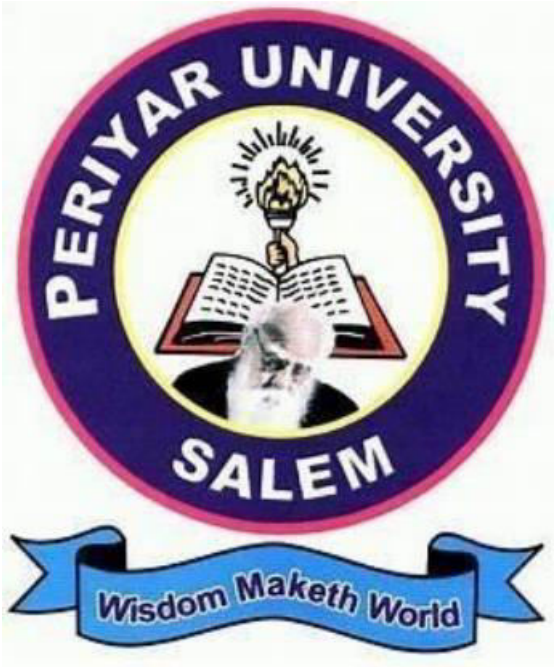
PERIYARUNIVERSITY

PERIYARPALKALAINAGAR

SALEM– 636011



DEGREEOFBACHELOROFSCIENCE

CHOICEBASEDCREDITSYSTEM

Syllabusfor

B.Sc., Digital and Cyber Forensic Science

(SEMESTERPATTERN-CBCS)

(ForCandidatesadmittedintheCollegeaffiliatedto Periyar

University from 2026-2027 onwards)

B.Sc., Digital and Cyber Forensic Science

Syllabus

REGULATIONS

1. EligibilityforAdmission:

Candidate seeking admission to the first year degree of Bachelor of Science in Digital and Cyber Forensic Science shall be required to have passed the Higher Secondary Examination with Mathematics / Statistics /Computer Science /Computer Technology/Computer Applications as one of the subjects conducted by the Governmentof Tamil Nadu or any other examination accepted by the syndicate of Periyar University, subjecttosuch conditionas,maybeprescribed thereto,arepermittedtoappearandqualify for B.Sc., Degree of this University after a course of three academic years.

2. Eligibilityforawardof degree:

A Candidate shall be eligible for the award of degree onlyif he/she has undergone, the prescribed courseofstudyin acollegeaffiliated to theUniversityforaperiod not lessthan three academic years, comprising six Semesters and passed the examination.

3. COURSEOFSTUDYANDSCHEME OFEXAMINATION

The course of study shall comprise instruction in the following subjects according to the syllabus and books prescribed from time to time. The scheme of examination of the different semesters shall be as follows;

TotalMarks:	**4300**
Part I:	400
Part II:	400
PartIII:	2300
Part IV:	1200
TotalCredits:	**140**
Part I:	12
Part II:	12
PartIII:	87
Part IV:	29

ProgrammeOutcomes (POs)	
OnsuccessfulcompletionoftheB.Sc.,DigitalandCyberForensicScience.	
PO1	Exhibitgood**domainknowledge**andcompletestheassignedresponsibilities effectivelyand efficientlyin parwith theexpected qualitystandards.
PO2	Apply**analyticalandcriticalthinking**toidentify,formulate,analyze,andsolve complex problemsinordertoreachauthenticated conclusions
PO3	**Designanddevelopresearch-basedsolutions**forcomplexproblemswith specifiedneedsthroughappropriateconsiderationforthepublichealth,safety, cultural, societal, and environmental concerns.
PO4	Establishtheabilityto**Listen,read,proficientlycommunicateandarticulate complexideas** withrespecttotheneedsandabilitiesofdiverse audiences.
PO5	**Deliverinnovativeideastoinstigatenewbusinessventuresand**possessthe qualitiesofagoodentrepreneur
PO6	Acquirethequalities ofa**goodleaderandengagein efficient decision-making.**
PO7	Graduateswillbeabletoundertakeanyresponsibilityasan**individual/memberof multidisciplinaryteamsandhaveanunderstandingofteamleadership**
PO8	Function as s**ocially responsible individual** with ethical values and accountable to ethicallyvalidateanyactionsordecisionsbeforeproceedingandactivelycontribute tothesocietal concerns.
PO9	Identifyand**addressoweducationalneedsi**nachangingworldinways sufficienttomaintainthecompetenceandtoallowthemtocontributetothe advancement of knowledge
PO10	**Demonstrateknowledgeandunderstandingofmanagementprinciplesa**nd applythesetooneownworktomanageprojectsandinmultidisciplinaryenvironment.

