हिमाचल प्रदेश केंद्रीय विश्वविद्यालय
Central University of Himachal Pradesh
(Established under Central Universities Act 2009)
अस्थाईशैक्षणिकखण्ड ,शाहपुर ,ज़िलाकाँगड़ा) ,हि.प्र - (.176206
Temporary Academic Block, Shahpur ,Distt. Kangra (HP) - 176206

Department of Computer Science & Informatics

Minutes of 5th Meeting of Board of Studies of the Department of Computer Science & Informatics held on 23rd September 2020

5thMeeting of Board of Studies of the Department of Computer Science and Informatics was held on 23rd September 2020 at 02.30 PM at Conference Hall, TAB-Shahpur, through Google Meet. At the outset, Prof. Sandeep Kumar Sood, Head- Computer Science and Informatics (Chairman) extended a warm welcome to all members for sparing their valuable time to attend this meeting.

The following members attended the meeting through Google meet (online mode):

1. Prof. Arvind Kalia (Subject Expert)
2. Dr. Narottam Chand Kaushal (Subject Expert)
3. Prof. O.S.K.S Sastri (V.C. Nominee)

The following members attended the meeting at Conference Hall, TAB-Shahpur:

1. Prof. Sandeep Kumar Sood (Chairman)
2. Dr. Dimple Patel (Dean's Nominee)
3. Dr. Rajender Kumar (V.C. Nominee)
4. Mr. Ajay Kumar (Member)

Thereafter the following items were discussed-

Item-BOS-5.1: Confirmation of the minutes of 4th Meeting of Board of Studies of the Department of Computer Science & Informatics Scheduled on 6th June 2018 at 3.00 PM.
The Minutes of 4th Meeting of Board of Studies of the Department of Computer Science & Informatics held on 6th June 2018, attached as Annexure-1, were confirmed.

Item-BOS-5.2: To place before the Board of studies for approval the rectification in course nomenclature of M.Sc.[IT] programme to Master of Computer Applications (MCA)-3 year Programme in the Department of Computer Science & Informatics.
The students of M.Sc. IT programme are not eligible for HP SET, banking examinations, and other entrance tests. IT-based companies are also not showing much interest in giving employment to students. For the future perspectives of students, we have sent a proposal to convert M.Sc. IT programme to MCA (3 Year) programme to Hon'ble Vice-Chancellor of CUHP (Annexure 2). Due to some administrative reasons, the formation of the new Board of Studies of Computer Science and Informatics has been delayed. Henceforth, the department

has not scheduled a Board of Studies meeting. To take care of the student's future, we have discussed this matter in the Academic Council of CUHP (Annexure2-AC Approval). After deliberate discussion, the MCA programme has been approved and suggested to get the modalities regarding this programme: course duration, eligibility conditions, criteria of selection, and other formalities (Annexure 3) approved by the Board of Study and School Board. Therefore, this item is placed for approval.

The Board of Studies of the Department of Computer Science & Informatics deliberated on this agenda item. As per the subject expert's suggestions, the Board of Studies approved with rectifications that M.Sc.[IT] programme has been discontinued, and the Master of Computer Applications (MCA)- 3 year Programme will be started in the Department of Computer Science & Informatics from 2020-2021. As per the subject expert's suggestions, Relaxation in Minimum Qualifying Marks for candidates belonging to the SC, ST, OBC (Non-creamy layer), and Persons with Disabilities Categories have been included in Annexure 3.

Item-BOS-5.3: To place before the Board of studies for approval list of MCA course scheme and course contents as per the CBCS scheme of UGC.

As per Item-BOS-5.3, the list of MCA course scheme and course contents as per the CBCS scheme of UGC are placed in Annexure 3.

After deliberate discussion and suggestions of subject experts and members regarding the course scheme and course contents, the Board of studies approved the list of MCA course scheme and course contents as per the CBCS scheme of UGC attached as Annexure-3.

Item-BOS-5.4: To place before the Board of studies for approval change in the Supervisor of the following research scholar:

Name of Student with Roll No.	Name of old Supervisor	Name of new Supervisor	Topic
Mr. Keshav Singh Rawat (CUHP15 RDCS01)	Prof. I.V. Malhan (Supervisor)	Prof. Sandeep Kumar Sood (Supervisor)	Knowledge discovery based on data mining techniques in higher education

The application has been received on 5th Oct 2019 from Mr. Keshav Singh Rawat, research scholar, Department of Computer Science and Informatics, regarding change of Supervisor, as his previous allotted Supervisor Prof. I.V. Malhan has retired on 3rd May 2019. Prof. Sandeep Kumar Sood has joined the department on 4th October 2019, and he has agreed to supervise Ph.D. research work of Mr. Keshav Singh Rawat. The candidate is working for his research work with Prof. Sandeep Kumar Sood since 5th Oct 2019. The matter is placed to change the Supervisor of Mr. Keshav Singh Rawat and to approve Prof. Sandeep Kumar Sood as new Supervisor w.e.f. 5th Oct 2019.

The Board of Studies of the Department of Computer Science & Informatics deliberated on this matter and approved the change the Supervisor of Mr. Keshav Singh Rawat and approved Prof. Sandeep Kumar Sood as new Supervisor w.e.f. 5th Oct 2019. Mr. Keshav Singh Rawat is working in the research area of Prof. Sandeep Kumar Sood. Therefore, there is no requirement for a co-supervisor. The RAC approval of the new supervisor and NOC of the previous Supervisor are attached as Annexure 4.

Item-BOS-5.5: To place before the Board of studies for confirmation of the Ph.D. synopsis of Mr. Keshav Singh Rawat (CUHP15 RDCS01) on the topic "Knowledge discovery based on data mining techniques in higher education."

As per item number 4.4, minutes of 4th Meeting of Board of Studies dated: 6th June 2018. "The Board of studies already approved the Ph.D. Synopsis of Keshav Singh Rawat, CUHP15RDCS01, on topic "Knowledge Discovery based on data Mining Techniques in Higher Education." Subject to production of NOC for PhD before next meeting of BOS. The NOC (Annexure 4) has been received by Mr. Keshav Singh Rawat. The matter is placed to confirm the Ph.D. synopsis of Mr. Keshav Singh Rawat (CUHP15 RDCS01) on the topic "Knowledge discovery based on data mining techniques in higher education."

As previous 4th Meeting of Board of Studies of the Department of Computer Science & Informatics dated: 6th June 2018 has already approved the Ph.D. synopsis of Mr. Keshav Singh Rawat (CUHP15RDCS01) on the topic "Knowledge discovery based on data mining techniques in higher education" and the NOC (Annexure 4) has been received by Mr. Keshav Singh Rawat.

Therefore, the Board of Studies of the Department of Computer Science & Informatics confirmed the Ph.D. synopsis of Mr. Keshav Singh Rawat (CUHP15RDCS01) on the topic "Knowledge discovery based on data mining techniques in higher education."

Item-BOS-5.6: To place before the Board of studies for approval Supervisor to Supervise research work of the following research scholar:

S. No.	Name of Student	Name of Supervisor	Date of Joining of student for Ph.D.
1.	Mr. Girish Sharma	Prof. Sandeep Kumar Sood	01-08-2020
2.	Mr. Manoj Dhiman	Prof. Sandeep Kumar Sood	01-08-2020
3.	Mr. Dheeraj Kumar	Prof. Sandeep Kumar Sood	01-08-2020

The above-mentioned research scholars have admitted to Ph.D. on 01/08/2020. The matter is placed for approval of the Supervisor that supervises the research work of the mentioned research scholars in the above list.

The Board of Studies of the Department of Computer Science & Informatics approved Prof. Sandeep Kumar Sood as Supervisor for the research scholars in the list mentioned above. The minutes of RAC is attached as Annexure 4.

Item-5.7: To place before the Board of studies for approval of Ph.D. Courses for research scholar course work.

Any courses related to his/her research work, including research methodology and research ethics courses for course work as per UGC guidelines.

The Board of Studies of the Department of Computer Science & Informatics approved the Research Methodology, Research Ethics as mandatory courses and other courses will be related to their research work in coursework.

Mr. Ajay Kumar (Member)	Dr. Dimple Patel (Dean's Nominee)	Prof. O.S.K.S Sastri (VC Nominee)	Dr. Rajender Kumar (VC Nominee)

Prof. Arvind Kalia
(Subject Expert)
(Minutes are confirmed by Email.)

