved category).**

The board was of the opinion that though CDAC, where these programs are being run, is requesting to include Electronics and other relevant branches as eligibility, but same can not been considered keeping in line with the GATE entrance exam eligibility for M.Tech- CSE. It is reinforced here that GATE, is national level M.Tech entrance exam.

Also it was focused that the core courses required for M.Tech(CSE) , particularly specialized programs as Artificial Intelligence and Cyber Secuirty, as a prerequisite are not included in B.Tech programs other than included above.

Further, eligibility of M.Tech(CSE) of IKGPTU is similar to above and does not include B. Tech(Electronics and related fields) as eligibility.

- The members appreciated the draft of PhD new scheme from Jan 2021, as proposed by the RIC department, based on the guidelines of UGC and urged its implementation.
- The mapping report of B.Sc.(CS) from Wilfrid Laurier University, Canada with B.Tech ( CSE), IKGPTU was prepared and observations were recorded. **The report is enclosed along with the MoM.**
- The summer training for 4<sup>th</sup> Semester students, batch 2019 only, has been proposed during the 5<sup>th</sup> semester vide letter no. IKG-PTU/DA/2470 dated 12-3-21, due to the pandemic situation. The board decided that the same can be covered through:  
Online Industrial Internships  
OR  
MOOCs of Swayam/ NPTEL courses of 12 weeks along with certification. The list of these MOOCs will be provided by MOOCs coordinator of the institute, duly approved by the Chairperson of the BoS, as applicable from time to time  
OR  
Institute level with 60 hrs. training module.



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The meeting ended with a vote of thanks. Due to online mode of meeting the MoM and other documents will be signed in hard copy at a later stage (Acceptance taken through mail)

Dr. Sandeep Sood

Dr. Geeta Sikka

Dr. Manju Sharma

Dr. Krishan Saluja

Dr. Ajay Sharma

Dr. Sunny Behal

Dr. Raman Kumar

Dr. Sandeep Kad

Mr. JAtinder BAnsal

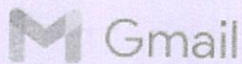
Dr. Anshu Bhasin

Dr. Monika Sachdeva  
(Chairman)



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IKG PTU Main Campus  
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anshu bhasin &lt;anshukmv@gmail.com&gt;

**MoM and Docs related to BOS meeting held on 16 June 2021**

7 messages

anshu bhasin &lt;anshukmv@gmail.com&gt;

Wed, Jun 23, 2021 at 4:19 PM

To: Monika Sachdeva <Monasach1975@gmail.com>, Dr Manju Bala <drmanju571@gmail.com>, sandeepkard@acetamritsar.org, harpreet\_daviet@yahoo.in, sunnybehal@sbsstc.ac.in, ajaysharma@acetamritsar.org, dr.ramankumar@ptu.ac.in, san1198@gmail.com, Krishan Saluja <k.salujasbs@gmail.com>, sikkag@nitj.ac.in, jatinder Bansal <bansal.jatinder@gmail.com>  
Cc: Sarwan Singh <ssmailbag@yahoo.co.in>, vikaschawlaikgptu <vikas.chawla.ikgptu@gmail.com>

Respected BoS Member

Good Evening!

Apropos the BoS meeting held on 16 th June 2021 through online mode, please find enclosed with this mail the MoM and agenda wise documents prepared with the contribution of expert suggestions.

You are requested to suggest corrections, if any and approve the same in this mail thread only.

The same will be forwarded as your consent on the proceedings to the esteemed Dean Academics office.

Thank you in advance.

Regards

--

Dr. Anshu Bhasin












Asstt. Professor

Dept. of Comp. Sc. &amp; Engg.

I.K.G Punjab Technical University , Main Campus

Kapurthala

**11 attachments**

-  **MoM.pdf**  
424K
-  **Scheme and Syllabus of B.Tech CSE 2018 Batch-UC.pdf**  
1792K
-  **Scheme and Syllabus of B.Tech CSE 2019 Batch-UC.pdf**  
1505K
-  **BTech-Computer-Engineering 2019 onwards.pdf**  
946K
-  **Scheme and syllabus -SE.pdf**  
1294K
-  **Scheme & Syllabus-B.tech iot.pdf**  
1040K
-  **Scheme & Syllabus-B.tech( AI& ML).pdf**  
1040K
-  **Scheme & Syllabus-B.techdata science.pdf**  
1040K
-  **mapping remarks.pdf**  
269K
-  **List of MOOCs courses for Open Electives.pdf**  
266K
-  **Courses for Summer Training.pdf**

  
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6/28/2021

Gmail - MoM and Docs related to BOS meeting held on 16 June 2021

181K

Dr. Sunny Behal <sunnybehal@sbsstc.ac.in>  
To: anshu bhasin <anshukmv@gmail.com>

Wed, Jun 23, 2021 at 4:38 PM

Dear Dr. Anshu Bhasin,

I have one observation regarding specialized B.Tech courses.

As we are now making a uniformity in the curriculum of semester 1 to 4 for all of these specialized courses, we can make it open to choose among C++/ java/Python for the implementation of OOP and Data Structures subjects depending upon the requirements of that particular specialized course or student choice.

Rest of the things seem fine to me and approved from my side.

Best wishes

Dr. Sunny Behal,  
Dean Academics,  
HOD-CSE (Data Science) and  
PG Diploma in Cyber Security and Digital Forensic

Associate Professor, CSE Deptt  
Shaheed Bhagat Singh State University, Ferozepur-152004  
Mobile: +91-8288012007  
Email:  
sunnybehal@sbsstc.ac.in  
sunnybehal@rediffmail.com  
sunnybehal.sbs@gmail.com

Google Scholar Profile: <https://scholar.google.co.in/citations?user=TVDsvK8AAAAAJ&hl=en>

ResearchGate Profile: [https://www.researchgate.net/profile/Sunny\\_Behal](https://www.researchgate.net/profile/Sunny_Behal)

Scopus Profile: <https://www.scopus.com/authid/detail.uri?authorId=54419434600>

ORCID ID / Profile: <https://orcid.org/0000-0002-9701-4358>

Personal Web Page: <https://sites.google.com/view/sunnybehal/home>







[Quoted text hidden]

anshu bhasin <anshukmv@gmail.com>  
To: Dr Krishan Kumar <k.salujaiet@gmail.com>

Wed, Jun 23, 2021 at 5:36 PM

[Quoted text hidden]

#### 11 attachments

-  MoM.pdf  
424K
-  Scheme and Syllabus of B.Tech CSE 2018 Batch-UC.pdf  
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-  Scheme and Syllabus of B.Tech CSE 2019 Batch-UC.pdf  
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





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6/28/2021

Gmail - MoM and Docs related to BOS meeting held on 16 June 2021

-  **Scheme & Syllabus-B.tech( AI& ML).pdf**  
1040K
-  **Scheme & Syllabus-B.techdata science.pdf**  
1040K
-  **mapping remarks.pdf**  
269K
-  **List of MOOCs courses for Open Electives.pdf**  
266K
-  **Courses for Summer Training.pdf**  
181K

Ajay Sharma <ajaysharma@acetamritsar.org>

Wed, Jun 23, 2021 at 6:08 PM

To: anshu bhasin <anshukmv@gmail.com>

Cc: Monika Sachdeva <Monasach1975@gmail.com>, Dr Manju Bala <drmanju571@gmail.com>, "Dr. Sandeep Kad" <sandeepkad@acetamritsar.org>, harpreet\_daviet@yahoo.in, sunnybehal@sbsstc.ac.in, dr.ramankumar@ptu.ac.in, san1198@gmail.com, Krishan Saluja <k.salujasbs@gmail.com>, sikkag@nitj.ac.in, jatinder Bansal <bansal.jatinder@gmail.com>, Sarwan Singh <ssmailbag@yahoo.co.in>, vikaschawlaikgptu <vikas.chawla.ikgptu@gmail.com>

Thanks for the mail.

[Quoted text hidden]

Sandeep Sood <san1198@gmail.com>

Thu, Jun 24, 2021 at 11:37 AM

To: anshu bhasin <anshukmv@gmail.com>

Respected Madam,


I hereby convey my formal acceptance to the attached draft MoM. The filled honorarium form is attached. Kindly forward it to the accounts section.

With Regards

On Wed, Jun 23, 2021 at 4:20 PM anshu bhasin <anshukmv@gmail.com> wrote:

[Quoted text hidden]

--  
Dr. Sandeep Kumar Sood  
Associate Professor, Computer Applications,  
National Institute of Technology,  
Kurukshetra-136119, Haryana, India  
Mobile:9465204534  
Skyp:live:.cid.9071aee726d33ae7  
Mobile:9465204534

-  **Sood\_hon\_bos.pdf**  
887K

Dr. Sandeep Kad <sandeepkad@acetamritsar.org>

Mon, Jun 28, 2021 at 10:07 AM

To: anshu bhasin <anshukmv@gmail.com>

Dear Ma'am,

Greetings!!

As discussed in the meeting held on 16th June, 2021 , the agenda items stand approved on my behalf.

Regards,

<https://mail.google.com/mail/u/0?ik=85bf7affdd&view=pt&search=all&permthid=thread-a%3Ar5267143148332823754&simpl=msg-a%3Ar5262185694...> 3/4

  
HOD

Department of Computer Science & Engineering  
IKG PTU Main Campus  
Kapurthala



6/28/2021

Gmail - MoM and Docs related to BOS meeting held on 16 June 2021

On Wed, Jun 23, 2021 at 4:20 PM anshu bhasin <anshukmv@gmail.com> wrote:

[Quoted text hidden]

--

Dr. Sandeep Kad,  
Professor (Department of Computer Science and Engineering)  
Amritsar College of Engineering and Technology, Amritsar  
(Autonomous College, NAAC (A-Grade))

**Monika Sachdeva** <monasach1975@gmail.com>

To: anshu bhasin <anshukmv@gmail.com>

Mon, Jun 28, 2021 at 1:02 PM

Dear Mam

I agree with the attached MOM.

