

CASC -19P	Lab 12: Mobile Application Development		
CASC -20T	Fundamentals of IoT and Applications		
CASC -20P	Lab 14: Fundamentals of IoT and Applications		

Program Outcomes (PO):

- Gain a complete exposure to the theories and practices of Computer Application.
- Get transformed into a skilled learner and active programmer, enabling the students to focus on their higher studies.
- Value computer professionals and programmers.
- Explore how the concepts and applications of Computer lead to innovative thinking with a problem-solving attitude.

Program Specific Outcomes (PSO):

- Understand the basic computer knowledge and concept of operating systems.
- Understanding the concept of programming and develop program in C++.
- Understanding the concept of data structure and implementation with C/C++.
- Understanding the concept of DBMS and implementation in MySQL /Oracle.
- Understanding the concept of OOPs and Java programming and develop program in Java.
- Understanding the concept of web technology and its implementation with HTML/CSS/DHTML/PHP.
- Understand the basic concept of data and computer networks.
- Understanding the basic concept of digital electronics.
- Understanding the basic concept of cyber security and cyber law.
- Understanding the basic concept of Artificial Intelligence.

~~Dr. H.S. Hota~~
(Chairman)

~~Dr. K.B. Dubey~~

~~Dr. S.K. Sahu~~

~~Dr. J.K. Singh~~

~~Dr. Anil Sharma~~

~~Dr. S. Jain~~

~~R. Khuntia~~

Sushil
(Sushil Kumar Sahu)

~~Dr. P.K. Gupta~~
11/06/21
Dr. P.K. Gupta

~~Dr. Anand Kumar~~
(Dr. Anand Kumar)

~~Dr. Suresh Thakur~~

~~Dr. Suresh Thakur~~
18-06-2019
Dr. Suresh Thakur

~~Dr. Shailendra Arora~~
(Shailendra Arora)

~~Anjeeta Kujur~~
ANJEETA KUJUR

~~Dr. H.S.P. Taneja~~
(H.S.P. Taneja)

CURRICULUM STRUCTURE

Scheme

Program: BCA

Discipline: Computer Application

Semester	Course Type	Course Code	Course Title	Total Credit	Total Marks	
					Max	Min
1 st Semester	DSC (Major/Core)	CASC-01	Discrete Mathematics	4	100	40
		CASC-02T	Computer Fundamental and MS-Office	3	100	40
		CASC-02P	Lab 1: MS-Office	1	50	20
		CASC-03T	Operating System	3	100	40
		CASC-03P	Lab 2: Operating System	1	50	20
2 nd Semester	DSC (Major/Core)	CASC-04	Digital Electronics	4	100	40
		CASC-05T	Programming in C++	3	100	40
		CASC-05P	Lab 3: Programming in C++	1	50	20
		CASC-06T	Data Structure	3	100	40
		CASC-06P	Lab 4: Data Structure Using C++	1	50	20
3 rd Semester	DSC (Major/Core)	CASC-07	Software Engineering	4	100	40
		CASC-08T	Relational Database Management System	3	100	40
		CASC-08P	Lab 5: Relational Database Management System (Oracle/MySQL)	1	50	20
		CASC-09T	Programming in Java	3	100	40
		CASC-09P	Lab 6: Programming in Java	1	50	20
	DSE	CASE-01	Cyber Security and Cyber Law	4	100	40
4 th Semester	DSC (Major/Core)	CASC-10	Theory of Computation	4	100	40
		CASC-11T	Web Technology	3	100	40
		CASC-11P	Lab 7: Web Technology	1	50	20
		CASC-12T	Python Programming	3	100	40
		CASC-12P	Lab 8: Python Programming	1	50	20

*JMP
Conven*

Dr. H.S. Hota
(Chairman)

Dr. K.B. Dubey
(Dr. K.B. Dubey)

Dr. S.K. Saha
(Dr. S.K. Saha)

Dr. Anand Sharma
(Dr. Anand Sharma)