Dr. Narottam Chand Kaushal
(Subject Expert)
(Minutes are confirmed by Email)

Prof. Sandeep Kumar Sood
(Chairman)

Gmail

Sandeep Sood <san1198@gmail.com>

Minutes of the 5th Board of Studies of Computer Science & Informatics meeting of the Central University of Himachal Pradesh

Dr. Narottam Chand Kaushal <nar@nith.ac.in> Mon, Oct 12, 2020 at 7:35 AM
To: Sandeep Sood <san1198@gmail.com>, Sandeep Sood <san1198@hpcu.ac.in>

Dear Sir,

Agreed to the Minutes of 5th Board of Studies Meeting of Department of Computer Science and Informatics, Central University of Himachal Pradesh, held on 23rd September, 2020.

Regards

Dr. Narottam Chand Kaushal
Department of Computer Science and Engineering
NIT Hamirpur
Mobile: +91 94180 94345

On Fri, Oct 9, 2020 at 3:42 PM Sandeep Sood <san1198@gmail.com> wrote:

Respected Sir,

1. Kindly find attached herewith the signed copy of **Minutes** of the 5th **Board of Studies of Computer Science & Informatics meeting** of the Central University of Himachal Pradesh held on 23rd September, 2020 at 02:30 PM.

2. All members who were present offline have signed and confirmed the minutes as per discussion and suggestions from all concerned. Vice Chancellor nominee (Prof. O.S.K.S Sastri) who was present online have confirmed the minutes through email.

3. All your suggestions have been incorporated in the minutes advised by you in the meeting and on the draft of minutes.

4. It is requested to confirm **Minutes** of the 5th **Board of Studies of Computer Science & Informatics meeting.** Comments on the Minutes, if any, may please be sent by email at san1198@hpcu.ac.in and san1198@gmail.com, at the earliest possible. If no comments are received within 5 days, the Minutes shall be taken as confirmed.

Warm regards,

Dr. Sandeep Kumar Sood

Head & Professor, Computer Science & Informatics,
Director, Computer Centre,
Central University of Himachal Pradesh,
Dharmshala-176215
Mobile:9465204534
Skyp:live:.cid.9071aee726d33ae7
Mobile:9465204534

Gmail

Sandeep Sood <san1198@gmail.com>

Minutes of the 5th Board of Studies of Computer Science & Informatics meeting of the Central University of Himachal Pradesh

Arvind Kalia <kaliaarvind28@gmail.com>
To: Sandeep Sood <san1198@gmail.com>

Sat, Oct 24, 2020 at 8:46 PM

Dear Dr Sandeep

I approve the proceedings of the meeting as proposed.

Regards

On 10/9/20, Sandeep Sood <san1198@gmail.com> wrote:
> Respected Sir,
>
> 1. Kindly find attached herewith the signed copy of *Minutes *of the
> 5th *Board
> of Studies of Computer Science & Informatics meeting *of the Central
> University of Himachal Pradesh held on 23rd September, 2020 at 02:30 PM.
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> you in the meeting and on the draft of minutes.
>
> 4. It is requested to confirm* Minutes *of the 5th *Board of Studies of
> Computer Science & Informatics meeting. *Comments on the Minutes, if any,
> may please be sent by email at *san1198@hpcu.ac.in <san1198@hpcu.ac.in>*
> and *san1198@gmail.com <san1198@gmail.com>*, at the earliest
> possible. If no comments are received within 5 days, the Minutes shall be
> taken as confirmed.
>
> Warm regards,
>
> Dr. Sandeep Kumar Sood
> Head & Professor, Computer Science & Informatics,
> Director, Computer Centre,
> Central University of Himachal Pradesh,
> Dharmshala-176215
> Mobile:9465204534
> Skyp:live:.cid.9071aee726d33ae7
> Mobile:9465204534
>

Annexure: 1

Minutes of 4th BOS, dated:06/06/2018

Central University of Himachal Pradesh

Temporary Academic Block, Shahpur,
District – Kangra, Himachal Pradesh – 176 206
Phone: +91(1892) 237286 (404);
Mobile: +91(0)98166-23461

MINUTES OF THE 4th BOARD OF STUDIES MEETING OF THE DEPARTMENT OF COMPUTER SCIENCE & INFORMATICS HELD ON 6th of June, 2018 AT 3:00 PM

VENUE: Seminar Hall, Central University of Himachal Pradesh, Temporary Academic Block, Shahpur, District – Kangra, Himachal Pradesh – 176 206

Minutes

The Fourth Board of Studies Meeting of the Department of Computer Science & Informatics was held on 6th of June, 2018 at 03.00 P.M. at Seminar Hall, Central University of Himachal Pradesh – Temporary Academic Block, Tehsil-Shahpur, District-Kangra, Himachal Pradesh-176206.
The following members were present:-

1.	**Prof. I.V. Malhan** HOD, Docs&Inf.	**CHAIRMAN**
2.	**Prof. R.K.Singla** Punjab University, Chandigarh	**SUBJECT EXPERT**
3.	**Prof. Vibhaker Mansotra** University of Jammu	**SUBJECT EXPERT**
4.	**Prof. Mushtaq Ahmed** Dept of Env Science	**VC Nominee**
5.	**Dr. Rakesh Kumar** Dept of Mathematics	**VC Nominee**
6.	**Sh. Manoj Dhiman** Assistant Professor, DoCS&Inf.	**MEMBER**
7.	**Sh. Ajay Kumar** Assistant Professor, DoCS&Inf.	**SPECIAL INVITEE**
8.	**Sh. D.P.Dora** Assistant Professor, DoCS&Inf.	**SPECIAL INVITEE**

6/6/18

At the outset, Prof. I.V. Malhan, HOD, Department of Computer Science & Informatics (Chairman) extended a warm welcome to all the members for sparing their valuable time to attend this meeting.

THEREAFTER, THE AGENDA WAS TAKEN UP AS UNDER:

ITEM NO: 4.1 **To confirm the minutes of the third Meetings of BOS of the Department of Computer Science and Informatics held on 27th Jan 2017.**

Decision: *The Minutes of Third Meeting of Board of Studies of the Department of Computer Science & Informatics held on 7th Jan 2017 were confirmed.*

ITEM NO: 4.2 **To approve updated list of courses offered by the department for M.Sc. IT.**

Decision: *Updated list of courses offered by the department were discussed and recorded suggestions of external members.*

ITEM NO: 4.3 **To review the content of new courses developed by the faculties.**

Decision: *The External experts were satisfied by the course content developed by faculty members of department of Computer Science & informatics.*

ITEM NO: 4.4 **To approve the Ph.D. Synopsis of Keshav Singh Rawat, CUHP15 RDCS01 (Internal PhD candidate), Assistant Professor, Department of Computer Science & Informatics.**

Decision: *The Board of Studies approved the Ph.D. Synopsis of Keshav Singh Rawat, CUHP15RDCS01, on topic "Knowledge Discovery based on Data Mining Techniques in Higher Education." subject to production of NOC for PhD before next meeting of BOS. Further BOS approved that Prof. I.V. Malhan shall be supervisor and Prof. Vibhakar Mansotra , Dept of Computer Science and IT, University of Jammu shall be Co-Supervisor of the candidate.*

ITEM No: 4.5 **To adopt UGC (Credit framework for Online Courses through Swayam) regulation, 2016 for course registration preferably selecting if required the need based courses that may augment the requisite skills of learners.**

Decision: *Item no. 4.5 was approved by the Board of Studies.*

6/6/18

ITEM NO: 4.6 **To approve the Panel of External Examiners to be appointed for conducting viva-voce and practical examination.**

Decision: *The Board of Studies approved the Panel of External Examiners to be appointed for conducting viva-voce and practical examination. The Board further authorized the HOD to appoint any other examiner in addition to the list if required.*

ITEM NO: 4.7 **To approve the list of external paper setters for various courses of study**

Decision: *The Board of Studies approved list of external paper setters for various courses of study. The Board further authorized the HOD to appoint any other paper setters in addition to the list if required.*

ITEM NO: 4.8 **Any other item**

The HOD presented the content of the various courses being taught by the faculty for evaluation and suggestion of BOS members.

Decision: *The Board of Studies appreciated the content of the various courses taught with the remarks that these are in conformity to the best of the courses designed in the Indian universities and fairly incorporate the latest trends and developments in area of computer science and IT.*

THE MEETING ENDED WITH THE VOTE OF THANKS TO THE CHAIR.

Prof. Mushtaq Ahmed 6/6/18.
VC Nominee

Dr. Rakesh Kumar
VC Nominee

Sh. Manoj Dhiman
Asst.Prof., DoCS&Inf.

Sh. Ajay Kumar
Asst.Prof., DoCS&Inf.
(special invitee)

Sh. D.P.Dora
Asst.Prof., DoCS&Inf.
(special invitee)

Prof. R.K.Singla
Subject Expert

Prof. Vibhakar Mansotra
Subject Expert

Prof. I.V. Malhan
Chairman & HOD, Docs&Inf.