Regards  
Dr Monika Sachdeva  
Professor, Department of Computer Science and Engineering  
IKGPTU Mohali Campus- I, Mohali, Punjab  
India

On Wed, Jun 23, 2021 at 4:20 PM anshu bhasin <anshukmv@gmail.com> wrote:

[Quoted text hidden]



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IKG PTU Main Campus  
Kapurthala





anshu bhasin &lt;anshukmv@gmail.com&gt;

**Proceedings of BOS meet held on 5th August 21**

7 messages

anshu bhasin &lt;anshukmv@gmail.com&gt;

Mon, Aug 9, 2021 at 2:30 PM

To: Monika Sachdeva <Monasach1975@gmail.com>, Dr Manju Bala <drmanju571@gmail.com>, Parminder Singh <parminder2u@gmail.com>, sandeepkad@acetamritsar.org, harpreet\_daviet@yahoo.in, ajaysharma@acetamritsar.org, dr.ramankumar@ptu.ac.in, san1198@gmail.com, sikkag@nitj.ac.in, Dr Krishan Kumar <ksalujaiet@gmail.com>

Respected BoS Members  
Greetings !

Please find enclosed the MoM and documents related to the proceedings of agenda items. Kindly inform me if any unintentional mistake is identified, else please send your approval on the same in this mail thread only. This mail will be forwarded to the Dean Academics office, as your kind consent on the attachments.

Thank you in anticipation.

regards

---

Dr. Anshu Bhasin  
Asstt. Professor  
Dept. of Comp. Sc. & Engg.  
I.K.G Punjab Technical University, Main Campus  
Kapurthala

**2 attachments**

**BTech-Computer-Engineering 2019 onwards.pdf**  
958K

**MoM.docx**  
21K

Ajay Sharma &lt;ajaysharma@acetamritsar.org&gt;

Mon, Aug 9, 2021 at 2:48 PM

To: anshu bhasin &lt;anshukmv@gmail.com&gt;

Cc: Monika Sachdeva <Monasach1975@gmail.com>, Dr Manju Bala <drmanju571@gmail.com>, Parminder Singh <parminder2u@gmail.com>, "Dr. Sandeep Kad" <sandeepkad@acetamritsar.org>, harpreet\_daviet@yahoo.in, dr.ramankumar@ptu.ac.in, san1198@gmail.com, sikkag@nitj.ac.in, Dr Krishan Kumar <ksalujaiet@gmail.com>

Thanks for the mail.

[Quoted text hidden]

Sandeep Sood &lt;san1198@gmail.com&gt;

Mon, Aug 9, 2021 at 2:54 PM

To: anshu bhasin &lt;anshukmv@gmail.com&gt;, Monika Sachdeva &lt;monasach1975@gmail.com&gt;

Kindly change my affiliation to N.I.T. Kurukshetra.

[Quoted text hidden]

---

Dr. Sandeep Kumar Sood  
Associate Professor, Computer Applications,  
National Institute of Technology,  
Kurukshetra-136119, Haryana, India  
Mobile:9465204534

Skyp:live:.cid.9071aee726d33ae7

<https://mail.google.com/mail/u/0/?ik=85bf7affdd&view=pt&search=all&permthid=thread-a%3Ar2502552869803182662&simpl=msg-a%3Ar2504205353...> 1/2

**HOD**  
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Kapurthala



8/18/2021

Gmail - Proceedings of BOS meet held on 5th August 21

Mobile:9465204534

**anshu bhasin** <anshukmv@gmail.com>  
To: Sandeep Sood <san1198@gmail.com>  
Cc: Monika Sachdeva <monasach1975@gmail.com>

Mon, Aug 9, 2021 at 3:04 PM

Noted.

[Quoted text hidden]

**Sandeep Sood** <san1198@gmail.com>  
To: anshu bhasin <anshukmv@gmail.com>, Monika Sachdeva <monasach1975@gmail.com>

Mon, Aug 9, 2021 at 4:32 PM

I give my acceptance to minutes of the BoS(CSE/IT) meeting held on 05/08/2021 as attached.

With Best Wishes,  
Dr. Sandeep Kumar Sood  
Associate Professor, Computer Applications,  
National Institute of Technology,  
Kurukshetra-136119, Haryana, India  
Mobile:9465204534

Skyp:live:.cid.9071aee726d33ae7

Mobile:9465204534

On Mon, Aug 9, 2021 at 2:30 PM anshu bhasin <anshukmv@gmail.com> wrote:

[Quoted text hidden]

With Best Wishes,

[Quoted text hidden]

**Parminder Singh** <parminder2u@gmail.com>  
To: anshu bhasin <anshukmv@gmail.com>

Mon, Aug 9, 2021 at 10:16 PM

Madam,

I give my consent to the minutes of the BOS meeting.

Regards,  
Dr. Parminder Singh  
Professor and Head,  
Department of Computer Science & Engineering,  
Guru Nanak Dev Engineering College,  
Gill Road, Ludhiana (Punjab) - 141 006  
INDIA  
Ph. +91-98555-76176 (m)  
+91-161-5064547 (o)

On Mon, Aug 9, 2021 at 2:30 PM anshu bhasin <anshukmv@gmail.com> wrote:

>

[Quoted text hidden]


**Monika Sachdeva** <monasach1975@gmail.com>  
To: anshu bhasin <anshukmv@gmail.com>

Tue, Aug 10, 2021 at 9:26 AM

I agree to the attached MoM.

On Mon, 9 Aug 2021, 14:30 anshu bhasin, <anshukmv@gmail.com> wrote:

[Quoted text hidden]

  
HOD  
Department of Computer Science & Engineering  
IKG PTU Main Campus  
Kapurthala



# IKG PUNJAB TECHNICAL UNIVERSITY, JALANDHAR

## Minutes of Meetings

A meeting of Board of Studies (CSE/ IT), was held on 5<sup>th</sup> August, 2021 at 11.00 a.m. through online ( Google.meet) mode, with the due permission of the concerned office.

### The agenda of the meeting were:

Agenda 1: Revisit the eligibility for M.tech- CSE (Artificial Intelligence) and M.tech- CSE (Cyber security) 2020 batch onwards

Agenda 2: Discuss the scheme & syllabus of B.Tech- SE, 2019 batch 6<sup>th</sup> semester onwards

Agenda 3: Discuss the scheme & syllabus of B.Tech CoE, 2019 batch 6<sup>th</sup> semester onwards

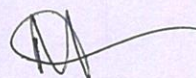
### Following Members were present at the meeting:

1. Dr. Monika Sachdeva, Prof., Mohali Campus, IKGPTU
2. Dr. Sandeep Sood, Prof., Associate Prof., NIT Kurukshetra
3. Dr. Krishan Saluja, Prof., UIET, Chandigarh
4. Dr. Geeta Sikka , Associate Prof., NIT, Jalandhar
5. Dr. Parminder Singh, Professor, GNDEC
6. Dr. Parminder Singh, Professor, GNDEC
7. Dr. Manju Bala, Professor., Khalsa College of Engg. & Tech., Amritsar
8. Dr. Harpreet Kaur, Associate Professor, Daviet, Jalandhar
9. Dr. Ajay Sharma, ACET, Amritsar
10. Dr. Sandeep Kad. ACET, Amritsar
11. Dr. Raman Kumar, MC, IKGPTU
12. Dr. Anshu Bhasin, Asstt. Prof. , BOS Coordinator, IKGPTU
13. Dr. Balwinder, Joint Director, CDAC, Mohali

### Following members could not attend the meeting:

- Dr. Sumeet Kaur Sehra, GNDEC
- Dr. Navdeepak Sandhu, CR&A, IKGPTU
- Dr. Sunny Behal, SBSSTC, Ferozpur
- Mr. Jatinder Bansal , Design Consultant, TCS

The Board took the agenda and following decisions were taken:





- The board very patiently listened to the representation of CDAC, Mohali on the **eligibility** of M.Tech- CSE(Cyber Security) and M.tech (Artificial Intelligence) and after deep deliberations it was revised as below:

**B.E. / B. Tech. (CSE/ IT/ Software Engg./ Computer Engg./ Software Systems/ Information Security/ Cyber Security/ Computational Engg./ Machine learning/ IoT/ Data Science) with atleast 50% (45% in case of candidate belonging to reserved category).**

**OR**

**B.E./ B.Tech in any stream as Major along with Minor degree in CSE.**

**OR**

**B.Tech. in any relevant/ appropriate branch of CSE as mentioned in the AICTE regulations, from time to time, under “ Major Branches of Engineering / Technology and their relevant / appropriate branch of UG degree in Engineering / Technology”.**

The board maintained its opinion, as delivered in the last BoS meeting held on 16<sup>th</sup> June 2021, that though CDAC, is requesting to include Electronics and other relevant branches as eligibility, but same can not be considered keeping in line with the GATE, national level entrance exam, eligibility for M.Tech- CSE. Also it was focused that the core courses required for M.Tech(CSE) , particularly specialized programs as Artificial Intelligence and Cyber Security, as a prerequisite are not included in B.Tech programs of Electronics and related streams from all institutes.

Further, eligibility of M.Tech(CSE) of IKGPTU is similar to above and does not include B. Tech(Electronics and related fields) as eligibility.

- The board discussed on the requests received from the students, through mail, on the inclusion of Programming in Python as an elective option in the 5<sup>th</sup> sem. in the scheme of **B.Tech (Computer Engg.) 2019 onwards.**

The board approved the same.

**The revised scheme and syllabus is enclosed along the MoM.**

- The board proposed the list of Electives for B.tech- CoE and B.Tech- SE and decided to discuss details based on drafts in the next BoS meet.