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	DSE	CASE-02	Artificial Intelligence and Expert System	4	100	40
5 th Semester	DSC (Major/Core)	CASC-13	Data Mining and Data Warehousing	4	100	40
		CASC-14T	Programming in .Net	3	100	40
		CASC-14P	Lab 9: Programming in .Net	1	50	20
		CASC-15T	Machine Learning	3	100	40
		CASC-15P	Lab 10: Machine Learning	1	50	20
	DSE	CASE-03	Numerical Analysis	4	100	40
6 th Semester	DSC (Major/Core)	CASC-16	Data Communication and Computer Networking	4	100	40
		CASC-17T	Advanced Java	3	50	20
		CASC-17P	Lab 11: Advanced Java	1	100	40
		CASC-18	Major Project-1	4	50	20
	DSE	CASE-04	Computer System Architecture	4	100	40
7 th Semester	DSC (Major/Core)	CASC-19T	Mobile Application Development	3	100	40
		CASC-19P	Lab 12: Mobile Application Development	1	50	20
	DSE	CASE-05	Computer Graphics	4	100	40
		CASE-06T	Cloud Computing	3	100	40
		CASE-06P	Lab 13: Cloud Computing	1	50	20
		CASE-07	Cryptography and Network Security	4	100	40
		CASE-08	Advanced Operating systems	4	100	40
8 th Semester	DSC (Major/Core)	CASC-20T	Fundamentals of IoT and Applications	3	100	40
		CASC-20P	Lab 14: Fundamentals of IoT and Applications	1	50	20
	DSE	CASE-09	Soft Computing	4	100	40
		CASE-10	Digital Image Processing	4	100	40
		CASE-11	Big Data Analytics	4	100	40
		CASE-12	Major Project - 2	4	100	40

Dr H.S. Hota
(Chairman)

Dr K.B. Dubey

Dr. S. K. Saha

Dr. S. K. Saha

Dr. Anil Sharma

Dr. Anil Sharma

Dr. S. Datta

H.S.P. Tondle

Sushil Kumar Saha

Dr. Anil Sharma

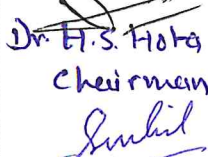
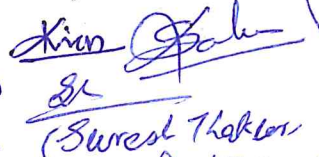
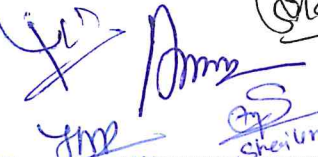