<u>Annexure: 2</u>

Proposal sent to VC for approval of MCA –

F. No. CSI/2-2/(CUHP)14 Page – 28 दिनांक: 20/02/2020

विषय: कंप्यूटर एवं सूचना विज्ञान विभाग के दो वर्षीय अध्ययन कार्यक्रम M.Sc. IT के स्थान पर तीन वर्षीय Master in Computer Application (MCA) शुरु करने के सम्बन्ध में ।

— 82 — आदरणीय, कंप्यूटर एवं सूचना विज्ञान विभाग के छात्रों को राज्य पात्रता परीक्षा एवं अन्य पात्रता परीक्षाओं के लिए योग्य नहीं माना जा रहा है तथा काफी निजी कंपनियां भी इन छात्रों को रोजगार देने में कोई रुचि नहीं रखती, इस लिए छात्रों के भविष्य को ध्यान में रखते हुए आपसे अनुरोध है कि दो वर्षीय अध्ययन कार्यक्रम M.Sc. IT के स्थान पर तीन वर्षीय Master in Computer Application (MCA) शुरु किया जाये इस से छात्रों को सभी पात्रता परीक्षाओं के लिए योग्य माना जायेगा एवं सभी निजी कंपनियां भी इन छात्रों को रोजगार देने में रुचि दिखायेंगी ।

— 83 — प्रशासनिक अनुमोदन के लिए प्रस्तुत है ।

श्री केशव रावत सहायक प्राध्यापक	श्री मनोज धीमान सहायक प्राध्यापक	श्री अजय कुमार सहायक प्राध्यापक

सन्दीप सूद
(प्रो. संदीप सूद)
विभागाध्यक्ष, कंप्यूटर एवं सूचना विज्ञान विभाग

(प्रो. राकेश कुमार)
अधिष्ठाता, गणित, कंप्यूटर और सुचना विज्ञान स्कूल

माननीय प्रति कुलपति

माननीय कुलपति

अनुमति प्रदान
BOS, SB, AC, EC
में पारित होने

3361/VC
28/2/2020

AC Approval -

The following items were included with the permission of the Chairman:

The Chairman apprised the members that the University has activated the Centre of Bharatiya Panth, Matt, Sampraday and Semitic Religions. Under this Centre a Post Graduate Diploma in Hindu Studies of 40 Credits is proposed to be started from the ensuing Academic Session. Other modalities of the course shall be prepared and notified separately.

All the members unanimously appreciated the proposal and approved the same.

Head, Department of Library & Information Sciences proposed that the existing Master of Library and Information Science two year Integrated programme may be discontinued and Bachelor of Library and Information Science, independent Programme of Study of one-year duration and Master of Library and Information Science independent Programme of Study, of one-year duration may be started form the academic session 2020-21.

The members of Academic Council after deliberation, approved the proposal in principle to start Bachelor of Library and Information Science, independent Programme of Study of one-year duration and Master of Library and Information Science independent Programme of Study, of one-year duration form the academic session 2020-21 and asked Head, Department of Library and Information Science to get the modalities like course duration, eligibility conditions, criteria of selection and other formalities approved from the School Board.

Head, Department of Computer Science & Informatics proposed that the existing M.Sc. (Information Technology) Programme of Study of two years duration may be discontinued and MCA Programme of Study, of three years duration may be started form the academic session 2020-21.

The members of Academic Council after deliberation, approved the proposal in principle to start MCA Programme of Study of three years' duration form the academic session 2020-21 and asked Head, Department of Computer Science and Informatics to get the modalities like course duration, eligibility conditions, criteria of selection and other formalities approved from the School Board.

EC Approval (Confirmation of AC minutes in EC meetings)-

Item No. 46.10: **To place before the Executive Council the matter regarding empanelment of Printers for printing of University books under Publication Bureau.**

A proposal from Hony. Director, Publication Bureau of the University has been received to empanel following five printers on the analogy of Himachal Pradesh Board of School Education, Govt. of H.P. vide Notification No. HP(41) Book Printing Branch/2019-1301 dated 20.09.2019 (**ANNEXURE-46.10[A]**) to publish the University books:

i. Impressions Printers, Ghaziabad,
ii. Delhi Printers, Jalandhar,
iii. Tagore Printers, Jalandhar City,
iv. M/s Mangat Ram Printing Press, Jalandhar,
v. P.R.P. Printers, Jalandhar.

The Executive Council on the analogy of Himachal Pradesh Board of School Education, Govt. of H.P approved the empanelment of Printers for printing of University books under Publication Bureau.

Item No. 46.11: **To place before the Executive Council the recommendations made by the Academic Council in its 26th Meeting held on 20th March, 2020.**

The 26th Meeting of the Academic Council was held on 20th March, 2020 at 12.00 P.M.in the Chamber of Vice-Chancellor at Central University of Himachal Pradesh, Camp Office, Dharamshala, District Kangra, H.P. - 176215. The recommendations of the Academic Council (**ANNEXURE-46.11[A]**) are placed at **the Spot** for consideration and approval of the Executive Council.

The Minutes of 26th Meeting of Academic Council held on 20th March, 2020 were confirmed by the Executive Council.

The following item was included by the permission of the Chairman:

The Chairman apprised the Executive Council that the University as per guidelines of University Grants Commission has considered the

Annexure: 3

The minimum eligibility requirements and selection criteria for admission in MCA

M.C.A.(Master of Computer Applications) Duration: 3 Year	• A minimum of 50% marks or an equivalent grade in Bachelors/UG degree in science/engineering/technology/computer application stream from a recognized University or an equivalent examination *(Relaxation in Minimum Qualifying Marks: Relaxation in minimum qualifying marks up to a maximum of 5% shall be made in case of candidates belonging to the SC, ST, OBC (Non-creamy layer) and Persons with Disabilities Categories)* • Selection criteria as suggested by university time to time.

Reservation Policy: As per Central University of Himachal Pradesh rules.

Examination System: As per Central University of Himachal Pradesh rules.

New CBCS Scheme of UGC as per CUHP:

At PG level (3 year), a student would be required to accumulate total 120 PG credits as under:

Course Type		**Credit required**
Core courses	Compulsory	60
	Open	18
Elective courses	Specialization	24
	Open	6
Foundation courses	Human making	6
	Skill development	6

Compulsory (60 credits)

S. No.	Course Code	Course Name	Credit
1.	MCA-C01	Computer Organization and Architecture	4
2.	MCA-C02	Mathematical Foundations of Computer Science	4
3.	MCA-C03	Operating Systems	4
4.	MCA-C04	C Programming	2
5.	MCA-C05	C Programming Lab	2
6.	MCA-C06	Computer Networks	4
7.	MCA-C07	Data Structures	4
8.	MCA-C08	Data Structures Lab	2
9.	MCA-C09	Data Base Management System	4
10.	MCA-C10	DBMS Lab	2
11.	MCA-C11	Theory of Computations	4
12.	MCA-C12	Analysis and Design of Algorithms	4
13.	MCA-C13	Major Project	20
14.	MooC courses *(any course from above and over this category)*		4
15.	MooC courses *(any course from above and over this category)*		2

Open- core (18 credits)

S. No.	Course Code	Course Name	Credit
1.	MCA-OC1	Compiler Design	4
2.	MCA-OC2	Artificial Intelligence	4
3.	MCA-OC3	Software Engineering	4
4.	MCA-OC4	Modelling and Simulation	2
5.	MCA-OC5	Java Programming	4
6.	MCA-OC6	Java Programming Lab	2
7.	MCA-OC7	Data Mining	4
8.	MooC courses *(any course from above and over this category)*		4
9.	MooC courses *(any course from above and over this category)*		2

Elective-specialisation (24 credits)

S. No.	Course Code	Course Name	Credit
1.	MCA-E01	Cryptography and Network Security	4
2.	MCA-E02	Cloud and Fog Computing	4
3.	MCA-E03	Mobile Wireless Communication	4
4.	MCA-E04	Image Processing	4
5.	MCA-E05	Machine Learning	4
6.	MCA-E06	Big Data Analytics	4
7.	MCA-E07	Internet of Things	4
8.	MCA-E08	Multimedia Applications	4
9.	MCA-E09	Soft Computing	4

10.	MCA-E10	Cyber Laws	4
11.	MCA-E11	Advance Operating System	4
12.	MCA-E12	Information Retrieval Systems	4
13.	MCA-E13	Parallel and Distributed System	4
14.	MCA-E14	Software Testing and Quality Assurance	4
15.	MCA-E15	Software Project Management	4
16.	MCA-E16	Advance Computer Network	4
17.	MCA-E17	Software Quality Engineering	4
18.	MCA-E18	Distributed Database	4
19.	MCA-E19	Latest Trends in ICT	4
20.	MCA-E20	Object Oriented Analysis and Design	4
21.	MCA-E21	Network Programming	4
22.	MCA-E22	Embedded System	4
23.	MCA-E23	Operational Research	4
24.	MCA-E24	Advanced Computer Algorithms	4
25.	MooC courses *(any course from above and over this category)*		4