The meeting ended with a vote of thanks. Due to online mode of meeting the MoM and other documents will be signed in hard copy at a later stage (Acceptance taken through mail may please be accepted).

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Dr. Sandeep Sood

Dr. Geeta Sikka

Dr. Manju Sharma

Dr. Krishan Saluja

Dr. Parminder Singh

Dr. Harpreet Kaur

Dr. Ajay Sharma

Dr. Sandeep Kad

Dr. Balwinder

Dr. Raman Kumar

Dr. Anshu Bhasin

Dr. Monika Sachdeva  
(Chairman)



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54.	1114009	28.04.17	Manish Kumar	R.K. Bansal	Applied Sciences	Computer Applications
<b>Title of Thesis :</b> Development of lexical resources and algorithms for automatic translating of the study material of computer subjects for technical institutions using existing Hindi to Punjabi machine translation system.						
55.	1114010	28.04.17	Rajeev Puri	Ashok Kumar Puri	Applied Sciences	Computer Applications
<b>Title of Thesis :</b> Development of an automated software tool for plagiarism detection in Punjabi text documents						
56.	1114020	28.04.17	Harjeet Singh Arora	Joginder Singh	Applied Sciences	Computer Applications
<b>Title of Thesis :</b> Development of resources and approach for translating the standard Punjabi text into its Malwai dialect.						
57.	02.43.09	07.04.17	Umesh Gupta	Rakesh Gupta	Engineering	Electronics and Communication Engineering
<b>Title of Thesis :</b> Optimization of edfa and raman amplifiers for wdm systems.						
58.	11.63.08	05.05.17	Damanpreet Kaur	Charanjit Singh	Business Administration	Management
<b>Title of Thesis :</b> Mergers and acquisitions in Indian Banking Sector.						
59.	1014013	05.05.17	Jagmohan Mago	Harbans Lal Mago	Applied Sciences	Computer Applications
<b>Title of Thesis :</b> Fuzzy model to interpret and evaluate education system: teacher student perspective.						
60.	1014020	05.05.17	Munish Gupta	Krishan Kumar Gupta	Applied Sciences	Computer Applications
<b>Title of Thesis :</b> Development of cross layer energy efficient protocols for multi hop wireless sensor networks.						
61.	02.47.09	08.05.17	Raminder Singh Uppal	Avtar Singh Uppal	Engineering	Electronics and Communication Engineering
<b>Title of Thesis :</b> New deployment & dynamic shortest path routing in wireless sensor network.						
62.	1002001	08.05.17	GURDEEPAK SINGH	S.PRITAM SINGH	Engineering	Civil Engineering
<b>Title of Thesis :</b> Prediction of ultimate load carrying capacity of cast-in-situ concrete circular bored pile by artificial neural network model.						
63.	1311006	08.05.17	HARVINDER KAUR	Pritam Singh	Applied Sciences	Physics
The studies of ground state properties of nuclei at drip-lines and super-heavy mass regions of nuclear landscape						

**Item No. 50.04: Amendment in Ph.D. Regulations-2016.**

Council approved the proposed amendments in Ph.D. Regulations 2016.

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16/5/17  
Page 6 of 11



**Item No. 50.05: Academic Calendar Session 2017-18.**

After detailed deliberations, it was decided that there should be two mid term examinations instead of three so that more working days shall be available for teaching. Out of two mid term examinations best shall be considered for internal assessment.

It was also decided that Academic Session shall start from 1<sup>st</sup> working day of July for existing students. The proposed modified Academic Calendar for Session 2017-18 shall be circulated to all the members before finalizing. It was also decided that even semester should start from 2<sup>nd</sup> working day of January.

**Item No. 50.06: Amendment in M. Tech. Regulations.**

The council approved the proposed amendments.

**Item No. 50.07: Golden Chance.**

Council allowed the golden chance to old students who could not complete their degree within stipulated period. It was further decided that the examination for this chance should be held in the University campus only.

It was further decided that a social study should be conducted regarding the detailed socio-academic economic reasons for students appearing in golden chance. On the basis of the study the University should take remedial measures to ameliorate the situation.

**Item No. 50.08: Ph.D. Course work 2016-17.**

Dean (R & D) informed the council that the proposed Ph.D. course work has already been implemented from session 2016-17 with the approval of BOG.

Council noted the item.

**Item No. 50.09: Change of Nomenclature of some UGC (Non-AICTE) courses.**

Council accepted the proposed nomenclature for implementation.



**Agenda for the 66<sup>th</sup> Meeting of the Board of Governors to be held on 15.09.2017 at 10:30 AM in the IKGPTU Mohali Campus, C-102/B, Phase 07, Mohali (Punjab)**

Item No.	Item	Page No.	Annexure
66.1	To confirm the proceedings of 64 <sup>th</sup> & 65 <sup>th</sup> meeting of Board of Governors held on 28.12.2016 and 10.07.2017 respectively.	2	I,II,III-A, III-B
66.2	Action taken report on the proceedings of 64 <sup>th</sup> meeting & 65 <sup>th</sup> meeting of the Board of Governors, IK Gujral Punjab Technical University.	3	-
66.3	To recommend a panel of names for the post of Vice-Chancellor from the panel recommended by the Search Committee nominated by the BOG	4	IV
66.4	Appeal filed by Dr. M.S Saini before Chairman, BOG, IKGPTU against order dated 14.07.2016 passed by Vice Chancellor.	5-6	-
66.5	Approval for hiring of legal retainer	7	V
66.6	To consider and regularize the admission of Zimbabwean student Mr. Thandolwenkosi Pride Ndlouy, Roll no. 1215609, Punjab College of Technical Education Ludhiana affiliated to University	8-10	-
66.7	To approve the minutes of 48 <sup>th</sup> , 49 <sup>th</sup> & 50 <sup>th</sup> meeting of Academic Council held on 27.04.2016, 27.06.2016 & 13.05.2017 respectively	11	VI
66.8	Any other item with the permission of Chair	12	-

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# I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY

Estd. Under Punjab Technical University Act, 1996  
(Punjab Act No. 1 of 1997)

Ref. No. : IKGPTU/Reg/N/

Dated :

## NOTIFICATION

Sub: **Regarding Pre-Ph.D Course work.**

This is for information of all concerned that Pre-Ph.D course work from 2016-17 will be conducted in the IKGPTU main campus Kapurthala in regular mode. The PhD course work will consists of minimum 15 credits. The structure of the course work is as under.

Sr. No.	Nature of course	Name of course	Credits	Remarks
1.	Core	1. Research Methodology	4	The syllabus of RM should be formulated faculty wise such as Engineering, Science, Management/ Humanities and Life sciences
		2. Subject related theory paper	4	Discipline specific related to advancements in theoretical methods for research
		3. Presentation	3	Discipline specific
2.	Interdisciplinary	4. Elective	4	From list of subjects from allied fields
Total Minimum credits			15	

*Sd-*  
Registrar

Endorsement No: IKGPTU/REG/N/ 4244-4251

Dated: 22.08.2016

1. Secretary to Vice Chancellor: For kind information of Vice Chancellor
2. Dean (P&D)
3. Dean (RIC)
4. Dean (Academics)
5. Finance Officer
6. Controller of Examination
7. DR (Computers): For uploading on website
8. File Copy

*[Signature]*  
Registrar

I. K. Gujral Punjab Technical University, Jalandhar  
Jalandhar Kapurthala Highway, Near Pushpa Gujral Science City, Kapurthala - 144 603  
Ph. No. 01822 - 662521. 662501 Fax No. : 01822-255506. 662526. Email : registrar@ptu.ac.in

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**Pre Ph.D. Course in Computer Science Engineering  
Schematic and Syllabus**

Sr. no.	Nature of Course	Name of course	Credits	Remarks
1.	Core	Research Methodology	4	The syllabus of RM should be formulated faculty wise
		Discipline Specific subjects	4	1.Cloud Computing 2. Advanced Concepts in Image Processing 3. Advanced Information Security 4. Modelling and Simulation 5. Data Warehousing and Data Mining 6. Mobile Computing Technologies 7. Network Security and Cryptography 8. Advanced Software Engineering 9. Advanced Computer Architecture 10. Advanced Database systems 11. Advanced Data structure & Algorithms 12. Soft Computing 13. Advanced Operating Systems 14. Big Data Analytics
		Presentation	3	Discipline specific
2.	Interdisciplinary	Elective	4	From list of subjects from allied fields 1. Advanced Data Communication 2. Internetworking 3. Optimization Techniques 4. Adhoc Wireless and Sensor Networks 5. Neural Networks and Fuzzy Logic 6. Mathematical Foundations of Computer Networks
Total Minimum credits			15	

*Principles*

*Sanjay Main*

*Aditya*

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**Paper Title: Research Presentation**

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Research Scholar will have to present a seminar based upon his/her research area. Performance of the scholar and participation in seminar will be taken into consideration.

**Pre Ph.D. Course in Computer Science and Engineering  
Research Methodology**

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1. Introduction Research Methodology: Definition of Research, Need of Research, Concept and steps of Research Methodology , Uses of Research Methodology, Research Techniques. Reviewing Literature: Need, Sources-Primary and Secondary, Purposes of Review, Scope of Review, Steps in conducting review.
  2. Identifying and defining research problem: Locating. Analyzing stating and evaluating problem, Generating different types of hypotheses and evaluating them. Method of Research: Descriptive research design-survey, case study, content analysis, Ex-post Facto Research, Correlational and Experimental Research.
  3. Sampling Techniques : Concept of population and sample' sampling techniques-simple random sampling, stratified random sampling, systematic sampling and cluster sampling, quota sampling techniques determining size of sample. Procedure of data collection: Aspects of data collection, Techniques of data Collection
  4. Statistical Methods of Analysis: Descriptive statistics: Meaning, graphical representations, mean, range and standard deviation, characteristics and uses of normal curve. Inferential statistics: t-test. Chi-square tests. Correlation (rank difference and product moment), ANOVA (one way).
  5. Procedure for writing a research proposal and report: Purpose, types and components of research proposal, Audiences and types of research reports, Format of Research report and journal.
- Case Studies on s/w tools used for research work.