- Toemphasizethe importanceof scientificmethods in crimedetection.
- Todisseminateinformationon theadvancementsinthe fieldofcyberforensic science.
- Tohighlighttheimportanceofforensicscienceforperseveranceofthesociety.
- Togeneratetalentedhumanresource, commensuratewithlatest requirementsofdigital and cyber forensic science.
- Toreviewthestepsnecessaryforachievinghighestexcellenceincyberforensicscience.

- Toprovideaplatformforstudentsandforensicscientiststoexchangeviews,chalk-out collaborative programs and work in a holistic manner for the advancement of forensic science.

ProgrammeEducationalObjectives(PEOs)	
TheB.Sc.,DigitalandCyberForensicScienceprogramdescribeaccomplishmentsthat graduates are expected to attain within five to seven years after graduation.	
PEO1	Expertisewiththeknowledgeofinvestigationofcyberoffensesandonline frauds
PEO2	Handlecyberforensiclaboratorymethodologies withrespectto the examinationandanalysisofevidence.
PEO3	Developoral communicationskillsfordiscussingthescientificmethodsin alaboratorysettingandeffectivelytestifyingin acourt of law.
PEO4	Toanalyticallyeducatethenecessitytounderstandtheimpactofcybercrimes and threats with solutions in a global context.

ProgrammeSpecificOutcomes (PSOs)	
AfterthesuccessfulcompletionofB.Sc.DigitalandCyberforensicScienceprogramthe students are expected to	
PSO1	Imparteducationwithdomainknowledgeeffectivelyandefficientlyinparwith theexpectedqualitystandards fordigitalandcyber forensicscienceprofessional.
PSO2	Abilitytoapplythemathematical,technicalandcriticalthinkingskillsinthe forensic investigations.
PSO3	Abilitytoinvolveinlife-longlearningandadoptfastchangingtechnologyto prepareforprofessionaldevelopment.
PSO4	Expose the students to learn the important of forensic science and criminology such as basic of cyber forensic science psychology, forensic chemistry, forensic toxicology, and cyber forensic anthropology.
PSO5	Inculcateeffectivecommunicationskillscombinedwithprofessional&ethical attitude.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7		PO9	PO10
CO1	**S**	**S**	**S**	**M**	**M**	**L**	**L**		**L**	**L**
CO2	**S**	**S**	**S**	**M**	**M**	**L**	**L**		**L**	**L**
CO3	**S**	**S**	**S**	**M**	**M**	**M**	**M**		**L**	**L**
CO4	**S**	**S**	**M**	**M**	**M**	**M**	**M**		**L**	**L**
CO5	**S**	**S**	**M**	**M**	**M**	**M**	**M**	**L**	**L**	**L**

***S-Strong M- Medium L– Low**

B.Sc.,DIGITALANDCYBERFORENSICSCIENCE

FIRSTYEAR–SEMESTER-I

PART	Paper Code	SubjectTitle	Hours / Week	Credit	CIA	ESE	Total
Part–I		Language–Tamil –I	6	3	25	75	100
Part–II		LanguageEnglish– I	6	3	25	75	100
Part-III		CoreCourse–I:Introduction to Cyber Security	5	5	25	75	100
		CoreCourse–IPractical: Cyber Security Lab	4	3	40	60	100
		Maths / Physics / Electronics / Statistics	5	4	25	75	100
Part–IV		**NME-I**	2	2	25	75	100
		Value Education	2	2	25	75	100
		Total	**30**	**22**			700

FIRSTYEAR–SEMESTER-II

PART	Paper Code	SubjectTitle	Hours / Week	Credit	CIA	ESE	Total
Part–I		Language–Tamil - II	6	3	25	75	100
Part–II		LanguageEnglish– II	6	3	25	75	100
Part-III		Core Course – II: PythonProgramming	5	5	25	75	100
		CoreCourse–II:Practical PythonProgramming Lab	3	3	40	60	100
		Maths / Physics / Electronics / Statistics (Theory)	3	4	25	75	100
Part–IV		Maths / Physics / Electronics / Statistics (Practicals)	2	2	25	75	100
		Disaster Management	1	2	25	75	100
		NME - II	2	2	25	75	100
		Naan Mudhalvan	2	2	25	75	100
		Total	**30**	**22**			700

CourseCode	24UDCF01	INTRODUCTIONTOCYBER SECURITY	L	T	P	C
Core/Elective		Core:1	5	1	-	5
		BasicknowledgeinCyberSecurity				