Shantilal Asy

ANJEETA KUMAR

Dr. Anil Sharma

Dr. Anil Sharma

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER APPLICATION
COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Computer Application <i>(Certificate / Diploma / Degree/Honors)</i>		Semester - VII	Session: 2024-2025
1	Course Code	CASC-19T	
2	Course Title	Mobile Application Development	
3	Course Type	DSC (Discipline Specific Course)	
4	Pre-requisite	As per program	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: <ul style="list-style-type: none"> • Apply general programming knowledge in the field of developing mobile applications. • Develop and deploy mobile applications into different hosting services. • Interact between user interface and underlying application. • Understand the full life cycle development of mobile apps. • Plan and carry out design work including developing a prototype that can be evaluated with a specified user group. 	
6	Credit Value	3 Credits	Credit = 15 Hours - Learning & Observation
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40
PART -B: Content of the Course			
Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)			
Unit	Topics (Course contents)		No. of Period
I	Introduction to Mobile Applications: History of Android, Android Features, Android Versions, Fundamentals: Basic Building blocks, Activities, Intents, Services, Broadcast Receivers, Intent Filters and Activity Stack. Android Development: Development IDE: Android Studio, Eclipse; Android Virtualization Framework, Creating Android Virtual Device (AVD), System Images in AVD, creating a Hardware Profile in AVD, Creating an Emulator Skin, Creating and Running a Simple Hello World Program.		12
II	Basic UI Design: Styles & Themes, Form widgets, Text Fields, Layouts: Relative Layout Table Layout, Frame Layout, Linear Layout, Nested layouts (dip, dp, sip, sp versus px), styles.xml, Drawable Resources for Shapes, gradients (selectors), Style attribute in the Layout File, Alert Dialogs & Toast, Time and Date, Images and media.		11
III	Android Interface: View and Notifications: creation and display; Menus: Options menu, Context menu, Pop-up Menu; Input Controls: Buttons, Text Fields, Checkboxes, Alert Dialogs, Spinners, Rating bar, Progress bar, Android Threads and Thread Handlers, Content Providers, Android File System, and Databases (SQLite, Firebase).		11
IV	Messaging and Location-Based Services: Sending SMS Messages Programmatically, Getting Feedback After Sending the Message, Receiving and Sending Email, Introduction to Location-based service, Configuring an Android Emulator for Location-Based Services, Geocoding and Map-Based Activities, Different Types of Permission in Android, Android Connectivity, Different types of Sensors, Android App Testing, Android App Deployment.		11
Keywords	<i>Android Studio, Eclipse, Virtualization, Debugging, Android Layout, Android UI Design, Android Menus, Toast, Spinners, Threads, Geocoding, Sensor, Android Connectivity, Android App Testing.</i>		
Name and Signature of Convener & Members of CBoS:			
<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="text-align: center;">  Dr. H.S. Hota Chairman </div> <div style="text-align: center;">  Kiran Secy </div> <div style="text-align: center;">  Suresh Thakkar Convener </div> <div style="text-align: center;">  Anshu Member </div> <div style="text-align: center;">  ANJEETA Kujur Member </div> </div>			

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER APPLICATION
COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Computer Application <i>(Certificate / Diploma / Degree)</i>		Semester - VII	Session: 2024-2025
1	Course Code	CASC-19P	
2	Course Title	LAB 12: Mobile Application Development	
3	Course Type	Practical	
4	Pre-requisite	<i>As per program</i>	
5	Course Learning Outcomes (CLO)	<p>At the end of this course, the students will be able to:</p> <ul style="list-style-type: none"> • Apply general programming knowledge in the field of developing mobile applications. • Design and develop an Android app for different real-time activities and purposes. • Develop and deploy mobile applications into different hosting services. • Understand the specific requirements, possibilities, and challenges when developing for a mobile context. • Interact between user interface and underlying application. • Understand the full life cycle development of mobile apps. • Plan and carry out design work including developing a prototype that can be evaluated with a specified user group. • Reflect on possibilities and demands in collaborative software development. 	
6	Credit Value	1 Credits	<i>Credit =30 Hours Laboratory or Field Learning/Training</i>
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20
PART -B: Content of the Course			
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)			
Module	Topics (Course contents)		No. of Period
Lab./Field Training/ Experiment Contents of Course	<ol style="list-style-type: none"> 1. Create “Hello World” application that will display “Hello World” in the middle of the screen in the red color with white background. 2. Create Custom Toast & Dialog Box. 3. Design an application that contains phone contacts in vertical linear manner. Selected contact appears at the top of the list with a large italicized font and a blue background. 4. Create an application that uses Layout Managers and Event Listeners. 5. Develop a standard calculator application to perform basic calculations like addition, subtraction, multiplication and division. 6. Design an application to draws basic graphical primitives (rectangle, circle) on the screen. 7. Design an android application Using Radio buttons. 8. Create a user registration application that stores the user details in a database table. 9. Build a mobile application that create, save, update and delete data in database. 10. Create an application that takes the name from a text box and shows hello message along with the name entered in text box, when the user clicks the OK button. 11. Devise an application that implements Multithreading. 12. Develop a mobile application that uses GPS location information. 		30

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 Marks

Continuous Internal Assessment (CIA): 15 Marks

End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 10 & 10	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
	Assignment/Seminar +Attendance - 05 Total Marks - 15	
End Semester Exam (ESE):	Laboratory / Field Skill Performance: On spot Assessment A. Performed the Task based on lab. work - 20 Marks B. Spotting based on tools & technology (written) - 10 Marks C. Viva-voce (based on principle/technology) - 05 Marks	Managed by Course teacher as per lab. status