**Books:**

1. C.R. Kothari, "Research Methodology – Methods and Techniques", Wiley Eastern Ltd 2009
2. Richard I. Levin, David S. Rubin, Statistics for Management (7th Edition), Pearson Education India.
3. K. N. Krishnaswamy, Appa Iyer Sivakumar, M. Mathirajan," Management Research Methodology: Integration of Methods and Techniques, Pearson, 2006
4. S.P Gupta,"Statistical Methods", Sultan Chand & Sons, 2006

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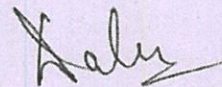
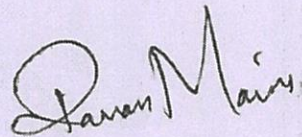
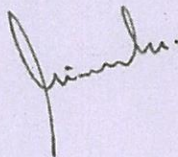
**Pre Ph.D. Course in Computer Science and Engineering  
Cloud Computing**

L	T	P
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1. Cloud Computing Basics: Cloud Computing Overview; Characteristics; Applications; Internet and Cloud; Benefits; Limitations; Challenges.
2. Cloud Computing Services and Deployment Models: Infrastructure as a Service; Platform as a Service; Software as a Service; Private Cloud; Public Cloud; Community Cloud; Hybrid Cloud.
3. Cloud Computing vs Other Computing Technologies: Overview of Grid, Peer-to-Peer, Pervasive and Utility Computing technologies; their characteristics and comparison between them.
4. Accessing the Cloud: Hardware and Infrastructure requirements; Access Mechanisms: Web Applications, Web APIs, Web Browsers. Cloud Storage and Cloud Standards: Overview; Storage as a Service; Cloud Storage Issues; Challenges; Standards.
5. Security Issues: Securing the Cloud, Securing Data, Establishing identity and presence. Developing Applications: Major Players in Cloud Business; Overview of Service Oriented Architecture; Tools for developing cloud services and applications.
6. Introduction to Google App Engine, Azure Services Platform, Amazon EC2, Amazon S3. Migrating to the Cloud: Overview; Issues; Approaches.

**Books**

1. Anthony T. Velte, Toby J. Velte, and Robert Elsenpeter, Cloud Computing: A Practical Approach, McGraw Hill, 2010.
2. Rajkumar Buyys, James Broberg, Andrzej Goscinski (Editors), Cloud Computing: Principles and Paradigms, Wiley, 2011.
3. Barrie Sosinsky, Cloud Computing Bible, Wiley, 2011.
4. Judith Hurwitz, Robin Bloor, Marcia Kaufman, Fern Halper, Cloud Computing for Dummies, Wiley, 2010.
5. Borko Furht, Armando Escalante (Editors), Handbook of Cloud Computing, Springer, 2010.
6. Dimitris N. Chorafas, CRC Press, Taylor and Francis Group, 2011.



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## Pre Ph.D. Course in Computer Science and Engineering

### Advanced Concepts in Image Processing

L	T	P
4	0	0

1. Introduction to Image Processing: Introduction to Digital Image Processing, Examples and Components of Digital Image Processing, Digital Image fundamentals: Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and Quantization, Basic Relationships Between Pixels, Linear And Nonlinear Operations, Color Models.
2. Image Enhancements and Restoration: Gray Level Transformations, Histogram Processing, Enhancement Using Spatial Filtering: Smoothing Filters, Sharpening Filters, Image Enhancement in the frequency domain: Introduction to the Fourier Transform, Smoothing filters, Sharpening Filters, Homomorphic Filtering, Image Restoration : Image Degradation/ Restoration Process, Noise Models, Periodic Noise Reduction by Frequency Domain filtering, Linear, Position-Invariant Degradations, Estimating the degradation Function, Inverse Filtering, Minimum Mean Square Error(Wiener)Filtering, Constrained Least Squares Filtering, Morphological Image Processing.
3. Image Compression and wavelets: fundamentals, image compression models, elements of information theory, error free compression lossy compression, image compression standards, Color Fundamentals, Wavelets and multiresolution processing: multiresolution expansions, wavelets transforms in one dimension, the fast wavelet transform, wavelets transforms in two dimensions, wavelet packets.
- Image Segmentation, Recognition and Analysis: Image Segmentation : Detection of 4. Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region- Based Segmentation, Representation and Description :Boundary descriptors, Regional Descriptors, Use of Principal Components for Description, Relational Descriptors, Object Recognition : Patterns and Pattern Classes, Recognition Based on Decision- Theoretic Methods, Structural Methods. Case studies on research areas related to image processing.

#### Books:

1. Gonzalez and Woods, "Digital Image Processing" ISDN 0-201-600-781, Addison Wesley 1992.
2. Trucco & Verri, "Introductory techniques for 3-D Computer Vision", Prentice Hall.
3. Jain, A.K. Kasturi and Scunk, "Fundamental of Digital Image Processing", Tata McGraw-Hill 1995.
4. Sonka, Hlavac, Boyle. "Image Processing, Analysis and Machine Vision" 2nd ed. PWS Publishing, 1999.
5. Madhuri A. Joshi, "Digital Image Processing: An Algorithmic Approach ", PHI learning private limited.
6. S. Jayaraman, S.Esakkirajan, T. Veerakumar, " Digital Image Processing", Tata McGraw Hill, 2010

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**Pre Ph.D. Course in Computer Science and Engineering  
Advanced Information Security**

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1. Introduction to Security/Security Models: Introduction to Computer Security, Threats , Security Policy , Formal Model and Mechanism ,Security Trends , Security Attacks, Trust and assurance , Confidentiality and Integrity Model, Lattice Model ,Bell-LaPadulla Model , Access Control Matrix Model ,HRU Model, Integrity Model , Biba Integrity Model , Clark Wilson Model , Originator Controlled Access Control, Role based Access Control, Study of Emerging Access Control Models.
2. Cryptography and Cryptosystem: Cryptography, Classical Cryptosystems, DES , AES, Computational vs. Unconditional (or Information-Theoretic) Security; One-Way Functions and Hash Functions; Design Principles; Examples: MD5, Secure Hash Algorithm (SHA-1), etc.; Hashing with Block Ciphers; MACs from Hash Functions , Public-Key Cryptography , Trapdoor Functions; Fast Exponentiation; Square-and-Multiply Algorithm; Diffie-Hellman Key Agreement Protocol, Status of Security; Rivest-Shamir-Adleman (RSA) System , Elliptic Curve Cryptosystems , Discrete Logarithm Algorithms , Digital Signatures; Digital Signatures Based on Discrete Logarithms, Public-Key Certificates; Key Management Protocol. X.509.PGP, Study of Emerging Cryptography Techniques .
3. Intrusion detection and prevention models for network security: Intrusion Detection, Models, Architecture, NIDS, HIDS, Network Security , Network Security Attacks, Applications of Cryptography in Network Security; Encryption at Different OSI-Layers; Code Based Vulnerabilities, Policy Deployment in Network
4. Study of Emerging Intrusion Detection and Prevention Techniques , Protection in general purpose operating systems , Data base protection and security. Assurance and Trust, Building Secure and Trusted Systems, Software Design Assurance, Formal Methods, Formal Specification and Verification , Formal Specification Languages, Evaluation System Criteria . TCSEC , ITSEC , Common Criteria, Disaster Recovery and Business Continuity, Organisational Policies , Risk Management.

**Book**

1. Bishop, Matt: Introduction to Computer Security. Addison-Wesley, Pearson Education, Inc.
2. William Stallings, " Cryptography and Network Security Principles and Practice", 2/e, Pearson Education.
3. Michael. E. Whitman and Herbert J. Mattord , " Principles of Information Security" .
4. William Stallings, "Network Security Essentials, Applications and Standards", Pearson Education.
5. J Pieprzyk, Thomas and Jennifer, "Fundamental of Computer Security", Springer.
6. Arthur and White, "Principles of Computer Security", Tata Mcgraw Hill.

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*Aminder*  
*Raman Mairi*



**Pre Ph.D. Computer Science and Engineering  
Modelling and Simulation**

L	T	P
4	0	0

1. Introduction: What is modeling and simulation? Application areas, definition and types of system, model and simulation, introduction to discrete-event and continuous simulation.
2. Simulation Methods: Discrete-event Simulation, Time advance Mechanisms, Components and organization of Discrete-event simulation, Flowchart of next-event time advance approach, Continuous Simulation, Random Number generation methods.
3. Queuing Models: Single server queuing system, introduction to arrival and departure time, flowcharts for arrival and departure routine. Event graphs of queuing model. Determining the events and variables.
4. Distribution Functions: Stochastic activities, Discrete probability functions, Cumulative distribution function, Continuous probability functions. Generation of random numbers following binomial distribution, poisson distribution, continuous distribution, normal distribution, exponential distribution, uniform distribution.
5. Programming in MATLAB: Introduction, Branching statements, loops, functions, additional data types, plots, arrays, inputs/outputs etc.
6. Programming in GPSS and C/C++: Basic Introduction to Special Simulation Languages: GPSS and Implementation of Queuing Models using C/C++.
7. Introduction to Simulators: Introduction regarding features and usage of any Network simulator.

**Books:**

1. Averill M. Law and W. David Kelton, "Simulation Modeling and Analysis", Tata McGraw-Hill Publication.
2. Geoffrey Gordon, "System Simulation", Prentice-Hall of India.
3. D.S. Hira, "System Simulation", S. Chand Publications
4. Stephen J. Chapman, "MATLAB Programming for Engineers", Thomson learning inc.
5. Jerry Banks, John S. Carson, Barry L. Nelson and David M. Nicol, "Discrete-Event System Simulation", Prentice-Hall of India.