Open- elective (6 credits)

S. No.	Course Code	Course Name	Credit
1.	MCA-OE1	Computer Graphics	4
2.	MCA-OE2	Ethical Hacking	2
3.	MCA-OE3	Mobile Computing	4
4.	MCA-OE4	E-Governance	2
5.	MooC courses *(any course from above and over this category)*		4
6.	MooC courses *(any course from above and over this category)*		2

Human making (6 credits)

S. No.	Course Code	Course Name	Credit
1.	MCA-HM1	Online Meeting and Web Conferencing Tools	2
2.	MCA-HM2	Google Tools	2
3.	MCA-HM3	Open Source Technology	2
4.	MCA-HM4	Research Ethics	2
5.	MCA-HM5	IT Tools for Smart Work	2
6.	MooC courses *(any course from above and over this category)*		2

Skill development (6 credits)

S. No.	Course Code	Course Name	Credit
1.	MCA-SD1	Python Programming	2
2.	MCA-SD2	Network Administration	2
3.	MCA-SD3	No SQL	2
4.	MCA-SD4	LaTeX Editor	2
5.	MCA-SD5	Linux Programming	2
6.	MCA-SD6	Android App Development	2
7.	MCA-SD7	Web Designing	2
8.	MooC courses *(any course from above and over this category)*		2

MCA Scheme (Semester-wise)

First Semester- Master of Computer Applications

S. No.	Course Category	Course Name	Credit
1.	MCA-C	Computer Organization and Architecture	4
2.	MCA-C	Mathematical Foundations of Computer Science	4
3.	MCA-C	Operating Systems	4
4.	MCA-C	C Programming	2
5.	MCA-C	C Programming Lab	2
6.	MCA-SD	Skill-development	2
7.	MCA-HM	Human-making	2

Second Semester- Master of Computer Applications

S. No.	Course Category	Course Name	Credit
1.	MCA-C	Computer Networks	4
2.	MCA-C	Data Structures	4
3.	MCA-C	Data Structures Lab	2
4.	MCA-E	Elective-1	4
5.	MCA-OE	Open-elective-1	2
6.	MCA-SD	Skill-development	2
7.	MCA-HM	Human-making	2

Third Semester- Master of Computer Applications

S. No.	Course Category	Course Name	Credit
1.	MCA-C	Data Base Management System	4
2.	MCA-C	DBMS Lab	2
3.	MCA-C	Analysis and Design of Algorithms	4
4.	MCA-OC	Open-core-1	4
5.	MCA-E	Elective-2	4
6.	MCA-SD	Skill-development	2

Fourth Semester- Master of Computer Applications

S. No.	Course Category	Course Name	Credit
1.	MCA-C	Theory of Computations	4
2.	MCA-OC	Open-core-2	4
3.	MCA-OC	Open-core-3	2
4.	MCA-E	Elective -3	4
5.	MCA-E	Elective -4	4
6.	MCA-HM	Human-making	2

Fifth Semester- Master of Computer Applications

S. No.	Course Category	Course Name	Credit
1.	MCA-OC	Open-core-4	4
2.	MCA-OC	Open-core-5	4
3.	MCA-E	Elective -5	4
4.	MCA-E	Elective -6	4
5.	MCA-OE	Open-electives-2	4

Sixth Semester- Master of Computer Applications

S. No.	Course Category	Course Name	Credit
1.	MCA-C	Major Project	20

फाइल सं: 1-5/हि.प्र.कें.वि./सा.प्र./2010/4079-80
हिमाचल प्रदेश केन्द्रीय विश्वविद्यालय
Central University of Himachal Pradesh
(सामान्य प्रशासन / General Administration)

दिनांक, धर्मशाला – 176215, 16 जुलाई, 2020

1. **सभी स्कूलों के अधिष्ठाता,**
2. **सभी विभिन्न विभागों/केन्द्रों के सभी विभागाध्यक्ष/निदेशक,**
   टैब, शाहपुर, धौलाधार परिसर-I & II, धर्मशाला और सप्त सिन्धु परिसर, देहरा, जिला काँगड़ा।

विषय: MOOC(s) Courses के अन्तर्गत 20 credits पूरा करने संबंधित छात्रों को प्रोत्साहित करने हेतु।

महोदय,

1. विश्वविद्यालय अनुदान आयोग द्वारा SWAYAM PORTAL पर उपलब्ध PG MOOC(s) Courses के कम से कम 20% Credit पूरे करने हेतु समय-समय पर निर्देश जारी किये जाते रहें हैं।

2. इस संबंध में आपसे SWAYAM PORTAL पर उपलब्ध MOOC(s) Courses के कम से कम 20% Credit अर्जित करने के लिए विधार्थियों को प्रोत्साहित करने का अनुरोध है।

भवदीय,

डॉ. संजीव शर्मा
कुलसचिव (अतिरिक्त प्रभार)

Course Contents

हिमाचल प्रदेश केंद्रीय विश्वविद्यालय

Central University of Himachal Pradesh

(Established under Central Universities Act 2009)

अस्थाईशैक्षणिकखण्ड ,शाहपुर ,ज़िलाकाँगड़ा) ,हि.प्र - (.176206

Temporary Academic Block, Shahpur ,Distt. Kangra (HP) - 176206

Assignment of Credits: (as per CUHP Ordinance)

A course of 1 Credit shall require a work load of 30 Hours comprising:

Teacher – Student Contact hours

a. 10 Hours of Lectures / Organized classroom activity

b. 5 Hours of Laboratory Work / Problem Solving / Field Work / Tutorials / Teacher led Activities / Mentoring.

Student Effort

a. 15 Hours of other workload such as independent individual / group work; obligatory / optional work placement; literature survey / library work; data collection / field work; writing of papers / projects / dissertation / thesis; seminars etc.

MCA-C01
Computer Organization and Architecture

UNIT I

Brief introduction of Digital computers, Logic gates (OR, AND, NOR, NAND, XOR & XNOR), Boolean algebra, Demorgan's laws, Boolean laws, Map simplification, Combinational circuits, half adder, full adder, Flip-flops- (RS, D, JK, Master-slave && T flip-flops). Digital Components: Integrated circuits, Encoder, Decoders, Multiplexers, Demultiplexers, Registers.

UNIT II

Data Representation: Data types, Complements, binary arithmetic, Fixed point representation, Floating point representation. Computer Basics and CPU: Von Newman model, various subsystems, CPU, Memory, I/O, System Bus, CPU and Memory registers, Program Counter, Accumulator, Instruction register, Micro operations, Instruction Fetch, decode and execution, data movement and manipulation, Instruction formats and addressing modes of basic computer.

UNIT III

Computer Arithmetic: Introduction, Addition and subtraction, Multiplication algorithms, Division algorithms, Floating-point arithmetic operations.
Input-Output Organization: Peripheral devices, Input output interface, Asynchronous data transfer, Modes of transfer, Direct memory Access.

UNIT IV

Memory Organization: Memory Hierarchy, Main memory, Auxiliary memory, Associative memory, Cache memory, Virtual memory, Memory management hardware. Multiprocessors: Pipeline and Vector processing.

Text Books:

- M. Morris Mano, " Computer System Architecture", Pearson
- V. Rajaraman & T. Radhakrishanan, "Digital Logic and Computer Organization", PHI

Reference Books:

- J.P. Hayes, "Computer Architecture and Organization", McGraw Hill
- William Stallings, "Computer Organization and Architecture – Designing for performance", 6th Edition, Pearson Education.
- V. Rajaraman, "Computer Organization and Architecture", PHI
- Tanenbaum, "Structured Computer Organization", Pearson Education

MCA-C02
Mathematical Foundations of Computer Science

UNIT I

Counting Principles**:** Function and relations, POSETS and Lattices, Groups, Conditional Probability & Bayes theorem, Pigeon-hole principle, Statistics: Random variable, Uniform, Normal, exponential, Poisson and Binomial distributions.

UNIT II

Mathematical Logic: Propositions, connectives, conditionals and biconditionals, well-formed formulas, tautologies, equivalence of formulas, duality law, normal forms, inference theory for propositional calculus; predicate calculus: predicates, free and bound variables, inference theory of predicate calculus.

UNIT III

Graph Theory: Basic terminology for undirected and directed graphs, multigraphs and weighted graphs, paths and circuits, eulerian paths and circuits, Hamiltonian paths and circuits, Planar Graphs, Graph coloring, Cut sets.

