Re-Accredited 'B++' 2.86 CGPA by NAAC
VEER NARMAD SOUTH GUJARAT UNIVERSITY
University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
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–: પરિપત્ર :–

કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખા હેઠળની તમામ બી.એસસી.(કોમ્પ્યુટર સાયન્સ) ચલાવતી કોલેજોના આચાર્યશ્રીઓને જણાવવાનું કે, શૈક્ષણિક વર્ષ ૨૦૨૪–૨૫ થી અમલમાં આવનાર S.Y.B.Sc. (Computer Science) Sem.-3 & 4 Major, Minor,MDC,SEC,AEC અને VAC નો પેટાસમિતિ દ્વારા તૈયાર કરવામાં આવેલ અભ્યાસક્રમ કોમ્પ્યુટર સાયન્સ વિષયની અભ્યાસ સમિતિના ચેરમેનશ્રીએ અભ્યાસ સમિતિવતી તેમજ કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખાના અધ્યક્ષશ્રીએ વિદ્યાશાખાની મંજૂરીની અપેક્ષાએ વિદ્યાશાખાવતી મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ એકેડેમિક કાઉન્સિલની તા.૦૧/૦૩/૨૦૨૪ની સભાના ઠરાવ ક્રમાંકઃ૧૦૪ અન્વયે માન.કુલપતિશ્રીને આપેલ સત્તા અંતર્ગત ઈ.ચા.માનનીય કુલપતિશ્રી દ્વારા મંજૂર કરેલ છે. જેનો અમલ કરવા આથી જાણ કરવામાં આવે છે.

બિડાણઃ ઉપર મુજબ

ક્રમાંક : એસ./સિલેબસ/પરિપત્ર/૧૨૯૬૯/૨૦૨૪
તા.૨૫–૦૬–૨૦૨૪

કુલસચિવશ્રી

પ્રતિ,
૧)બી.એસસી.(કોમ્પ્યુટર સાયન્સ) નો અભ્યાસક્રમ ચલાવતી કોલેજોના આચાર્યશ્રીઓ.

.....આપશ્રીની કોલેજના સંબંધિત શિક્ષકો તથા વિદ્યાર્થીઓને જણ કરી અમલ કરવા સારૂ.

૨) ડીનશ્રી, કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખા.
૩) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.

.....તરફ જાણ તેમજ અમલ સારૂ.

Veer Narmad South Gujarat University, Surat

Computer Science, Application and I.T. Faculty

Syllabus for (Semester-3 and Semester-4)

of

B.Sc.(Computer Science) (Honours) as per the NEP-2020

To be implemented from

Academic Year: June, 2024-2025

Veer Narmad South Gujarat University, Surat
Bachelor of Computer Application (B.Sc.(Computer Science)(Honours))
Under the Faculty of
Computer Science, Application and Information Technology

Name of Program:	Bachelor of Science in Computer Science (Honours)
Abbreviation:	B.Sc.(Computer Science): Four-year Integrated Program. With Multi-Level Entry and Exit option
Multi-level Exit Criteria:	i) Under Graduate Certificate in Computer Science: If the student wish to exit after completion of First year (Semester-1 and Semeter-2) without any back-log and secure additional 4 credits from work based skill oriented university approved courses /vocational courses / summer internship / Apprenticeship in addition to 6 credits from skill-based courses earned during first and second semester. ii) Diploma in Computer Science: If the student wish to exit after completion of Second year (Semester-1 to Semeter-4) without any back-log and secure additional 4 credits from work based skill oriented university approved courses /vocational courses / summer internship / Apprenticeship offered at end of first or second year in addition to 6 credits from skill-based courses earned during first four semesters. iii) B.Sc. (Bachelor's of Science in Computer Science): If the student wish to exit after completion of Third year (Semeste-1 to semester-6) without any back-log and secure additional 4 credits from work based skill oriented university approved courses /vocational courses / summer internship / Apprenticeship offered at end of first or second year in addition to 6 credits from skill-based courses earned during first four semesters.
Multi-Level Entry Criteria:	As per the norms of the Veer Narmad South Gujarat University.
Duration:	4 year of B.Sc.(Computer Science)(Honors) degree program with multi level exit options at 1st, 2nd and 3rd Year to obtain Certificate, Diploma, Degree and Honours Degree in Computer Application respectively.
Eligibility:	Candidate must have passed standard 12th (H.S.C.) Examination in Science (Any Group) / Commerce / vocational / General stream from Gujarat Higher Secondary Board (G.H.S.E.B.) or any other equivalent board (C.B.S.E. / I.C.S.E. etc. which must be approved and possess equivalence certificate from Veer Narmad South Gujarat University) with English as one of the subject. In case of candidates passed out from 12th Board from General Stream; Statistics/Economics/Business Mathematics/Accountancy must be one of the subjects. In case of Students passed out with 12th (H.S.C.) vocational stream, Computer and English must be one of the subject.