Course Objectives

1. Exhibitknowledgetosecurecorruptedsystems,protectpersonaldata,andsecurecomputer networks in an organization
2. Understandprinciplesofwebsecurityandtoguaranteeasecurenetworkbymonitoring and analyzing the nature of attacks through cyber computer forensics software/tools.
3. Understandthe performanceand troubleshoot cyber securitysystems.
4. Understandkeyterms and concepts in Cryptography
5. Developcybersecuritystrategiesandpolicies

ExpectedCourseOutcomes

CO1	UnderstandtheneedandnatureofCyber Security	K1 To K6
CO2	Implementmechanismforaccesscontrol cryptographyandauthentication	
CO3	Analyze andevaluatethecybersecurityneedsofan organization.	
CO4	Describeriskmanagementconceptand cybersecurity law	
CO5	Understandprinciplesofwebsecurityandto guaranteeasecurenetwork	

K1–Remember K2– Understand K3– ApplyK4-AnalyzeK5 –Evaluatek6-Create

UNIT– I	INTRODUCTIONTOCYBERSECURITY	15 Hours

Introduction to Cyber Security. Confidentiality, Integrity and Availability – Triad. Attacks: Threats, Vulnerabilities and Risk. Risk Management, Risk Assessment and Analysis. Information Classification, Policies, Standards, Procedure and Guidelines. Controls: Physical, Logical and Administrative; Security Frameworks, Defense in-depth: Layers of Security. Identification and Authentication Factors. Authorization and Access Controls- Models, Methods and Types of Access Control.

UNITII	BASICS OFCRYPTOGRAPHY	15 Hours

DefinitionsandConcepts,SymmetricandAsymmetricCryptosystems,ClassicalEncryptionTechniques –SubstitutionTechniques,TranspositionTechniques,BlockCiphersandStreamCiphers,Hybrid EncryptionTechniques,One-TimePad.E-mailsecurity,InternetandWebSecurity.Steganographyand itsdetection,DataEncryptionStandard(DES),Principlesofpublickeycryptosystems-TheRSA algorithm-Key management - Diffie Hellman Key exchange.

UNIT-III	NETWORKANDWIRELESS ATTACKS	15 Hours

Network Sniffing, Wire shark, packet analysis, display and capture filters, Etter cap, DNS Poisoning, ARP Poisoning, Denial of services, Vulnerability scanning, Setup network IDS/IPS, Router attacks,Man-in-the-middle Attack, N map, open ports, filtered ports, service detection, network vulnerability assessment,Evadeanti-virusesandfirewalls,Protocols,MACFiltering,PacketEncryption,Packet Sniffing,Typesofauthentication,AttacksonWEP,WPAand WPA-MEncryption,fake hotspots.

UNIT-IV	NETWORKSECURITY	15 Hours

IPsecurity architecture,Security protocols,IPSec,WebSecurity–Firewalls,IDS,IDPS–Typesand Technologies.Trustedsystems–Electronicpaymentprotocols.NetworkSecurityApplications, Authentication Mechanisms: Passwords, Cryptographic authentication protocol, Kerberos, X.509 LDAP Directory. Digital Signatures.		
UNIT-V	**WEBSECURITY**	**15 Hours**
WebSecurity:SSLEncryption,TLS,SET.Intrusiondetection.Securingonlinepayments(OTP).		
	TotalLectureHours	**75 Hours**
	Text Book(s)	
1	WilliamStallings;"CryptographyandNetworkSecurity:PrinciplesandPractices",Fifth Edition, Prentice Hall Publication Inc., 2007.	
2	NinaGodboleandSunitBelapore;"CyberSecurity:UnderstandingCyberCrimes, computer Forensics and Legal Perspectives", Wiley Publications, 2011.	
	REFERENCEBOOKS:	
1	MichaelEWhitemanandHerbertJMattord;"PrinciplesofInformationSecurity",Vikas Publishing House, New Delhi, 2003.	
2	MattBishop,"computerSecurityArtandScience",Pearson/PHI,2002.	
3	AtulKahate"CryptographyandNetworkSecurity"McGrawHill Education (India), 2008.	
	RelatedOnlineContents(MOOC, SWAYAM, NPTEL,Websitesetc)	
1	**https://onlinecourses.swayam2.ac.in/aic20_sp06/preview**	
2	https://www.coursera.org/learn/forensic-science	
3	https://onlinecourses.swayamM.ac.in/cec20_ge10/preview	
4	https://onlinecourses.swayamM.ac.in/cec20_ge10/preview	