UNIT IV

Linear Algebra: Algebra of Matrices, system of linear equations, Determinants & its properties, Eigen value & Eigen vector: Caley-Hamilton theorem, LU Decomposition.

Text Books:

- C.L. Liu & Mahopatra, “Elements of Discrete Mathematics” , TMH Publication
- Seymour Lipschutz, Mar Lipson, “Linear Algebra”, 4th edition, TMH Publication

Reference Books:

- Gilbert Strang, “Introduction to Linear Algebra”, 4th Edition, Wellesley-Cambridge Press, 2009
- Kenneth H. Rosen, “Discrete Mathematics & its applications”, McGraw-Hill

MCA-C03
Operating Systems

UNIT I

Introduction: Definition, Structure and Functions of Operating System, Types of operating systems. Process Management: Process states, State Transitions, Process Control block, Context Switching, Process Scheduling, Scheduling algorithm, Threads.

UNIT II

Inter process synchronization and communication: need, Mutual exclusion, semaphore and hardware support for mutual exclusion, queuing implementation, and classical Problem in concurrent programming, critical region and conditional critical region, Monitors, Messages, Deadlock.

UNIT III

Memory Management: Address Binding, Dynamic Loading and Linking Concepts, Logical and Physical Addresses, Contiguous Allocation, fragmentation, Paging, Segmentation, Virtual Memory, Demand Paging, Page fault, Page replacement algorithms, Thrashing, Working Set Model.

UNIT IV

Storage Management: File Attributes, File Types, File Access Methods, Directory Structure, File System Organization and Mounting, file system implementation, directory system implementation, Allocation Methods, Free Space management, Secondary storage management, I/O system, Protection & Security.

Text Books:

- A. Silverschatz, P.V. Galvin, and G. Gagne, “Operating system concepts”, Wiley.
- A.S. Tanenbaum, “Modern operating Systems”, PHI.

Reference Books:

- William Staling, “Operating Systems”, Pearson.
- D.M. Dhamdhere, “Operating Systems: A Concept Based Approach”, 3rd Ed, McGraw- Hill.

MCA-C04
C Programming

UNIT I

Overview of C- General Structure of C Program, C compilers, Editing, Compiling & , Running of a C program Data types, Constants and Variables, Operators and expressions, Storage Classes, Different types of expressions and their Evaluation, Conditional Expression, Assignment statement, Enumerated data type, Library functions, Type casting.

UNIT II

Input/Output- Unformatted and formatted I/O Functions. Control Statements- Decision making using if, if-else, elseif and switch statements, Looping using for, while and do-while statements, Transferring Program controlling break and continue statements. Functions- Defining a function, Local variables, return statement, invoking a Function, specifying and passing arguments to a function, Functions returning non Integer, External, static, and register variable, block structure, initialization and recursion.

UNIT III

Array & strings- Introduction to arrays, Declaring arrays, Initializing, arrays, Processing arrays, Pointers to arrays, Passing arrays as arguments to functions, Introduction to strings. Pointers- Definition, Need of pointers, declaring Pointers, Accessing Values via Pointers, Pointer arithmetic, Types of pointers, Programming examples to illustrate the use of pointers.

UNIT IV

Structures- Declaring a structure type, Declaring Variables of structure type, Initializing Structures, Accessing Elements of structures, arrays of structures, nested structures, Pointers to structures. Data files- Definition of data files, different ways of file processing (standard I/O and system I/O), description of various library functions for file handling, updating files.

Text Books:

- E. Balagurusamy, “Programming in ANSI C”, Tata McGraw Hill.
- Yashwant Kanetakar, “Let us C”, BPB.

Reference Books:

- R.S. Salaria, “Application Programming in C”, Khanna book publishing.
- Yashwant Kanetakar, “Pointer in C” BPB.
- Kerninghan B.W. & Ritchie D.M. “The C Programming Language” Prentice-Hall.
- Mullish Cooper, “The Spirit of C” Jaico Publishing House.
- Byron Gottfried, “Programming with C”, Schaum’s Outlines, Tata McGraw Hill.
- Herbert Schildt, “C: The Complete Reference”, Tata McGraw Hill.

MCA-C05
C Programming Lab

UNIT I

Programming implementation of Overview of C- General Structure of C Program, C compilers, Editing, Compiling & , Running of a C program Data types, Constants and Variables, Operators and expressions, Storage Classes, Different types of expressions and their Evaluation, Conditional Expression, Assignment statement, Enumerated data type, Library functions, Type casting.

UNIT II

Programming implementation of Input/output- Unformatted and formatted I/O Functions. Control Statements- Decision making using if, if-else, elseif and switch statements, Looping using for, while and do-while statements, Transferring Program controlling break and continue statements. Functions- Defining a function, Local variables, return statement, invoking a Function, specifying and passing arguments to a function, Functions returning non Integer, External, static, and register variable, block structure, initialization and recursion.

UNIT III

Programming implementation of Array & strings- Introduction to arrays, Declaring arrays, Initializing, arrays, Processing arrays, Pointers to arrays, Passing arrays as arguments to functions, Introduction to strings. Pointers- Definition, Need of pointers, declaring Pointers, Accessing Values via Pointers, Pointer arithmetic, Types of pointers, Programming examples to illustrate the use of pointers.

UNIT IV

Programming implementation of Structures- Declaring a structure type, Declaring Variables of structure type, Initializing Structures, Accessing Elements of structures, arrays of structures, nested structures, Pointers to structures. Programming implementation of Data files- Definition of data files, different ways of file processing (standard I/O and system I/O), description of various library functions for file handling, updating files.

Text Books:

- E. Balagurusamy, “Programming in ANSI C”, Tata McGraw Hill.
- Yashwant Kanetakar, “Let us C”, BPB.

Reference Books:

- R S Salaria, Application in C, Khanna book publishing.
- Yashwant Kanetakar, “Pointer in C” BPB.
- Kerninghan B.W. & Ritchie D.M. “The C Programming Language” Prentice-Hall.
- Mullish Cooper, “The Spirit of C” Jaico Publishing House.
- Byron Gottfried, “Programming with C”, Schaum’s Outlines, Tata McGraw Hill.
- Herbert Schildt, “C: The Complete Reference”, Tata McGraw Hill

MCA-SD1
Python Programming

UNIT I

Introduction to Python Programming Language: History and Origin of Python Language, Installing Python, Setting up Path and Environment Variables, Running Python, First Python Program. Python Data Types & Input/ Output: Keywords, Identifiers, Python Statement, Indentation, Documentation, Variables, Multiple Assignment, Understanding Data Type, Data Type Conversion, Python Input and Output Functions, Import command. Operators and Expressions: Operators in Python, Expressions, Precedence, Associativity of Operators, Non Associative Operators.

UNIT II

Control Structures: Decision making statements, Python loops, Python control statements. Python Native Data Types: Numbers, Lists, Tuples, Sets, Dictionary, Functions & Methods of Dictionary, Strings (in detail with their methods and operations).

UNIT III

Python Functions: Functions, Advantages of Functions, Built-in Functions, User defined functions, Anonymous functions, Pass by value Vs. Pass by Reference, Recursion, Scope and Lifetime of Variables. Python Modules: Module definition, Need of modules, creating a module, Importing module, Path Searching of a Module, Module Reloading, Standard Modules, Python Packages.

UNIT IV

Exception Handling: Exceptions, Built-in exceptions, Exception handling, User defined exceptions in Python. File Management in Python: Operations on files (opening, modes, attributes, encoding, closing), read() & write() methods, tell() & seek() methods, renaming & deleting files in Python, directories in Python. Classes and Objects: The concept of OOPS in Python, Designing classes, Creating objects, Accessing attributes, Editing class attributes, Built-in class attributes, Garbage collection, Destroying objects.

Text Books:

- A. Martelli, A. Ravenscroft, S. Holden, “Python in a Nutshell”, OREILLY.
- Pooja Sharma,“Programming in Python”, BPB Publications.

Reference Books:

- R. Nageswara Rao, “Core Python Programming”, 2nd Edition, Dreamtech.
- Martin C. Brown, “Python, The complete Reference”, Mc Graw Hill.

MCA-HM2
Google Tools

UNIT I

Google Tools For all-1

Android Auto, Android OS, Android TV, Calendar, Cardboard, Chrome, Chrome Web Store, Chrome book, Chrome cast, Connected Home, Contacts, Docs, Drive, Earth, Finance, Forms, Gboard, Gmail, Google Alerts, Google Assistant, Google Cast, Google Chat, Google Classroom, Google Cloud Print, Google Duo, Google Expeditions, Google Fi, Google Fit, Google Flights, Google Fonts.