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hote
Chairman

Kris

Gulab

[Signature]

[Signature]

Oral

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[Signature]

[Signature]

[Signature]
(Suresh Thakur)

[Signature]
Shivendra Agn

[Signature]
ANJETA KUR

[Signature]

[Signature]
Secretary

[Signature]

[Signature]
11/06/24
Dr. H.S. Hote

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Foley, Van Dam, Feiner, Hughes, Computer Graphics Principles & practice, 2000.
- D.J. Gibbs & D.C. Tsichritz: Multimedia programming Object Environment & Frame work, 2000.

Reference Books Recommended:

- Ralf Skinmeiz and Klana Naharstedt, Multimedia: computing, Communication and Applications, Pearson, 2001
- D. Haran & Baker. Computer Graphics Prentice Hall of India, 1986.

Online Resources:

- NPTEL: https://onlinecourses.nptel.ac.in/noc20_cs90
- https://mrcet.com/downloads/digital_notes/CSE/III%20Year/COMPUTER%20GRAPHICS%20NOTES.pdf
- <http://www.aagasc.edu.in/cs/COMPUTER%20GRAPHICS%20NOTES.pdf>
- [https://archive.mu.ac.in/myweb_test/S.Y.B.Sc.\(IT\)%20\(Sem%20%20III%20\)%20Computer%20Graphics.pdf](https://archive.mu.ac.in/myweb_test/S.Y.B.Sc.(IT)%20(Sem%20%20III%20)%20Computer%20Graphics.pdf)

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks
 Continuous Internal Assessment (CIA): 30 Marks
 End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 20 +20	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
	Assignment / Seminar - 10	
	Total Marks - 30	

End Semester Exam (ESE):	Two section – A & B
	Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks
	Section B: Descriptive answer type qts., 1 out of 2 from each unit-4x10=40 Marks

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
chairman

Kiran

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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Distributed Computing by Dollymore Cloud Computing (Wind) by Dr. Kumar Saurabh, 2nd Edition, Wiley India.

Reference Books Recommended:

- Cloud Computing: Principles and Paradigms, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wiley, 2011
- Cloud Computing: Principles, Systems and Applications, Editors: Nikos Antonopoulos, Lee Gillam, Springer, 2012.
- Handbook of Cloud Computing by Anand Nayyar, Publisher: BPB Publication.

Online Resources:

- Introduction to Cloud Computing from W3school: <https://www.w3schools.in/cloud-computing/tutorials/>
- Introduction to Cloud Computing from Coursera: <https://www.coursera.org/learn/introduction-to-cloud>
- Cloud Computing Basics: <https://www.coursera.org/learn/cloud-computing-basics>
- Cloud Computing Concepts: <https://www.coursera.org/learn/cloud-computing>
- Cloud Computing Specialization from Coursera: <https://www.coursera.org/specializations/cloud-computing>
- Cloud Computing from SWAYAM/NPTEL: https://onlinecourses.nptel.ac.in/noc22_cs20/preview
<https://www.youtube.com/channel/UCK73enkjFQNDwdBqMyaMtRg>
- Cloud Computing Basics: https://terrorgum.com/tfox/books/cloudcomputingbasics_asefteachingintroduction.pdf
- CLOUD COMPUTING Principles and Paradigms : https://dphoto.lecturer.pens.ac.id/lecture_notes/internet_of_things/CLOUD%20COMPUTING%20Principles%20and%20Paradigms.pdf
- Cloud Computing Tutorial For Beginners: https://www.youtube.com/watch?v=fLV_t2qKYyU
- Introduction to Cloud Computing: <https://www.youtube.com/watch?v=Dv0sjAYnVCY>
- Cloud Computing Tutorials: <https://www.youtube.com/watch?v=NyA9PB6j8bg>

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Internal Assessment (CIA): 30 Marks

End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2):	20 +20	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
	Assignment / Seminar -	10	
	Total Marks -	30	