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**Pre Ph.D. Course in Computer Science and Engineering**  
**Data Warehousing and Data Mining**

L	T	P
4	0	0

1. Introduction: Introduction to RDBMS, Data Warehouse, Transactional Databases, Data Mining Functionalities, Interestingness of pattern, classification of data mining system, major issues.
2. Data Warehouse and OLAP: Difference from traditional databases, Multidimensional data model, Schema for Multi dimensional model, measures, concept hierarchies, OLAP operations, star and snowflake query model, Data Warehouse architecture, ROLAP, MOLAP, HOLAP, Data Warehouse Implementation, Data Cube, Metadata Repositories, OLAP.
3. Data Processing: Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and concept hierarchy generation.
4. Data Mining Architecture: Data Mining primitives, Task relevant data, interestingness measures, presentation and visualization of patterns, Data Mining Architecture, Concept Description, Data Generalization and Summarization, Attributed oriented induction, Analytical characterization, Mining class comparisons.
5. Association Rules: Association rules mining, Mining Association rules from single level, multilevel transaction databases, multi dimensional relational databases and data warehouses, Correlational analysis, Constraint based association mining.
6. Classification and Clustering: Classification and prediction, Decision tree induction, Bayesian classification, k-nearest neighbour classification, Cluster analysis, Types of data in clustering, categorization of clustering methods.

**Books:**

1. Data Mining: Concepts and Techniques By J.Han and M. Kamber, Morgan Kaufman publishers, Harcourt India pvt. Ltd. Latest Edition
2. Data Mining Introductory and Advance Topics By Dunham, Pearson Education, Latest Edition

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*Handwritten signature: Daman Maini*

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**Pre Ph.D. Course in Computer Science and Engineering  
Mobile Computing Technologies**

L	T	P
4	0	0

1. Introduction to Mobile Computing Architecture Mobile Computing – Middleware and Gateways – Application and Services – Developing Mobile Computing Applications – Security in Mobile Computing – Architecture for Mobile Computing – Three Tier Architecture – Design considerations for Mobile Computing – Mobile Computing through Internet – Making existing Applications Mobile Enabled. Cellular Technologies: GSM, GPS, GPRS, CDMA and 3G Bluetooth – Radio Frequency Identification – Wireless Broadband – Mobile IP – Internet Protocol Version 6 (IPv6) – Java Card – GSM Architecture – GSM Entities – Call Routing in GSM – PLMN Interfaces – GSM addresses and Identifiers – Network aspects in GSM – Authentication and Security – Mobile computing over SMS – GPRS and Packet Data Network – GPRS Network Architecture – GPRS Network Operations – Data Services in GPRS – Applications for GPRS – Limitations of GPRS.
2. Wireless Application Protocol (WAP) and Wireless LAN WAP – MMS – Wireless LAN Advantages – IEEE 802.11 Standards – Wireless LAN Architecture – Mobility in wireless LAN Intelligent Networks and Interworking Introduction – Fundamentals of Call processing – Intelligence in the Networks – SS#7 Signaling.
3. Client Programming, Palm OS, Symbian OS, Win CE Architecture Introduction – Moving beyond the Desktop – A Peek under the Hood: Hardware Overview – Mobile phones – PDA – Design Constraints in Applications for Handheld Devices – Palm OS architecture – Application Development – Multimedia – Symbian OS Architecture – Applications for Symbian, Different flavors of Windows CE -Windows CE Architecture J2ME JAVA in the Handset – The Three-prong approach to JAVA Everywhere – JAVA 2 Micro Edition (J2ME) technology – Programming for CLDC – GUI in MIDP – UI Design Issues.
4. Voice over Internet Protocol and Convergence Voice over IP- H.323 Framework for Voice over IP – Session Initiation Protocol – Comparison between H.323 and SIP – Real Time protocols – Convergence Technologies – Call Routing – Voice over IP Applications – IP multimedia subsystem (IMS) – Mobile VoIP Security Issues in Mobile Computing.

- BOOKS: 1. Mobile Computing – Technology, Applications and Service Creation – Asoke K Talukder, Roopa R Yavagal, 2009, TATA McGraw Hill
2. Mobile Communications – Jochen Schiller – 2nd Edition – Pearson Education
3. The CDMA 2000 System for Mobile Communications – Vieri Vaughi, Alexander Damn Jaonvic – Pearson
4. ADALESTEIN : Fundamentals of Mobile & Parvasive Computing, 2008, TMH.

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**Pre Ph.D. Course in Computer Science and Engineering  
Network Security and Cryptography**

L	T	P
4	0	0

1. Introduction: Attacks, Services and Mechanisms, Security attacks, Security services, A Model for Internetwork security. Classical Techniques: Conventional Encryption model, Steganography, Classical Encryption Techniques.
2. Modern Techniques: Simplified DES, Block Cipher Principles, Data Encryption standard, Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles and Modes of operations. Algorithms: Triple DES, International Data Encryption algorithm, Blowfish, RC5, CAST-128, RC2, Characteristics of Advanced Symmetric block ciphers. Conventional Encryption: Placement of Encryption function, Traffic confidentiality, Key distribution, Random Number Generation. Public Key Cryptography: Principles, RSA Algorithm, Key Management, Diffie-Hellman Key exchange, Elliptic Curve Cryptography.
3. Number theory: Prime and Relatively prime numbers, Modular arithmetic, Fermat's and Euler's theorems, Testing for primality, Euclid's Algorithm, the Chinese remainder theorem, Discrete logarithms. Message authentication and Hash functions: Authentication requirements and functions, Message Authentication, Hash functions, Security of Hash functions and MACs.
4. Hash and Mac Algorithms: MD File, Message digest Algorithm, Secure Hash Algorithm, RIPEMD-160, HMAC. Digital signatures and Authentication protocols: Digital signatures, Authentication Protocols, Digital signature standards. Authentication Applications: Kerberos, X.509 directory Authentication service. Electronic Mail Security: Pretty Good Privacy, S/MIME.
5. IP Security: Overview, Architecture, Authentication, Encapsulating Security Payload, Combining security Associations, Key Management. Web Security: Web Security requirements, Secure sockets layer and Transport layer security, Secure Electronic Transaction. Intruders, Viruses and Worms : Intruders, Viruses and Related threats. Fire Walls : Fire wall Design Principles, Trusted systems.

**BOOK:**

1. Cryptography and Network Security: Principles and Practice - William Stallings, 2000, PE.
2. Principles of Network and Systems Administration, Mark Burgess, John Wielly.

*Sanam Maini*

*Kalish*  
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**Pre Ph.D. Course in Computer Science and Engineering  
Advanced Software Engineering**

L	T	P
4	0	0

1. Software Project Management: Software Project Planning and its characteristics, Types of metrics, Effort Estimation- FP, LOC, FP vs. LOC, Schedule & Cost Estimation Models- Activity Networks-PERT/CPM, COCOMO-I, COCOMO-II, Risk Assessment- Probability Matrix, Risk Management. Agile Methodology- Scrum and XP. Formal Methods: Basic concepts, mathematical preliminaries, Applying mathematical notions for formal specification, Formal specification languages, using Z to represent an example software component, the ten commandments Of formal methods, Formal methods- the road ahead.
2. Component-Based Software Engineering: CBSE process, Domain engineering, Componentbased development, Classifying and retrieving components and economics of CBSE. Client/Server Software Engineering: Structure of client/server systems, Software engineering for Client/Server systems, Analysis modeling issues, Design for Client/Server systems, Testing issues
3. Web Engineering: Attributes Of web-based applications, the Web E process, a framework for Web E. Formulating, Analysing web-based systems, design and testing for web-based applications, Management issues. Reengineering: Business process reengineering, Software reengineering, Reverse reengineering, Restructuring, Forward reengineering, economics of reengineering.
4. Software Quality: CASE tools, metrics, Standards, Certification and Assessment. TQM. Bootstrap methodology, The SPICE project, ISO-IEC 15504, Six Sigma Concept for Software Quality. Computer-Aided Software Engineering: Building Blocks for CASE, taxonomy Of CASE tools, integrated CASE environments, Integration architecture, and CASE repository.

**Books**

1. Software Engineering a Practitioners Approach, Roger S. Pressman, McGraw-Hill 8<sup>th</sup> Edition, 2014
2. Formal Specification and Documentation testing - A Case Study Approach, J.Bowan , International Thomson Computer Press, 2003
3. Software Engineering for Embedded Systems: Methods, Practical and Applications, Robert Oshana, Mark Kraeling, Newnes Publisher, 2013
4. Software engineering an engineering approach, James S. Peters, WitoldPedrycz, Wiley India, 2011.
5. Software Engineering Principles and Practice, Hans Van Vliet, Yded (WILEY), 2015.

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**Pre Ph.D. Course in Computer Science and Engineering  
Advanced Computer Architecture**

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1. Fundamentals of Processors: Instruction set architecture; single cycle processors, hardwired and micro-coded FSM processors; pipelined processors, multi-core processors; resolving structural, data, control and name hazards; analyzing processor performance.
2. Fundamentals of Memories: memory technology; direct-mapped, associative cache; write-through and write-back caches; single-cycle, FSM, pipe-lined cache; Analyzing memory performance.
3. Advanced Processors: Superscalar execution, out-of-order execution, register renaming, memory disambiguation, dynamic instruction scheduling, branch prediction, speculative execution; multithreaded, VLIW and SIMD processors.
4. Advanced Memories: non-blocking cache memories; memory protection, translation and virtualization; memory synchronization, consistency and coherence.

**Books:**

1. Computer Architecture: A Quantitative Approach, by J.L Hennessy and D.A Patterson.
2. Digital Design and Computer Architecture, by D.M Harris and S.L Harris.