UNIT II

Google Tools For all-2

Google Groups, Google Meet, Google One, Google Pay, Google Photos, Google Play, Google Play Books, Google Play Games, Google Play Movies & TV, Google Play Music, Google Shopping, Google Street View, Hangouts, Keep, Maps, Messages, Nest Wifi, News, Pixel, Pixel Buds, Pixel book Go, Play Protect, Podcasts, Scholar, Search, Sheets,, Sites, Slides, Stadia, Tilt Brush, Translate, Voice, Waze, Wear OS by Google, YouTube, YouTube Kids, YouTube, YouTube TV.

UNIT III

Google Tools For developers

App Testing, Cloud Computing, Devices, Engagement, Game Services, Growth, Maps + Location, Messaging + Notifications, Monetization, Monitoring, Payments, Sign in + Identity, Storage + Sync.

UNIT IV

Google Tools For business

AdMob, AdSense, Analytics, Android, Blogger, Business Messages, Chrome Enterprise Data Studio, G Suite, Google Ads, Google Assistant, Google Cloud, Google Digital Garage, Google Domains, Google Enterprise Search, Google Manufacturer Center, Google Maps Platform, Google Marketing Platform, Google Merchant Center, Google My Business, Google Podcasts Manager, Google Shopping Campaigns, Google Trends, Google Web Designer, Optimize, Search Console, Shopping Actions, Surveys, Tag Manager, Waze Local.

Text Books:

- https://about.google/intl/en/products/?tab=mh

MCA-C06
Computer Networks

UNIT I

Reference Model: Components of a Data Communication System, Concept of layering: OSI and TCP/IP Protocol Stacks, interface and services, Network Devices (active & passive), Network Topologies: Point to point (Mesh) & shared channel (BUS).

UNIT II

Network Layer: Basics of packet, circuit and packet switching, Routing protocols: shortest path, flooding, distance vector and link state routing, Fragmentation and Public and Private IP addressing, Classful addressing and its drawback, examples on Subnetting and Supernetting, Classless addressing CIDR notation through example, Basics of IP support protocols (ARP, DHCP, ICMP), Network Address Translation.

UNIT III

Data Link Layer & Transport Layer: Framing, Error Detection and Correction; Flow control policies (Stop and wait, Go Back N, and Selective repeat ARQ) and Error Control, HDLC, Multiple Access – CSMA/CD, CSMA/CA, Transport layer: flow control and congestion control, UDP, TCP, Sockets.

UNIT IV

Application Layer: Application layer protocols: DNS, SMTP, HTTP, FTP, TELNET, POP and IMAP Uniform Resource Locator (URL), Domain Name Service (DNS), Resolution - Mapping Names to Addresses and Addresses to Names.

Text Books:

- A S Tanenbaum, Computer Networks, 5th Edition , Pearson Education India, 2013
- Behrouz A Forouzan, Data Communications and Networking, 5th Edition, McGraw Hill Education, 2017

Reference Books:

- Natalia Olifer, Victor Olifer, “Computer Networks, Principles, Technologies and Protocols for network design”, Wiley India
- Stallings W., “High Speed Networks and Internet : Performance and Quality of Service”, Prentice-Hall

MCA-C07
Data Structures

UNIT I

Introduction: Basic Terminology, Data structures and its classification, Algorithm, Complexity- space & time complexity, complexity notations- big Oh, Omega, Theta. Array Definition, Representation and Analysis of Arrays, Single and Multidimensional Arrays, Address calculation, Linear Search, Binary Search of Array, Traversing , Insertion & deletion in array, Sparse Matrices, Strings. Internal and External sorting, Insertion Sort, Bubble Sort, selection sort, Quick Sort, Merge Sort, Radix sort.

UNIT II

Linked List Introduction, Representation of linked list in to memory, Memory allocation -Garbage Collection, Traversing & Searching in Linked List, Insertion into linked list- at beginning of list & at given location, Deletion in linked list- from starting of list & given location of node, Header Linked List, two way List, Input & output restricted liked list, Circular Header Linked List, Representation of Polynomials using linked List.

UNIT III

Stack, Array Implementation of stack, Linked Representation of Stack, Application of stack: Conversion of Infix to Prefix and Postfix Expressions and Expression evaluation. Queue, Array and linked implementation of queues, Circular queues, D-queues and Priority Queues.

UNIT IV

Trees: Basic terminology, Binary Trees, algebraic Expressions, Complete Binary Tree, Extended Binary Trees, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees, Binary Search Tree (BST), AVL Trees, B-trees. Graphs: Introduction, Sequential Representations of Graphs, Adjacency Matrices, Traversal, Connected Component and Spanning Trees, Minimum Cost Spanning Trees. Searching & Hashing: Sequential search, binary search, Hash Table, Hash Functions, Collision Resolution Strategies.

Text Books:

- Lipschuitz L. Seymour, “Data Structures”, Schaum Outline Series, TMH,
- Horowitz and Sahani, “Fundamentals of data Structures”, Galgotia Publication Pvt. Ltd., N Delhi.

Reference Books:

- R. S. Salaria, “Data Structures & Algorithm Using C”, Khanna Book Publishing Co. (P.) Ltd., New Delhi.
- A.M. Tenenbaum, “Data Structures using C & C++”, Prentice-Hall of India Pvt. Ltd., New Delhi.
- Trembley and Sorenson, Data Structures, TMH Publications
- R. Kruse et al, “Data Structures and Program Design in C”, Pearson Education Asia, Delhi-2002

MCA-C08
Data Structures Lab

UNIT I

Implementation of Linear Search, Binary Search of Array, Traversing , Insertion & deletion in array, Sparse Matrices, Strings. Implementation of Internal and External sorting, Insertion Sort, Bubble Sort, selection sort, Quick Sort, Merge Sort, Radix sort.

UNIT II

Implementation of Traversing & Searching in Linked List, Insertion into linked list- at beginning of list & at given location, Deletion in linked list- from starting of list & given location of node, Header Linked List, two way List, Input & output restricted liked list, Circular Header Linked List.

UNIT III

Implementation of stack using array, Linked Representation of Stack, Application of stack: Conversion of Infix to Prefix and Postfix Expressions and Expression evaluation. Queue, Array and linked implementation of queues, Circular queues, D-queues and Priority Queues.

UNIT IV

Implementation of Binary Trees, Traversing Binary trees, Threaded Binary trees, Binary Search Tree (BST), AVL Trees, B-trees. Implementation of Graphs: Traversal, Connected Component and Spanning Trees, Minimum Cost Spanning Trees. Implementation of Searching & Hashing: Sequential search, binary search, Hash Table, Hash Functions, Collision Resolution Strategies.

Text Books:

- Lipschuitz L. Seymour, "Data Structures", Schaum Outline Series, TMH,
- Horowitz and Sahani, "Fundamentals of data Structures", Galgotia Publication Pvt. Ltd., N Delhi.

Reference Books:

- R. S. Salaria, "Data Structures & Algorithm Using C", Khanna Book Publishing Co. (P.) Ltd., New Delhi.
- A.M. Tenenbaum, "Data Structures using C & C++", Prentice-Hall of India Pvt. Ltd., New Delhi.
- Trembley and Sorenson, Data Structures, TMH Publications
- R. Kruse et al, "Data Structures and Program Design in C", Pearson Education Asia, Delhi-2002

MCA-E04
Data Mining

UNIT I

Motivation, importance, Data type for Data Mining : relation Databases, Data Warehouses, Transactional databases, advanced database system and its applications, Data mining Functionalities: Concept/Class description, Association Analysis classification & Prediction, Cluster Analysis, Outlier Analysis, Evolution Analysis, Classification of Data Mining Systems, Major Issues in Data Mining.

UNIT II

Data Warehouse and OLAP Technology for Data Mining: Differences between Operational Database Systems and Data Warehouses, a multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Architecture, Data Warehouse Implementation, Data Cube Technology. Data Preprocessing: Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation. Data Mining Primitives, Languages, and System Architectures, Concept Description: Characterization and Comparison, Analytical Characterization.

UNIT III

Mining Association Rules in Large Databases: Association Rule Mining: Market Basket Analysis, Basic Concepts, Mining Single-Dimensional Boolean Association Rules from Transactional Databases: the Apriori algorithm, Generating Association rules from Frequent items, Improving the efficiency of Apriory, Mining Multilevel Association Rules, Multidimensional Association Rules, Constraint-Based Association Mining.

UNIT IV

Classification & Prediction and Cluster Analysis: Issues regarding classification & prediction, Different Classification Methods, Prediction, Cluster Analysis, Major Clustering Methods, Applications & Trends in Data Mining: Data Mining Applications, currently available tools.