End Semester Exam (ESE):	Two section – A & B Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks Section B: Descriptive answer type qts..1 out of 2 from each unit-4x10=40 Marks
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Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

(Signatures of other members)

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER APPLICATION
COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor of Computer Application (Certificate / Diploma / Degree)		Semester - VII	Session: 2024-2025
1	Course Code	CASE-06P	
2	Course Title	Lab 14: Cloud Computing	
3	Course Type	Practical	
4	Prerequisite	As per program	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: <ul style="list-style-type: none"> • Identify the appropriate cloud services for a given application. • Assess the comparative advantages and disadvantages of Virtualization technology. • Analyze authentication, confidentiality and privacy issues in cloud computing. • Identify security implications in cloud computing. • Understand the importance of protocols and standards in management for cloud services. 	
6	Credit Value	1 Credits	Credit =30 Hours Laboratory or Field Learning/Training
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20

PART -B: Content of the Course

Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)

Module	Topics (Course contents)	No. of Period
List of Practical Experiment	<p>Note: This is tentative list; the teachers concern can add more experiments as per requirement.</p> <ol style="list-style-type: none"> 1. Use gcc to compile c-programs. Split the programs to different modules and create an application using make command. 2. Use version control systems command to clone, commit, push, fetch, pull, checkout, reset, and delete repositories. 3. Install Virtualbox/VMware Workstation with different flavours of linux or windows OS on top of windows7 or 8. 4. Install a C compiler in the virtual machine created using virtual box and execute Simple Programs 5. Install Google App Engine. Create hello world app and other simple web applications using python/java. 6. Use GAE launcher to launch the web applications. 7. Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim. 8. Find a procedure to transfer the files from one virtual machine to another virtual machine. 9. Find a procedure to launch virtual machine using trystack (Online Openstack Demo Version) 10. Install Hadoop single node cluster and run simple applications like word count. 	30
Keywords	Cloud Computing, Security, Governance, Storage, Virtualization.	

Name and Signature of Convener & Members of CBoS:

Dr. H. S. Hota
 chairman
 Anurag
 Suresh Thakur
 Anjesta Kujur

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, Mastering Cloud Computing, McGraw Hill Education.
- Barrie Sosinsky, “Cloud Computing Bible”, Wiley India Edition.
- Anthony Velte, Toby Velte, Robert Elsenpeter, “Cloud Computing – A Practical Approach”, Tata McGraw-Hill Edition.
- Kailash Jayaswal et al., Kogent Learning Solutions, Cloud Computing: Black Book, Dreamtech Press.

Reference Books Recommended:

- Rajkumar Buyya et al., Cloud Computing: Principles and Paradigms, Wiley India.
- Cloud Computing: Concepts, Technology & Architecture, Erl, Pearson Education India.
- Barrie Sosinsky, Cloud Computing Bible, O'Reilly Media.
- Toby Velte, Anthony Vote and Robert Elsenpeter, Cloud Computing: A Practical Approach, McGraw Hill.
- George Reese, Cloud Application Architectures: Building Applications and Infrastructures in the Cloud, O'Reilly Media.

Online Resources:

- Swayam/NPTEL: https://www.youtube.com/channel/UC6ZY_csXZc7YZZm2W8HcQ6A
- Javatpoint: <https://www.javatpoint.com/iot-internet-of-things>
- Tutorialspoint: https://www.tutorialspoint.com/internet_of_things/index.htm
- Topics Related to IOT from data-flair: <https://data-flair.training/blogs/iot-tutorial/>
- Topics Related to IOT from edureka: <https://www.edureka.co/blog/iot-tutorial/>
- Coursera: <https://www.coursera.org/courses?query=computing>
- Introduction to Cloud Computing from W3shool: <https://www.w3schools.in/cloud-computing/tutorials/>
- Introduction to Cloud Computing from Coursera: <https://www.coursera.org/learn/introduction-to-cloud>
- Cloud Computing Basics: <https://www.coursera.org/learn/cloud-computing-basics>
- Cloud Computing Concepts: <https://www.coursera.org/learn/cloud-computing>
- Cloud Computing Specialization from Coursera: <https://www.coursera.org/specializations/cloud-computing>
- Cloud Computing from SWAYAM/NPTEL https://onlinecourses.nptel.ac.in/noc22_cs20/preview
<https://www.youtube.com/channel/UCK73enkjfQNDwdBqMyaMtRg>
- Lab Manuals:
- <https://annauniversityedu.blogspot.com/2020/10/cs8711-cloud-computing-laboratory.html>
- <https://drive.google.com/file/d/1oiuQYwkgFXy4R4518us4ynnXNFqx6OkW/view>
- <https://www.vidyarthiplus.com/vp/attachment.php?aid=53342>
- https://www.iare.ac.in/sites/default/files/lab1/CAD%20LAB%20UPDATED%20BY%20ANJAIH-%20FINAL_0.pdf
- <https://jainakshay781.files.wordpress.com/2019/02/final-cc-lp-iv-manual-1.pdf>
- <http://www.gpcet.ac.in/wp-content/uploads/2018/08/GCC-LAB-MANUAL.pdf>

- <https://shanpnk.weebly.com/uploads/5/8/9/4/58948709/gcclab-courseware-labmanual.pdf>
- <https://www.bharathuniv.ac.in/downloads/esc/BCS7L1%20-Grid%20&%20Cloud%20Computing%20lab.pdf>

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 Marks

Continuous Internal Assessment (CIA): 15 Marks

End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 10 & 10 Assignment/Seminar +Attendance - 05 Total Marks - 15	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
End Semester Exam (ESE):	Laboratory / Field Skill Performance: On spot Assessment A. Performed the Task based on lab. work - 20 Marks B. Spotting based on tools & technology (written) - 10 Marks C. Viva-voce (based on principle/technology) - 05 Marks	Managed by Course teacher as per lab. status

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

Krish Babu

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[Signature]
(Sponon Thakur)

[Signature]
Sheelendra

[Signature]
Ananta Kumar

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ANJEETA KUMAR

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FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER APPLICATION
COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Computer Application <i>(Certificate / Diploma / Degree/Honors)</i>		Semester - VII	Session: 2024-2025
1	Course Code	CASE-07	
2	Course Title	Cryptography and Network Security	
3	Course Type	DSE (Discipline Specific Elective)	
4	Pre-requisite	<i>As per program</i>	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: <ul style="list-style-type: none"> • Classify the symmetric encryption techniques. • Illustrate various Public key cryptographic techniques. • Evaluate the authentication and hash algorithms. • Summarize the intrusion detection and its solutions to overcome the attacks. • Basic concepts of system level security. 	
6	Credit Value	4 Credits	Credit = 15 Hours - Learning & Observation
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40

PART -B: Content of the Course

Total No. of Teaching-learning Periods (01 Hr. per period) – 60 Periods (60 Hours)

Unit	Topics (Course contents)	No. of Period
I	Classical Encryption Technique: Basics of computer network, TCP/IP model, Foundations of Cryptography and security trends, Secret key vs public key cryptography, Symmetric cipher model, substitution techniques, Transportation techniques, Mathematical tools for cryptography: modular arithmetic, Euclidean algorithm, finite fields, polynomial arithmetic. Symmetric cipher: Symmetric cipher model, Traditional block cipher: Stream and block cipher, Feistel cipher network structure, Design Principles of Block Ciphers, Data Encryption Standard (DES), Strength of DES Triple DES, Block cipher design principal, Block cipher operation, Advance encryption Standard (AES), Evaluation criteria of AES, AES transformation function, key distribution.	15
II	Public Key cryptography and Hash Function: Principles of public key cryptosystem, requirement, RSA algorithm. Hash function, Key management: Diffie-Helman Key exchange, Man in the middle attack, elliptic curve arithmetic, elliptic curve cryptography, Application of cryptographic hash function, Hash and Message authentication Code (MAC), Hash and MAC algorithms, MAC based on hash function, Digital signature and Authentication protocol. Key management and distribution: Distribution of symmetric key and public key, Public key Infrastructure (PKI).	15
III	IP and Web security protocols: User authentication: principle, Remote user authentication using symmetric and asymmetric encryption, Kerberos, E-mail security: Pretty Good Privacy (PGP), S/MIME, IP security: IPsec, transport layer Security: Secure Socket layer (SSL), Secure Electronic Transaction (SET).	15
IV	Network Security and Management: Principles of cryptography, Authentication, integrity, key distribution and certification, Access control and Firewalls, attacks and counter measures, security in many layers. Infrastructure for network management, The internet standard management framework, SMI, MIB, SNMP, Security and administration.	15