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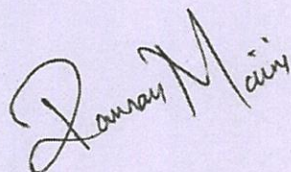
**Pre Ph.D. Course in Computer Science and Engineering  
Advanced Database Systems**

L	T	P
4	0	0

1. Data Base Analysis and Design Techniques: Review of basic Database Concepts, Database Design Methodologies. ER Modeling: Specialization, Generalization, Aggregation, Normalization Theory. Database Implementation using UML: Introduction to UML, Structure diagrams, behavioral diagrams, object oriented analysis, class diagram. Advanced Transaction Processing and Concurrency Control: Transaction Concepts, Concurrency Control: Locking Methods, Timestamping Methods, Optimistic Methods for Concurrency Control. Concurrency Control in Distributed Systems.
2. Query Compiler: Introduction, parsing, generating logical query plan from parse tree. Query Processing: Physical-Query-plan Operators. Operations: selection, sorting, join, project, set. Query Evaluation: Introduction, Approaches to Query Evaluation. Transformation of relational expressions in Query optimization, heuristic optimization, cost estimation for various operations, transformation rule.
3. Distributed Database Centralized DBMS and Distributed DBMS, functions and architecture of a DDBMS, Distributed Data Storage, Transparency issues in DDBMS, Query Processing DDBMS, Distributed transaction Management and Protocols, Distributed Concurrency Control and Deadlock Management. Object Oriented Database: Limitations of RDBMS, Need of Complex Datatype, Data Definition, ODBMS Fundamentals, issues in OODBMS, Object-oriented database design. Comparison of ORDBMS and OODBMS.
4. Emerging Database Models, Technologies and Applications Multimedia database-Emergence, Temporal Databases, difference from other data types, structure, deductive databases, GIS and spatial databases, Knowledge database, Information Visualization, Wireless Networks and databases, Personal database, Digital libraries, web databases, case studies of the emerging databases.

**Books:**

1. Distributed Databases by Ozsu and Valduriez, Pearson Education.
2. Fundamentals of Database Systems by RamezElmasri, ShamkantNavathe, Pearson Education
3. Database System Concepts by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Tata McGraw-Hill.
4. Advanced database management system by RiniChkrabarti and ShibhadraDasgupta, Dreamtech.
5. An Introduction to Database Systems, C J Date, Addison Wesley Publishing Company.
6. An Introduction to Data Systems, Bipin C. Desai, West Publishing Company.



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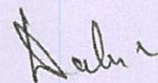
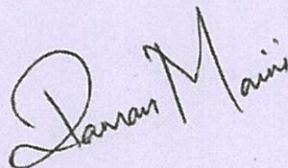
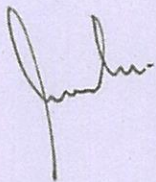
**Pre Ph.D. Course in Computer Science and Engineering**  
**Advanced Data Structures & Algorithms**

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1. Algorithms Complexity and Analysis: Recurrence Relations, Probabilistic Analysis, Amortized Analysis, Competitive Analysis, Internal and External Sorting algorithms: Quick Sort, Heap Sort, Merge Sort, Counting Sort, Bin Sort, Multi-way merge sort, Polyphase merging, Search: Linear, Binary, Hashing, Advanced Data Structures: AVL Trees, Red-Black Trees, Splay Trees, B-trees, Fibonacci heaps,
2. Data Structures for Disjoint Sets, Augmented Data Structures.
3. Graphs & Algorithms: Representation, Type of Graphs, Paths and Circuits: Euler Graphs, Hamiltonian Paths & Circuits; Cut-sets, Connectivity and Separability, Planar Graphs, Isomorphism, Graph Coloring, Covering and Partitioning, Depth- and breadth-first traversals.
4. Minimum Spanning Tree: Prim's and Kruskal's algorithms, Shortest-path Algorithms: Dijkstra's and Floyd's algorithm, Topological sort, Max flow: Ford-Fulkerson algorithm, max flow – min cut problem.
5. String Matching Algorithms: Suffix arrays, Suffix trees, Rabin-Karp, Knuth-Morris-Pratt, Boyer-Moore.
6. Approximation algorithms: Need of approximation algorithms: Introduction to P, NP, NP-Hard and NP-Complete; Deterministic, non-Deterministic Polynomial time algorithms; Knapsack, TSP, Set Cover, Open Problems.
7. Randomized Algorithms: Introduction, Type of Randomized Algorithms, Quick Sort, Min-Cut, 2-SAT; Game Theoretic Techniques, Random Walks.

**Books:**

1. Thomas Cormen, "Introduction to Algorithms", Third edition, Prentice Hall of India (2009).
2. Kleinberg J., Tardos E., "Algorithm Design", 1st Edition, Pearson, 2012.
3. Motwani R., Raghavan P., "Randomized Algorithms", Cambridge University Press, 1995.
4. Vazirani, Vijay V., "Approximation Algorithms", Springer, 2001.



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**Pre Ph.D. Course in Computer Science and Engineering  
Soft Computing**

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1. Soft Computing: An introduction. Artificial Neural Network: An introduction, Supervised Learning Network: Perceptron Networks, Adaptive Linear Neuron, Multiple Adaptive Linear Neuron, Back Propagation Network and other networks, Associative memory networks, Unsupervised Learning Networks.

2. Fuzzy Logic: Introduction to Fuzzy logic, Classical Sets and Fuzzy Sets, Classical Relations and Fuzzy Relations, Membership functions, Defuzzification, Fuzzy Arithmetic and Fuzzy measures, Fuzzy Rule base and approximate reasoning, Fuzzy decision making

3. Genetic Algorithm: An introduction, Traditional Optimization and Search Techniques, GA and Search Space, General GA, Operators in GA, Stopping Condition and GA flow. Constraints in GA, Classification of GA, Genetic Programming.

4. Hybrid Soft Computing Techniques: An Introduction, Neuro-Fuzzy Hybrid Systems, Genetic Neuro-Hybrid systems, Genetic fuzzy Hybrid and fuzzy genetic hybrid systems.

**Books:**

1. Principals of Soft Computing by Sivanandam and S. N. Deepa, Wiley Publication.
2. NEURAL NETWORKS, FUZZY LOGIC AND GENETIC ALGORITHM: SYNTHESIS AND APPLICATIONS By S. RAJASEKARAN, G. A. VIJAYALAKSHMI, PHI.
3. Introduction to Soft Computing By Samir Roy and Udit Chakraborty, Pearson.

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**Pre Ph.D. Course in Computer Science and Engineering  
Advanced Operating Systems**

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1. Distributed operating system: Architectures, Issues in Distributed operating systems, Limitations of Distributed Systems, Lamport's logical clock, Global states, Chandy-Lamport's global state recording algorithm, Basic concepts of Distributed Mutual Exclusion, Lamport's Algorithm, RicartAgrawala Algorithm; Basic concepts of Distributed deadlock detection, Distributed File system, Architecture, Design issues, SUN Network File system
2. Basic concepts of Distributed shared memory, Basic concepts of Distributed Scheduling, Load balancing, Load sharing, Distributed Resource Management: Distributed File systems, Architecture, Mechanisms, Design Issues, Distributed Shared Memory, Architecture, Algorithm, Protocols - Design Issues, Distributed Scheduling, Issues, Components, Algorithms, Distributed OS Implementation: Models, Naming, Process migration, Remote Procedure Calls.
3. Failure Recovery and Fault Tolerance: Basic Concepts-Classification of Failures, Basic Approaches to Recovery; Recovery in Concurrent System; Synchronous and Asynchronous Checkpointing and Recovery; Check pointing in Distributed Database Systems; Fault Tolerance; Issues - Two-phase and Nonblocking Commit Protocols; Voting Protocols; Dynamic Voting Protocols
4. Multiprocessor System: Definition, Classification, Multiprocessor Interconnections, Types, Multiprocessor OS functions & requirements; Design & Implementation Issue; Introduction to parallel programming; Multiprocessor Synchronization. Real Time Operating systems: Fundamentals of real time operating systems, real time multitasking, embedded application, preemptive task scheduling, inter-task communication and synchronization. Analytic Modeling: Introductions, Queuing Theory, Markov Process.

**Books:**

1. Operating Systems Concepts & design-Milan Milenkovic, TMH
2. Operating System- H.M. Deitel, Pearsons.
3. Advanced Concepts in operating Systems-Mukesh Singhal and Niranjan G. Shivaratri, TMH
4. Mukesh Singhal and N. G. Shivaratri, "Advanced Concepts in Operating Systems", McGraw- Hill, 2000
5. Abraham Silberschatz, Peter B. Galvin, G. Gagne, "Operating System Concepts", Sixth Addison n Wesley Publishing Co., 2003.

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**Pre Ph.D. Course in Computer Science and Engineering  
Big Data Analytics**

L	T	P
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1. An Overview of Big Data and Big Data Analytics. Understanding Hadoop Ecosystem (Hadoop Distributed File System, MapReduce, Hadoop YARN, HBase, Combining HBase and HDFS, Hive, Pig, Sqoop, ZooKeeper, Flume, Oozie). MapReduce Framework. Techniques to Optimize MapReduce Jobs, Role of HBase in Big Data Processing
2. Developing Simple MapReduce Application, Points to Consider while Designing MapReduce. Controlling MapReduce Execution with InputFormat, Reading Data with Custom RecordReader, Organizing Output Data with OutputFormats, Customizing Data with RecordWriter, Optimizing MapReduce Execution with Combiner, Controlling Reducer Execution with Partitioners.
3. YARN Architecture, Working of YARN, YARN Schedulers, Backward Compatibility with YARN, YARN Configurations, Commands, Containers. Introduction to NoSQL. Types of NoSQL Data Models, Schema-Less Databases, Materialized Views, Distribution Models.
4. Analytical Approaches, Introducing to various Analytical Tools, Installing R, Handling Basic Expressions in R, Variables in R, Working with Vectors, Storing and Calculating Values in R, Creating and Using Objects, Interacting with Users, Handling Data in R Workspace, Executing Scripts, Reading Datasets and Exporting Data from R, Manipulating and Processing Data in R, Working with Functions and Packages in R, Performing Graphical Analysis in R, Techniques Used for Visual Data Representation, Types of Data Visualization

**Books:**

1. Big Data, Black Book by DT Editorial Services, Dreamtech Press.
2. Big Data Computing and Communications edited by Yu Wang, Hui Xiong, Shlomo Argamon, XiangYang Li, JianZhong Li, Springer
3. Big Data Analytics Beyond Hadoop by Vijay Srinivas Agneeswaran, FT Press.