Text Books:

- J. Han and M. Kamber, “Data Mining: Concepts and Techniques”, Morgan Kaufmann Pub.
- Berson “Dataware housing, Data Mining & DLAP”, TMH.

Reference Books:

- W.H. Inmon “Building the Datawarehouse”, Wiley India.
- Anahory, “Data Warehousing in Real World”, PearsonEducation.
- Adriaans, “Data Mining”, Pearson Education.
- S.K. Pujari, “Data Mining Techniques”, University Press, Hyderabad.

MCA-OE04
E-Governance

UNIT 1

E-Governance: Introduction, E-Governance & E-Government, Need for e-Governance, Measures, work plan and infrastructure for E-Governance, Scope,(types) of e-Governance, Objectives of e-Governance, Evolution of e-Governance, UN e-Government Survey, Phases of e-Governance, e-Governance Project Development Lifecycle, Software Development Lifecycle vs e-Governance Lifecycle. E Governance: international scenario, Challenges in e-Governance.

UNIT II

E-Governance: Strategies for e-Governance in India, National e-Governance Plan, Mission Mode Projects conceptualized under NeGP: Central Government Category, State Government Category, Integrated Services Category, Components of NeGP: The Institutional Structure, The common Support Infrastructure, The Mission Mode Projects, Recent Initiatives in e-Governance in India: Government to citizen (G2c) initiatives, Government to business (G2B) initiatives, Government to Government (G2G) initiatives

UNIT III

E-Learning: what is learning, why e-learning, concept and definition, e-leaning basics, types of e-learning, computer based learning, internet based learning, completely online mode, the use of e-learning in education, advantages and disadvantages of e-learning, e-learning model-ADDIE model, MERRILL's principles of Instruction (MPI),GAGNE's nine events of instruction, e-learning components, e-learning content, E-Tutoring, E-Coaching, E-Mentoring, collaborative learning, virtual classroom, e-learning in India.

UNIT IV

E-Business: Introduction, Global Online Retail Spending: Statistics and Trends, E-business & E-commerce, E-business environment, E-marketplaces, E-business markets, Technical ingredients of e-business, Electronic business infrastructure, Potential benefits of E-business, Basic E-Commerce Strategies, Ebusiness Types & Categories, Phases of e-Business Development, E-business technology, Technology Issues in Internet Commerce, E-commerce Security, M-Commerce, E-marketing. E-Business: E-Business models: Storefront Model-Shopping-cart Technology, Online Shopping Malls, Auction Model, Portal Model, Dynamic Pricing Models: Name-Your-Price Model, Comparison Pricing Model, Demand-Sensitive Pricing model, The future of e-business.

Text Books:

- C. S. R. Prabhu, "E-Governance: Concepts & Case Studies", 2/E, PHI Learning.
- Hossen Najan, "Distance Education and E Learning", Lambert academic publishing.
- Ravi Kalakota and Marcia Robinson, "E-Business 2.0: Roadmap For Success", Pearson Education

Reference Books:

- Srinivasa H. Rajeshwari, "E-Governance in India Concepts and Cases", AP Lambert Academic Publishing
- Hardy Bower, "From Distance Education to E-Learning: Lessons Along the Way", John Wiley& Sons
- Parag Kulkarni, Sunita Jahirabadkar, Pradip Chande, "E Business", Oxford University Press.

MCA-OE02
Ethical Hacking

UNIT I

Introduction to Ethical Hacking, Cyber Laws and Standards, Spoofing, Foot printing and Reconnaissance, System Hacking, Trojans, Backdoors, Viruses, and Worms.

UNIT II

Scanning Networks, Enumeration, Metasploit, Denial of Service, Session Hijacking, Sniffing, Phishing, Social Engineering, Security of Email account.

UNIT III

Protecting Web servers from Hacking, Protecting Web Applications from Hacking, Protecting Mobile Platforms from Hacking, Evading IDS, Firewalls, and Honeypots, SQL Injection and Buffer Overflows.

UNIT IV

Linux Security, Secure Wireless Networks, Wi-Fi Security, Cloud Computing Security, IoT Security.

Text Books:

- Sean Oriyano, "CEH V9: Certified Ethical Hacker Version 9 Study Guide", Wiley.

Reference Books:

- Manthan Desai, "Hacking For Beginners", HT Hacking Tech.

MCA-SD02
Web Designing

UNIT I

Web Design Principles : Basic principles involved in developing a web site , Planning process , Five Golden rules of web designing , Designing navigation bar , Page design , Home Page Layout, Design Concept. Basics in Web Design: Brief History of Internet, What is World Wide Web, Why create a web site, Web Standards, Audience requirement.

UNIT II

Introduction to HTML : What is HTML, HTML Documents , Basic structure of an HTML document , Creating an HTML document , Mark up Tags , Heading-Paragraphs , Line Breaks , HTML Tags.

UNIT III

Elements of HTML: Introduction to elements of HTML, Working with Text, Working with Lists, Tables and Frames, Working with Hyperlinks, Images and Multimedia, Working with Forms and controls.

UNIT IV

Introduction to Cascading Style Sheets, Concept of CSS, Creating Style Sheet, CSS Properties, CSS Styling(Background, Text Format, Controlling Fonts), Working with block elements and objects, Working with Lists and Tables, CSS Id and Class 5.8 Box Model(Introduction, Border properties, Padding Properties, Margin properties), CSS Advanced(Grouping, Dimension, Display, Positioning, Floating, Align, Pseudo class, Navigation Bar, Image Sprites, Attribute sector), CSS Color, Creating page Layout and Site Designs.

Text Books:

- Kogent Learning Solutions Inc., “HTML 5 in simple steps”, Dreamtech Press.
- Steven M. Schafer, “HTML, XHTML, and CSS Bible”, 5ed Wiley India

Reference Books:

- Steven M. Schafer, “HTML, XHTML, and CSS Bible”, 5ed Wiley India
- John Duckett, “Beginning HTML, XHTML, CSS, and JavaScript”, Wiley India

MCA- C12
Analysis and Design of Algorithms

UNIT I

Analyzing algorithm: Asymptotic Notations: Big oh, Big omega, theta, small oh, small omega Analyzing algorithm: Time and space complexity (substitution, recurrence and master theorem method), Iterative and recursive function, Comparison based sorting, Linear sorting: Count Sort, Radix Sort, Bucket Sort and related problems.

UNIT II

Divide and Conquer: Time complexity and proof of correctness: Binary search, merge sort, Quick sort and randomized Quick sort Finding maximum and minimum in an array, Strassen's matrix multiplication, Basic Concept of tree: Binary tree representations (Array and Linked List representations), Heap Sort: Max heap, Min heap and Build heap.

UNIT III

Greedy Approach: Job Sequencing Problem, Huffman Coding, Fractional Knapsack, Basic concept of graph, Kirchoff's theorem, minimum cost spanning tree: Kruskal's and Prim's algorithm, single source shortest path: Dijkstra's and Bellman ford algorithm.

UNIT IV

Dynamic Programming: Fibonacci series, longest common subsequence, 0/1 Knapsack, Matrix chain multiplication, Floyd warshall's algorithm, Introduction of complexity classes: P, NP, NP-Hard, NP-Complete.

Text Books:

- T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, "Introduction to Algorithms", 3rd Edition, 2010, Prentice-Hall of India Learning Pvt. Ltd.
- Ellis Horowitz, SartajSahni and Sanguthevar Rajasekaran, "Computer Algorithms/C++", 2nd Edition, Universities Press, 2007.

Reference Books:

- R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, "Introduction to Design and Analysis of Algorithms A strategic approach", Mc Graw Hill
- Aho, Ullman and Hopcroft, "Design and Analysis of algorithms", Pearson education

Annexure: 4

AC approval of NOC

Ordinance No. 51 to the Executive Council after incorporating suggestions for its approval.

Item No: 18.14(T) **To place before the Academic Council for consideration and approval the matter pertaining to Eight Assistant Professors of Central University of Himachal Pradesh who enrolled in Ph.D. and grant of NoC and Study Leave.**

Central University of Himachal Pradesh has enrolled its following eight Assistant Professors working in different departments in October, 2015 for admission in Ph.D. programme:-

Sr. No.	Name of the teacher	Date of Appointment in CUHP
1.	Sh. Harikrishnan B.	15.02.2013
2.	Sh. Kuldip Singh	30.01.2013
3.	Ms. Ambreen Jamali	30.11.2012
4.	Sh. Kamal Singh	12.11.2012
5.	Ms. Renu Bhandari	01.07.2013
6.	Sh. Nimmala Karunakar	09.11.2012
7.	Sh. Keshav Singh Rawat	23.11.2012
8.	Sh. Arun Bhatia	12.11.2012

Above mentioned teachers also applied for Ph.D. Programme and got admitted. There applications for NoC and Study Leave are still pending in the office due to some technical reasons.