Mappingwith programmeand outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7		PO9	PO10
CO1	**S**	**S**	**S**	**M**	**M**	**L**	**L**		**L**	**L**
CO2	**S**	**S**	**S**	**M**	**M**	**L**	**L**	**L**	**L**	**L**
CO3	**S**	**S**	**S**	**M**	**M**	**M**	**M**		**L**	**L**
CO4	**S**	**S**	**M**	**M**	**M**	**M**	**M**		**L**	**L**
CO5	**S**	**S**	**M**	**M**	**M**	**M**	**M**	**L**	**L**	**L**

***S-Strong M- Medium L– Low**

Subject Code	SubjectName	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
24UDCFP01	PRACTICALI:CYBER SECURITY LAB		-	-	4	IV	5	25	75	100

Learning Objectives:

1. ToUnderstandthefundamentalconceptsofcryptographyandthedifferenttypesofencryption techniques
2. Todevelopanunderstandingofthedifferentsecurityalgorithmsandtheir implementation in open-source tools like GnuPG and Snort.
3. ToGainpracticalexperienceinusingvariousnetworksecuritytools
4. ToUnderstandtheimportanceofsecureddatastorageandtransmission
5. Tounderstandaboutintrusiondetectionsystem

	Course Outcomes	
CO1	Implementtheciphertechniques.	K1 TO K6
CO2	DevelopthevarioussecurityAlgorithms	
CO3	Usedifferentopen-sourcetoolsfornetworksecurityand analysis	
CO4	DemonstrateSecureddatatransmission	
CO5	Installationofrootkits	

K1–RememberK2–Understand K3– ApplyK4-AnalyzeK5 –EvaluateK6-Create

Lab Programs	Hour
1. Implement the following Substitution & Transposition Techniques concepts:a)CaesarCipherb)Railfancerow&ColumnTransformation 2. ImplementtheDiffie-HellmanKeyExchangemechanismusingHTMLand JavaScript 3. ToimplementDataEncryptionStandard (DES) 4. ImplementthefollowingAttack:a)DictionaryAttackb)BruteForceAttack 5. Installation of Wireshark, tcpdump, etc. and observe data transferred in clientservercommunicationusingUDP/TCPandidentifytheUDP/TCP datagram. 6. Installationofrootkitsandstudyaboutthevarietyofoptions. 7. Demonstrateintrusiondetectionsystemusinganytool(snortoranyothers/w). 8. Demonstratehowtoprovidesecuredatastorage,securedatatransmission and for creating digital signatures 9. Setupahoneypotandmonitorthehoneypotonnetwork(KF Sensor) 10. PerformwirelessauditonanaccesspointorarouteranddecryptWEPand WPA (Net Stumbler) *SoftwareRequirements* C,C++,JavaorequivalentcompilerGnu PG,Snort.	60

Mappingwith programmeand outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7		PO9	PO10
CO1	**S**	**S**	**S**	**M**	**M**	**L**	**L**		**L**	**L**
CO2	**S**	**S**	**S**	**M**	**M**	**L**	**L**		**L**	**L**
CO3	**S**	**S**	**S**	**M**	**M**	**M**	**M**		**L**	**L**
CO4	**S**	**S**	**M**	**M**	**M**	**M**	**M**	**L**	**L**	
CO5	**S**	**S**	**M**	**M**	**M**	**M**	**M**		**L**	**L**

***S-Strong M- Medium L – Low**

SEMESTER– II

Subject Code	SubjectName	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
24UDCF02	**PYTHON PROGRAMMING**		5	-	-	IV	4	25	75	100

LearningObjectives

1. TomakestudentsunderstandtheconceptsofPythonprogramming.
2. ToapplytheOOPconceptin PYTHONprogramming.
3. Toimpartknowledgeonstringfunctionabout lists
4. Tomakethestudentslearn bestpracticesinPYTHONprogramming
5. Toknowhow tohandle files in python

Course Outcomes		
Oncompletionofthiscourse,students will		
CO1	ToLearn thebasics ofpython,Do simpleprograms on python, Learnhowto usean array.	K1 to k6
CO2	ToDevelopprogramusingselectionstatement,WorkwithLoopingandjump statements, Do programs on Loops and jump statements.	
CO3	Tolearntheconceptoffunction,functionarguments,Implementingtheconcept strings in various application, Significance of Modules,	
CO4	ToWorkwithList,tuples anddictionaryand Writeprogramusinglist, Tuplesanddictionary.	
CO5	Toimplementfileconceptin python,Concept of readingandwriting files.	