Keywords *Symmetric Cipher, Hash, Message Authentication Code (MAC), Public key, Private key, Secure Socket Layer (SSL), Secure Electronic Transaction (SET).*

Name and Signature of Convener & Members of CBoS:

Dr. H. S. Hota
Chairman

ANJEETA Kujur

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Cryptography and Network Security, William Stallings, 4th Edition Pearson Publication.
- Network security and cryptography, Bernard Menezes, Cenage Learning India Pvt. Ltd. First edition 2010.

Reference Books Recommended:

- Applied cryptography - protocols and algorithm, Bruce Schneier, Springer Verlag 2003.
- Cryptography and Network Security, Atul Kahate, TMH Publication.
- Cryptography and Network Security, Behrouz A. Forouzan, First Edition, TMH Publication.
- Network Security: Private Communication in Public World By Charlie Kaufman, Radia Perlman and Mike Speciner, PHI Publication.

Online Resources:

- Swayam/NPTEL: https://onlinecourses.nptel.ac.in/noc20_cs21/preview
- Swayam/NPTEL: https://onlinecourses.nptel.ac.in/noc20_cs02/preview
- Coursera: <https://www.coursera.org/search?query=Cryptography>
- Coursera: <https://www.coursera.org/search?query=network%20security&>
- <https://www.gatevidyalay.com/tag/cryptography-and-network-security-tutorial/>
- <https://www.javatpoint.com/computer-network-security>
- <https://www.geeksforgeeks.org/cryptography-introduction/>
- <https://www.tutorialspoint.com/cryptography/index.htm>
- https://www.vssut.ac.in/lecture_notes/lecture1428550736.pdf
- Lab Manuals:
 - <http://www.anuraghyd.ac.in/cse/wp-content/uploads/sites/10/NS-CRYPTO-LAB-Final11.pdf>
 - <https://www.vvitengineering.com/lab/odd/CS6711-Security-Lab-Manual.pdf>
 - <https://www.vidyarthiplus.com/vp/attachment.php?aid=53300>
 - <https://kgr.ac.in/storage/2021/08/CNS-LAB-Manual.pdf>

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Internal Assessment (CIA): 30 Marks

End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 20 +20	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
	Assignment / Seminar - 10	
	Total Marks - 30	

End Semester Exam (ESE):

Two section - A & B

Section A: Q1. Objective - 10 x1 = 10 Mark; Q2. Short answer type- 5x4 =20 Marks
Section B: Descriptive answer type qts., 1 out of 2 from each unit-4x10=40 Marks

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

[Signature]

[Signature]
Suresh Thakur

[Signature]
Shankar Singh

[Signature]
Dial

[Signature]
Ramesh Kumar

[Signature]
Anvika Bante

[Signature]
Anjeeta Kujur

[Signature]
ANJEETA KIJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER APPLICATION
COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Computer Application (Certificate / Diploma / Degree/Honors)		Semester – VII	Session: 2024-2025
1	Course Code	CASE-08	
2	Course Title	Advanced Operating Systems	
3	Course Type	DSE (Discipline Specific Elective)	
4	Prerequisite	As per program	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: <ul style="list-style-type: none"> • Knowledge about advanced concepts in OS. • Ability to develop OS for distributed systems. • Understand process synchronisation and concurrency control. • Understand the architecture and functioning of mobile operating system. • Ability to develop modules for mobile devices. 	
6	Credit Value	4 Credits	Credit = 15 Hours - Learning & Observation
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40