The Academic Council keeping in view the interest of the institution and also of these teachers resolved that NoC be issued by the Vice-Chancellor in favour of these teachers and requested the Executive Council to grant Study Leave w.e.f. the date of beginning of Course Work to the end of course work examination provided that the applicant has completed the three years of regular service in the University prior to the date of beginning of the Course Work for Ph.D.

The meeting ended with a vote of thanks to the Chair

Ex Officio Secretary &
Registrar, CUHP, Dharamshala

Confirmed

Prof. (Dr.) Kuldip Chand Agnihotri
Chairman &
Vice-Chancellor, CUHP, Dharamshala

NOC:

NOC:

हिमाचल प्रदेश केन्द्रीय विश्वविद्यालय

Central University of Himachal Pradesh

कैंप कार्यालय, एचपीसीए क्रिकेट स्टेडियम के निकट, धर्मशाला, जिला - कांगड़ा, हिमाचल प्रदेश – 176215
Camp Office, Near HPCA Cricket Stadium, Dharamshala, District Kangra (HP)-176215
Phone No. 01892-229574; Fax No. 01892-229331; E-mail : registrar.cuhp@gmail.com

फा.सं. : 6-38/ हि.प्र.के.वि./संस्थापना/2012(खंड –II)/6675-77 दिनांक: 25 अक्टूबर, 2019

सेवा में,

श्री केशव सिंह रावत
सहायक प्रोफेसर
कंप्यूटर विज्ञान एवं सूचना विज्ञान विभाग ,
धौलाधार परिसर, धर्मशाला, जिला कांगड़ा (हि.प्र.)-176215

विषय : अनापत्ति प्रमाण पत्र जारी करने के संबंध में ।

महोदय,

आपके आवेदन दिनांक 11.6. 2018 के संदर्भ में शैक्षणिक परिषद् की 18.03.2017 को हुई 18वीं बैठक की मद संख्या 18.3(T) और उसके उपरांत कार्यकारिणी परिषद् की 18.04.2017 को हुई 27वीं बैठक की मद संख्या 27.7(T) के निर्णय के अनुसार आपके पक्ष में उच्चतर शिक्षा के लिए आवेदन करने हेतु अनापत्ति प्रमाण पत्र जारी किया जाता है |

भवदीय

(डॉ. संजीव शर्मा)
कुलसचिव (अतिरिक्त प्रभार)

पृष्ठांकन सं. : समसंख्या दिनांक: 25 अक्टूबर, 2019

प्रति निम्नलिखित को सूचनार्थ एवं आगामी कार्रवाई हेतु अग्रेषित :

1. अधिष्ठाता, गणित, कंप्यूटर विज्ञान एवं सूचना विज्ञान स्कूल, हि.प्र.के.वि., टैब शाहपुर ।
2. कुलपति, हि.प्र.के.वि. के विशेष कार्य अधिकारी- कृपया माननीय कुलपति महोदय के सूचनार्थ ।

कुलसचिव (अतिरिक्त प्रभार)

Minutes of RAC

हिमाचल प्रदेश केंद्रीय विश्वविद्यालय

Central University of Himachal Pradesh

(Established under Central Universities Act 2009)

अस्थाई शैक्षणिक खण्ड ,शाहपुर ,ज़िलाकाँगड़ा) ,हि.प्र - (.176206

Temporary Academic Block, Shahpur ,Distt. Kangra (HP) - 176206

MINUTES OF RESEARCH ADVISORY COMMITTEE (RAC) MEETING OF DEPARTMENT OF COMPUTER SCIENCE AND INFORMATICS ON 17TH SEP 2020

A Meeting of the Research Advisory Committee (RAC) of the department of Computer Science and Informatics was held on 17th September, 2020 at 02.00 PM. At the outset, Prof. Sandeep Kumar Sood, Head, Computer Science and Informatics (Chairman) extended a warm welcome to all members for sparing their valuable time to attend this meeting.

The following members of RAC attended the meeting:

1. Prof. Sandeep Kumar Sood (Chairman)
2. Dr. Mahesh Kulharia (Member)
3. Dr. Shivarama Rao K (Member)

Thereafter the following items were discussed-

1. The matter regarding change in the Supervisor of the following research scholar:

Name of Student with Roll No.	Name of old Supervisors	Name of new Supervisor	Topic
Mr. Keshav Singh Rawat (CUHP15 RDCS01)	Prof. I.V. Malhan (Supervisor)	Prof. Sandeep Kumar Sood (Supervisor)	Knowledge discovery based on data mining techniques in higher education

The application has been received on 5th October 2019 from Mr. Keshav Singh Rawat, research scholar, Department of Computer Science and Informatics regarding change of Supervisor, as his previous allotted supervisor Prof. I.V. Malhan has retired on 31th May 2019 and Prof. Sandeep Kumar Sood has joined the department on 4th October 2019 and he has agreed to supervise his Ph.D. The matter is placed to change the Supervisor of Mr. Keshav Singh Rawat and approve Prof. Sandeep Kumar Sood as new Supervisor.

After the discussion, the RAC approved and forward to the Board of Studies approval regarding change the Supervisor of Mr. Keshav Singh Rawat and approve Prof. Sandeep Kumar Sood as new Supervisor

2. The matter regarding approval the Supervisor to supervise research work of the following research scholar:

S. No.	Name of Student	Name of Supervisor	Area of Research	Date of Joining of student for Ph.D.
1.	Mr. Girish Sharma	Prof. Sandeep Kumar Sood	3-D Printing Technologies	01-08-2020

17/9/2020 17/9/20

2.	Mr. Manoj Dhiman	Prof. Sandeep Kumar Sood	IoT Based Cloud and Fog Assisted Framework for Rural Healthcare	01-08-2020
3.	Mr. Dheeraj Kumar	Prof. Sandeep Kumar Sood	IoT Based Frameworks for Covid 19 using Fog And Cloud Computing	01-08-2020

The above mentioned research scholars have admitted in PhD on 01/08/2020, the matter is placed for approval the Supervisor to supervise research work of the mentioned research scholars in the above list.

After the discussion, the RAC approved and forward this matter to the Board of studies for approval.

THE MEETING ENDED WITH THE VOTE OF THANKS TO THE CHAIR

Dr. Mahesh Kulharia 12/9/2020
(Member)

Dr. Shivarama Rao K
(Member)

Prof. Sandeep Kumar Sood
(Chairman)

Previous Supervisor NOC-

Gmail Keshav Rawat <keshav79699@gmail.com>

Reg: NOC for a change of supervisor

2 messages

Keshav <keshav79699@gmail.com> Thu, Sep 24, 2020 at 10:09 AM
To: Inder Malhan <imalhan_47@rediffmail.com>, Inder Malhan <imalhan47@gmail.com>

Respected Sir,

With due respect, as per discussion with you regarding the change of my Ph.D. Supervisor and the availability of research supervisor in the department i.e., Prof. Sandeep Kumar Sood. I request you to give NOC for a change of supervisor.

Thank you

Name: Keshav Singh Rawat

Roll No:CUHP15RDCS01

Title: Knowledge discovery based on data mining techniques in higher education

सादर / Regards,

केशव सिंह रावत / Keshav Singh Rawat
असिस्टेंट प्रोफेसर / Assistant Professor
कंप्यूटर साइंस एंड इन्फार्मेटिक्स / Computer Science & Informatics
Central University of Himachal Pradesh, Dharamsala
मोबाइल / Mob. : 7018158005
ई-मेल / E-mail : keshav79699@gmail.com
keshav@cuhimachal.ac.in

Inder malhan <imalhan_47@rediffmail.com> Thu, Sep 24, 2020 at 11:07 AM
To: Keshav <keshav79699@gmail.com>

I have no objection. Best wishes

Prof I V Malhan,
Fellow ,SIS
President, Indian Association of Teachers of Library & Inf. Sc.
Former, Incharge, TAB, Shahpur CUHP Campus
Former, Dean, Academic,CUHP
Former,Director,Centre for Development of Multimedia Systems ,CUHP
Former, Head,DLIS & Dean,School of Mathematics, Computers & Information Science,CUHP
Former,Member AC & EC, CUHP, Dharamshala
Former, Dean, Faculty of Social Sciences, University of Jammu(UOJ)
Former, Dean, Faculty of Behaviour Sciences(UOJ)
Former, Director,Academic Staff College,UOJ
Former,Head,DLIS. UOJ
Former I/C UOJ Library System
Former,Member,AC & Syndicate(UOJ)

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