K1–Remember K2–Understand K3–applyK4-AnalyzeK5–evaluateK6-Create

UNIT	Contents	No.of Hours
I	**BasicsofPythonProgramming:**HistoryofPython-FeaturesofPython-Literal-Constants-Variables-Identifiers–Keywords-Built-inDataTypes-OutputStatements–Input Statements-comments–Indentation-Operators-Expressions-Typeconversions. **Python Arrays:** Defining and Processing Arrays–Array methods.	**15**
II	**Control Statements:** Selection/Conditional Branching statements: if, if-else, nestedifandif-elsestatements.IterativeStatements:whileloop,forloop,else suite in loop and nested loops. **Jump Statements:** Break, continue and pass statements**.**	**15**
III	**Functions:** Function Definition – Function Call – Variable Scope and its Lifetime-Return Statement. **Function Arguments**: Required Arguments, Keyword Arguments,DefaultArgumentsandVariableLengthArguments-Recursion.Python **Strings:** String Operations-Immutable Strings -Built-in String Methods and Functions-String comparison. **Modules: import** statement- The Python module–dir() function–Modules and Name space–Defining our own modules.	**15**
IV	**Lists:** Creating a list -Access values in List-Updating values in Lists-Nested Lists-Basic list operations-List Methods.Tuples: Creating, Accessing, Updating and Deleting Elements in a tuple – Nested tuples–Difference between lists and tuples. **Dictionaries:**Creating,Accessing,UpdatingandDeletingElementsinaDictionary – Dictionary Functions and Methods-Difference between Lists and Dictionaries.	**15**
V	**Python File Handling:**Types of files in Python - Opening and Closing files-Reading and Writing files: write () and write lines () methods- append () method–read () and read lines () methods–with keyword–Splitting words–File Methods-File Positions-Renaming and deleting files.	
	TOTAL HOURS	**75**

Text books	
1	ReemaThareja,"PythonProgrammingusingproblemsolvingapproach",First Edition,2017,Oxford University Press.
2	Dr.R.NageswaraRao,"CorePythonProgramming",FirstEdition,2017,Dreamtech Publishers.

ReferenceBooks	
1.	VamsiKurama,"PythonProgramming:AModernApproach",PearsonEducation.10thjul M018
2.	MarkLutz,"LearningPython",Orielly.2013
3.	AdamStewarts,"PythonProgramming",Online.1019
4.	FabioNelli,"PythonDataAnalytics",APress.2015
5.	KennethA.Lambert,"FundamentalsofPython–FirstPrograms",CENGAGEPublication,2019
Web Resources	
1.	https://www.programiz.com/python-programming
2.	https://www.guru99.com/python-tutorials.html
3.	https://www.w3schools.com/python/python_intro.asp
4.	https://www.geeksforgeeks.org/python-programming-language/
5.	https://en.wikipedia.org/wiki/Python_(programming_language)

mappingwithProgramme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	M	S	S	S	S	S	M	S	S
CO4	S	S	M	S	S	S	S	S	M	S
CO5	S	S	S	S	S	M	S	S	S	S

S-Strong M-Medium L-Low

Subject Code	SubjectName	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
24UDCFP02	PYTHON PROGRAMMING LAB		-	-	4	I	4	25	75	100

Course Objectives:

1. Beableto designthe basicPython applications.
2. Beableto createloopsand decisionstatementsin Python.
3. Beabletowork withfunctions andpass argumentsin Python.
4. Beabletobuild andpackagePythonmodules for reusability.
5. Beabletoreadandwrite filesin Python.

Course Outcomes		
	Oncompletionofthiscourse,studentswill	K1 to k6
CO1	Toimplement basic ofoops concept in python	
CO2	Toapplyrecursion conceptsin pythonusingfunction.	
CO3	Toimplement various loopingstatementconditional statementin python	
CO4	Tousevarious data structuresuchas list,tuples and dictionaries	
CO5	Toapplyvarious fileoperation inpython.	

K1–Remember K2–Understand K3 –applyK4-AnalyzeK5–evaluateK6-Create

LAB EXERCISES	Required Hours
1. Programusingvariables,constants, I/Ostatements inPython. 2. ProgramusingOperatorsin Python. 3. ProgramusingConditionalStatements. 4. Programusing Loops. 5. ProgramusingJump Statements. 6. ProgramusingFunctions. 7. ProgramusingRecursion. 8. ProgramusingArrays. 9. ProgramusingStrings. 10. ProgramusingModules. 11. ProgramusingLists. 12. ProgramusingTuples. 13. ProgramusingDictionaries. 14. ProgramforFile Handling.	**60**

Mapping with Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	M	S	S	S	S	S	M	S	S
CO4	S	S	M	S	S	S	S	S	M	S
CO5	S	S	S	S	S	M	S	S	S	S

S-Strong M-Medium L-Low