PART -B: Content of the Course

Total No. of Teaching–Learning Periods (01 Hr. per period) – 60 Periods (60 Hours)		
Unit	Topics (Course contents)	No. of Period
I	Multiprocessor Operating Systems: System Architectures, Structures of OS, OS design issues, Process synchronization, Process Scheduling and Allocation, memory management.	15
II	Distributed Operating Systems: System Architectures, Design issues, Communication models, clock synchronization, mutual exclusion, election algorithms, Distributed Deadlock detection, Distributed scheduling, Distributed shared memory, Distributed File system, Multimedia file systems, File placement, Caching.	15
III	Database Operating Systems: Requirements of Database OS, Transaction process model, Synchronization primitives, Concurrency control algorithms.	15
IV	Mobile Operating Systems: ARM and Intel architectures, Power Management, Mobile OS Architectures, Underlying OS, Kernel structure and native level programming, Runtime issues, Approaches to power management.	15

Keywords Multiprocessor operating system, Distributed operating system, Database operating System, Mobile Operating system.

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
 Chairman
 (Suresh Thakur)
 Anjeeta Kujur
 Shekhar Anj
 Anjeeta Kujur
 Anjeeta Kujur

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Mukesh Singhal, Niranjan Shivaratri, "Advanced Concepts in Operating Systems", TMH, 2001
- William Stallings, "Operating Systems – Operating System: Internals and Design Principles", Prentice Hall, 2005.

Reference Books Recommended:

- Andrew S. Tanenbaum, "Distributed Operating Systems", Pearson Education, 1995.
- Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, "Operating System Principles", John Wiley & Sons Inc., 2006.

Online Resources:

- Advanced Concepts in Operating Systems:
https://books.google.co.in/books/about/Advanced_Concepts_in_Operating_Systems.html?id=ajx9NAEACAAJ&redir_esc=y
- Distributed Operating System:
<https://www.javatpoint.com/distributed-operating-system>
- Mobile Operating System
 - <https://www.sciencedirect.com/topics/computer-science/mobile-operating-system>
 - https://baou.edu.in/assets/pdf/PGDMAD_101_slm.pdf
- Database operating System:
 - [https://www.redswitches.com/blog/database-operating-system/#:~:text=A%20Database%20Operating%20System%20\(DBOS,storage%2C%20retrieval%2C%20and%20manipulation.](https://www.redswitches.com/blog/database-operating-system/#:~:text=A%20Database%20Operating%20System%20(DBOS,storage%2C%20retrieval%2C%20and%20manipulation.)
 - <https://www.ibm.com/docs/en/psfa/7.2.1?topic=logs-database-operating-system>
 - <https://eeecs.berkeley.edu/230426-2/>

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

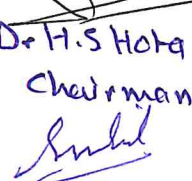


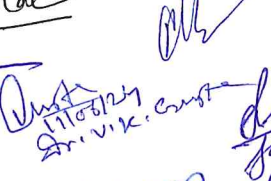
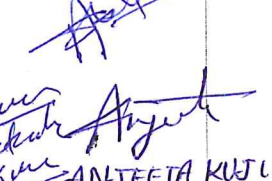
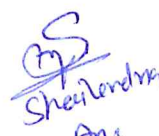
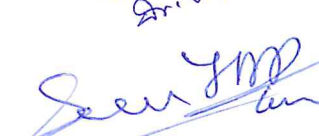
Continuous Internal Assessment (CIA): 30 Marks

End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 20 +20	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
	Assignment / Seminar - 10 Total Marks - 30	

End Semester Exam (ESE):	Two section – A & B Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks Section B: Descriptive answer type qts., 1 out of 2 from each unit-4x10=40 Marks
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Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
 Chairman

 Dr. K. S. Hota

 Dr. S. S. Hota

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