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## Inter Disciplinary course

### Pre Ph.D. Course in Computer Science and Engineering Advanced Data Communication

L	T	P
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1. Digital Modulation: Introduction, Information Capacity Bits, Bit Rate, Baud, and M-ARY Coding, ASK, FSK, PSK, QAM, BPSK, QPSK, 8PSK, 16PSK, 8QAM, 16QAM, DPSK – Methods, Band Width Efficiency, Carrier Recovery, Clock Recovery.
2. Basic Concepts of Data Communications, Interfaces and Modems: Data Communication Components, Networks, Distributed Processing, Network Criteria- Applications, Protocols and Standards, Standards Organizations- Regulatory Agencies, Line Configuration- Point-to-point Multipoint, Topology- Mesh- Star- Tree- Bus- Ring- Hybrid Topologies, Transmission Modes Simplex- Half duplex- Full Duplex, Categories of Networks- LAN, MAN, WAN and Internetworking, Digital Data Transmission- Parallel and Serial, DTE- DCE Interface- Data Terminal Equipment, Data Circuit- Terminating Equipment, Standards EIA 232 Interface, Other Interface Standards, Modems- Transmission Rates.
3. Error Detection and Correction: Types of Errors- Single- Bit Error, CRC (Cyclic Redundancy Check)- Performance, Checksum, Error Correction- Single-Bit Error Correction, Hamming Code. Data link Control: Stop and Wait, Sliding Window Protocols. Data Link Protocols: Asynchronous Protocols, Synchronous Protocols, Character Oriented Protocol- Binary Synchronous Communication (BSC) - BSC Frames- Data Transparency, Bit Oriented Protocols – HDLC, Link Access Protocols.
4. Switching: Circuit Switching- Space Division Switches- Time Division Switches- TDM Bus Space and Time Division Switching Combinations- Public Switched Telephone Network, Packet Switching, Circuit Switched Versus Virtual Circuit Connection, Message Switching.
5. Multiplexing: Time Division Multiplexing (TDM), Synchronous Time Division Multiplexing, Digital Hierarchy, Statistical Time Division Multiplexing. Multiple Access: Random Access, Aloha- Carrier Sense Multiple Access (CSMA)- Carrier Sense Multiple Access with Collision Detection (CSMA)- Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA), Controlled Access- Reservation- Polling- Token Passing, Channelization- Frequency- Division Multiple Access (FDMA), Time - Division Multiple Access (TDMA), - Code - Division Multiple Access (CDMA).

#### BOOKS:

1. Data Communication and Computer Networking - B. A. Forouzan, 3rd ed., 2008, TMH.
2. Advanced Electronic Communication Systems - W. Tomasi, 5 ed., 2008, PEI.
3. Data Communications and Computer Networks - Prakash C. Gupta, 2006, PHI.
4. Data and Computer Communications - William Stallings, 8<sup>th</sup> ed., 2007, PHI.
5. Data Communication and Tele Processing Systems - T. Housely, 2<sup>nd</sup> Edition, 2008, BSP.
6. Data Communications and Computer Networks- Brijendra Singh, 2<sup>nd</sup> ed., 2005, PHI.
7. Telecommunication System Engineering – Roger L. Freeman, 4<sup>th</sup> ed., Wiley-Interscience, John Wiley & Sons, 2004.

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## Inter Disciplinary course

### Pre Ph.D. Course in Computer Science and Engineering Internetworking

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1. Internetworking concepts: Principles of Internetworking, Connectionless Internetworking, Application level Interconnections, Network level Interconnection, Properties of the Internet, Internet Architecture, Wired LANS, Wireless LANS, Point-to-Point WANS, Switched WANS, Connecting Devices, TCP/IP Protocol Suite. IP Address: Classful Addressing: Introduction, Classful Addressing, Other Issues, Sub-netting and Super-netting IP Address: Classless Addressing: - Variable length Blocks, Sub-netting, Address Allocation. Delivery, Forwarding, and Routing of IP Packets: Delivery, Forwarding, Routing, Structure of Router. ARP and RARP: ARP, ARP Package, RARP.
2. Internet Protocol (IP): Datagram, Fragmentation, Options, Checksum, IP V.6. Transmission Control Protocol (TCP): TCP Services, TCP Features, Segment, A TCP Connection, State Transition Diagram, Flow Control, Error Control, Congestion Control. TCP Times. Stream Control Transmission Protocol (SCTP): SCTP Services, SCTP Features, Packet Format, Flow Control, Error Control, Congestion Control. Mobile IP: Addressing, Agents, Three Phases, Inefficiency in Mobile IP. Classical TCP Improvements: Indirect TCP, Snooping TCP, Mobile TCP, Fast Retransmit/ Fast Recovery, Transmission/ Time Out Freezing, Selective Retransmission, Transaction Oriented TCP.
3. Unicast Routing Protocols (RIP, OSPF, and BGP): Intra and Inter-domain Routing, Distance Vector Routing, RIP, Link State Routing, OSPF, Path Vector Routing, BGP. Multicasting and Multicast Routing Protocols: Unicast - Multicast- Broadcast, Multicast Applications, Multicast Routing, Multicast Link State Routing: MOSPF, Multicast Distance Vector: DVMRP.
4. Domain Name System (DNS): Name Space, Domain Name Space, Distribution of Name Space, and DNS in the internet. Remote Login TELNET:- Concept, Network Virtual Terminal (NVT). File Transfer FTP and TFTP: File Transfer Protocol (FTP). Electronic Mail: SMTP and POP. Network Management-SNMP: Concept, Management Components. World Wide Web- HTTP Architecture. Multimedia: Digitizing Audio and Video, Network security, security in the internet firewalls. Audio and Video Compression, Streaming Stored Audio/Video, Streaming Live Audio/Video, Real-Time Interactive Audio/Video. RTP, RTCP, Voice Over IP. Network Security, Security in the Internet, Firewalls.

#### BOOKS:

1. TCP/IP Protocol Suite- Behrouz A. Forouzan, Third Edition, TMH.
2. Internetworking with TCP/IP Comer 3rd edition PHI.
3. High performance TCP/IP Networking- Mahbub Hassan, Raj Jain, PHI, 2005
4. Data Communications & Networking – B.A. Forouzan – 2<sup>nd</sup> Edition – TMH
5. High Speed Networks and Internets- William Stallings, Pearson Education, 2002.



Inter Disciplinary course

Pre Ph.D. Course in Computer Science and Engineering  
Optimization Techniques

L	T	P
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1. Introduction to Optimization Techniques. Origin & development of O.R., Nature & Characteristic, features of O.R., Models & Modeling in Operation Research. Methodology of O.R.
2. Linear Programming - Mathematical Model, Assumptions of Linear Programming, Graphical Method, Principles of Simplex method and its Applications, Two Phase & Big M-method, Revised simplex method, Duality, Dual simplex method- Primal Dual Relationship and sensitivity analysis.
3. Linear Programming: Mathematical formation of linear programming problem, Special types of linear programming problems -Transportation and assignment problems, Unbalanced Assignment problems, Crew based assignment problems, Test for Optimality, Degeneracy in Transportation Problems, Unbalanced Transportation Problems.
4. Definition of Probability, Sample Space, Algebra of Events, Addition and multiplication law of probability, Conditional Probability. Dynamic Programming-Features and applications of dynamic programming.
5. Decision Theory, Integer Programming, Gomory Method and Branch & Bound Method.

Books:

1. Kapoor, V.K.: Operation Research, Sultan Chand & Co., New Delhi.
2. Man Mohan, Gupta P.K.: Operation Research, Sultan Chand & Co., New Delhi.
3. Ponsen, Richard: Theory and Problems of Operation Research, McGraw Hill, 1983.
4. Hiller, F.S. & Liberman, G.J., 1974: Introduction to Operations Research, 2nd Edn. Holden
5. Rao, S. S., 1978: Introduction to Optimization: Theory & Applications, Wiley Eastern.
6. Srinath, L.S.: Linear Programming, East-West, New Delhi.

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Inter Disciplinary course

Pre Ph.D. Course in Computer Science and Engineering  
Adhoc Wireless and Sensor Networks

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4	0	0

1. AD HOC Wireless Networks: Introduction, Issues in Ad Hoc Wireless Networks, AD Hoc Wireless Internet. MAC Protocols for Ad Hoc Wireless Networks: Introduction, Issues in Designing a MAC protocol for Ad Hoc Wireless Networks, Design goals of a MAC Protocol for Ad Hoc Wireless Networks, Classifications of MAC Protocols, Contention - Based Protocols, Contention - Based Protocols with reservation Mechanisms, Contention - Based MAC Protocols with Scheduling Mechanisms.

2. ROUTING PROTOCOLS: Introduction, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classification of Routing Protocols, Table -Driven Routing Protocols, On - Demand Routing Protocols, Hybrid Routing Protocols, Routing Protocols with Efficient Flooding Mechanisms, Hierarchical Routing Protocols, Power - Aware Routing Protocols. Transport layer and Security Protocols: Introduction, Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks, Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer Solutions, TCP Over Ad Hoc Wireless Networks, Other Transport Layer Protocol for Ad Hoc Wireless Networks.

3. QUALITY OF SERVICE: Introduction, Issues and Challenges in Providing QoS in Ad Hoc Wireless Networks, Classification of QoS Solutions, MAC Layer Solutions, Network Layer Solutions, QoS Frameworks for Ad Hoc Wireless Networks. ENERGY MANAGEMENT: Introduction, Need for Energy Management in Ad Hoc Wireless Networks, Classification of Ad Hoc Wireless Networks, Battery Management Schemes.

4. WIRELESS SENSOR NETWORKS: Introduction, Sensor Network Architecture, Data Dissemination, Data Gathering, MAC Protocols for Sensor Networks, Location Discovery, Quality of a Sensor Network, Evolving Standards, Other Issues.

BOOKS: 1. Ad Hoc Wireless Networks: Architectures and Protocols - C. Siva Ram Murthy and B.S.Manoj, 2004, PHI.

2. Wireless Ad- hoc and Sensor Networks: Protocols, Performance and Control Jagannathan Sarangapani, CRC Press.

3. Ad- Hoc Mobile Wireless Networks: Protocols & Systems, C.K. Toh ,1 ed. Pearson Education.

4. Wireless Sensor Networks - C. S. Raghavendra, Krishna M. Sivalingam, 2004, Springer

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S. Raghavendra

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**Inter Disciplinary course**

**Pre Ph.D. Course in Computer Science and Engineering  
Neural Networks and Fuzzy Logic**

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4	0	0

1. Fundamentals of Neural Networks: Introduction, Biological Neurons and Memory, Structure & Function of a single Neuron, Artificial Neural Networks (ANN). Typical Application of ANN - Classification, Clustering, Pattern Recognition, Function Approximation. Basic approach of the working of ANN - Training, Learning and Generalization.
2. Supervised Learning: Single-layer Networks, Linear Separability, handling linearly non-separable sets. Training algorithm. Error correction & gradient decent rules. Multi-layer network- Architecture, Back Propagation Algorithm (BPA) - Various parameters and their selection, Applications, Feedforward Network, Radial- Basis Function (RBF) network & its learning strategies.
3. Unsupervised Learning: Winner-takes all Networks, Hamming Networks. Adaptive Resonance Theory, Kohonen's, Self-organizing Maps.  
Neurodynamical models: Stability of Equilibrium states, Hopfield Network, Brain-state-in-a-Box network, Bidirectional associative memories.
4. Fuzzy Logic: Basic concepts of Fuzzy Logic, Fuzzy vs. Crisp set Linguistic variables, membership functions, operations of fuzzy sets, Crisp relations, Fuzzy relations, Approximate reasoning, fuzzy IF-THEN rules, variable inference, techniques, defuzzification techniques, Fuzzy rule based systems. Applications of fuzzy logic.

**Books:**

1. Satish Kumar, "Neural Network : A classroom approach", Tata McGraw Hill.
2. Jacek M. Zurada, "Artificial Neural Networks", West Publication.
3. Rajasekaran & Pai, "Neural networks, Fuzzy logic and genetic algorithms", PHI learning Pvt. Ltd.

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### Inter Disciplinary course

#### Pre Ph.D. Course in Computer Science and Engineering Mathematical Foundations of Computer Networks

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1. Basic algorithms on directed graphs, weighted shortest paths.
2. Networks and routing algebras - fixed-point equations, sequential algorithm to solve the fixed-point equations, generalized distance-vector and link-state routing protocols.
3. Applications to quality-of service intra-domain routing and to policy-based inter-domain routing in the Internet.
4. Network flows - flows and residual networks, Max-flow Min-cut theorem, Ford Fulkerson method and Edmonds-Karp algorithm.
5. Network calculus- Min-plus calculus: integrals and convolutions, Arrival curves and token buckets; service curves and schedulers, Applications to integrated and differentiated services in the Internet.

#### Books:

1. Thomas Cormen, Charles Leiserson, Ronald Rivest, and Clifford Stein. Introduction to algorithms, 2th edition. The MIT Press 2001 [Chapter VI]
2. Jorgen Bang-Jensen and Gregory Gutin. Digraphs: theory, algorithms and applications. Springer, 2002 [Section 7.3 and 9.5]
3. J. L. Sobrinho, An algebraic theory of dynamic network routing, IEEE/ACM Transactions on Networking, 13(5), October 2005.
4. Jean-Yves Le Boudec and Patrick Thiran. Network calculus. Springer, 2006. [Chapter 1, 2, and 3]

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IKGPTU/RC/PrePhD/461  
16.6.16

**I.K GUJRAL PUNJAB TECHNICAL UNIVERSITY, JALANDHAR**  
**Department of Research, Innovation & Consultancy**

Ref. No. IKGPTU/RC/4998

Date: 15.6.16

The Board of Governors, IKGPTU in its meeting held on 01.04.2016 decided to run Pre Ph. D. course work at the Campus of IKGPTU. It was further decided by BOG that Pre Ph. D course work should be of 15 credits. To decide the structure of the course work the following committee was formulated:

1. Dr. Ashutosh Kumar, Member Research Promotion Committee, Panjab University, Chandigarh
2. Dr. Rakesh Mohan Sharma, Additional Dean Research, Punjabi University, Patiala
3. Dr. Shushil Mittal, Professor, Thapar University, Patiala
4. Dr. T.S. Banipal, Director Research, GNDU, Amritsar

The meeting of above committee was held on 15.06.2016 at the office of Dean (RIC), IKGPTU. It was decided that as per the directions of BOG the Pre Ph.D. course work should be of 15 credits and shall be offered on regular basis at IKGPTU campus as per the following details:

Sr. no.	Nature of Course	Name of course	Credits	Remarks
1.	Core	1. Research Methodology	4	The syllabus of RM should be formulated faculty wise such as Engineering, Sciences, Management/ Humanities and Life sciences
		2. Subject related theory paper	4	Discipline specific related to advancements in theoretical methods for research.
		3. Presentation	3	Discipline specific
2.	Interdisciplinary	4. Elective	4	From list of subjects from allied fields
Total Minimum credits			15	

It was further decided that the course work will be done in one semester and in case of unsuccessful attempt the candidate should clear in the subsequent semester.

The question paper and answer sheet should be moderated by external examiner nominated by the Dean (RIC).

Also, to evaluate presentation of the candidate procedure of Thapar University shall be followed.

It is submitted for approval please.

*(Dr. Ashish Thore)* 15/6/16

*APL*  
Dean (RIC) 15/06/16

*We may like to discuss this in before notifying the same*

*Hon'ble*

*Dean, Ric*

I.K.G. Punjab Technical University  
Vice Chancellor Office  
Diary No. 169 Date 23.6.16  
Sent to Dean RIC

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**IKG-Punjab Technical University  
Kapurthala**

IKGPTU/RIC/5418  
DX 16/8/11

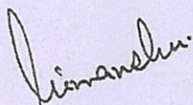
**Minutes of Meeting**

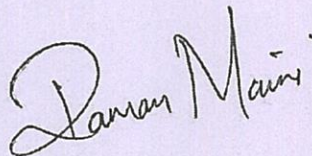
A meeting of experts for designing and updating of syllabus for pre-PhD course work for Computer Science & Engineering was held on 26<sup>th</sup> July in the office of Dean, RIC, IKGPTU.

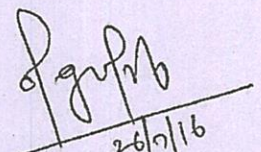
The following members were present:

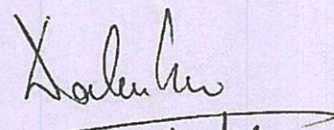
1. Dr. Himanshu Aggarwal, Punjabi University, Patiala
2. Dr. Raman Maini, Punjabi University, Patiala
3. Mr. Dinesh Gupta, IKG-PTU


The committee members thoroughly studied the proposed syllabi of different subjects and suggested modifications, deletions and alterations. The finally revised syllabi are approved and attached as annexure herewith.

  
Dr. Himanshu Aggarwal

  
Dr. Raman Maini

  
Mr. Dinesh Gupta

  
26/7/16

  
HOD  
Department of Computer Science & Engineering  
IKG PTU Main Campus  
Kapurthala



# I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY

Estd. Under Punjab Technical University Act, 1996  
(Punjab Act No. 1 of 1997)

Ref. No. : IKGPTU/Reg/N/

Dated :

## NOTIFICATION

Sub: **Regarding Pre-Ph.D Course work.**

This is for information of all concerned that Pre-Ph.D course work from 2016-17 will be conducted in the IKGPTU main campus Kapurthala in regular mode. The PhD course work will consists of minimum 15 credits. The structure of the course work is as under.

Sr. No.	Nature of course	Name of course	Credits	Remarks
1.	Core	1. Research Methodology	4	The syllabus of RM should be formulated faculty wise such as Engineering, Science, Management/ Humanities and Life sciences
		2. Subject related theory paper	4	Discipline specific related to advancements in theoretical methods for research
		3. Presentation	3	Discipline specific
2.	Interdisciplinary	4. Elective	4	From list of subjects from allied fields
Total Minimum credits			15	

-Sd-  
Registrar

Endorsement No: IKGPTU/REG/N/ 4244-4251

Dated: 22.08.2016

1. Secretary to Vice Chancellor: For kind information of Vice Chancellor
2. Dean (P&D)
3. Dean (RIC)
4. Dean (Academics)
5. Finance Officer
6. Controller of Examination
7. DR (Computers): For uploading on website
8. File Copy

-Sd-  
Registrar

I. K. Gujral Punjab Technical University, Jalandhar  
Jalandhar Kapurthala Highway, Near Pushpa Gujral Science City, Kapurthala - 144 603  
Ph. No. 01822 - 662521. 662501 Fax No. : 01822-255506. 662526. Email : registrar@ntu.ac.in

HOD  
Department of Computer Science & Engineering  
IKG PTU Main Campus  
Kapurthala