Objective of the Program:	Bachelor of Science in Computer Science (B.Sc.)(Computer Science)(Honours) is undergraduate degree program in computer application area. Objective of the program is to open a channel of admission for courses in the field of Computer Science, Applications and all relevant fields of information technologies to build career for students who have completed standard 12th (H.S.C.) and are interested in taking computing/computer Application and Information Technology as a career. Main objective is to equip the students with strong foundation in computer programming languages, coding, database handling, software application developments, problem-solving skills and development of analytical and logical skills. The focus is to introduce various programming languages on different platforms and operating systems, interaction with databases available on various platforms, software testing, development and deployment techniques. It also aim to provide knowledge in latest trends and advancements in field of computer technologies. The program caters to the needs of the students aspiring to excel in the field of computer science, applications and technologies. The program is designed to develop computer professionals versatile in almost all field of computer application. It also aim to enhance communication and interpersonal skills.
Program Outcome:	**PO1:** Ability to analyze a problem, identify and define the Computing requirements appropriate to its solution. **PO2:** Enhancing the Understanding related to core ideas of computer, analytical thinking, logical abilities and computational fundamentals. **PO3:** To generate Understanding regarding the core and fundamental ideas about the computer platforms, operating systems, software design concepts, networking concepts and advanced and emerging technologies. **PO4:** Foster critical thinking and innovation: The program encourages students to think critically and creatively in the context of computer science. They are challenged to explore innovative approaches to problem-solving, evaluate alternative solutions, and apply logical reasoning to make informed decisions. **PO5:** Develop technical proficiency: The objective is to equip students with practical skills in software development, programming languages, databases, networking, and other relevant technologies. They gain hands-on experience in designing, implementing, and testing software systems using industry-standard tools and techniques. **PO6:** Promote collaboration and communication skills: The program emphasizes the importance of teamwork and effective communication in the field of computer science. Students are encouraged to collaborate with peers on projects, participate in group discussions, and present their ideas clearly and professionally.

	These program objectives collectively aim to prepare students for diverse career paths in the field of computer science, including software development, systems analysis, data analysis, cybersecurity, and research.
Program Specific Outcome:	It will open field for the aspiring students to opt further career or masters' level study in the fields of Research, Design, Architecture and software development. **PSO 1 :** Develop and Strengthen the fundamental core computer science concepts that are required to solve complex problems. **PSO 2 :** Develop the professional skills that need independent logical and analytical thinking, teamwork for successful computer professionals. **PSO 3 :** Nurture the students for design and development of workable computer application solution for real world problems. **PSO 4 :** Develop students for self-learning and practicing computer science application problem solutions. **PSO 5 :** Develop ability to service and excel in fulfilling the modern day demands with their knowledge and skills. **PSO 6 :** Develop technical project and present them among the users.
PO and PSO mapping:	
Medium of Instruction:	English
Program Structure:	Semester-wise Breakup of the course is given as follows :

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
PO1						
PO2						
PO3						
PO4						
PO5						
PO6						

Veer Narmad South Gujarat University, Surat

Program Structure: S.Y.B.Sc.(Computer Science) (SEM – 3 and SEM – 4)

(w.e.f. Academic Year June, 2024-2025)

B.Sc.(Computer Science) – Three Year Program

B.Sc.(Computer Science)(Honours)) – Four Year Integrated Program

Program Structure	Semester-wise break up for the courses :

SEMESTER – 3

Course Code	**Course Title**	**Course Category**	**Level of Course**	**Course Credits**	**Teaching Hours/week**	
				Th.+Pra.	Theory	Practical/ Fieldwork /Project/ Internship
CS-301	The Prominent Gujarati Literary Texts (પ્રસિદ્ધ ગુજરાતી સાહિત્યિક કૃતિઓ) (AEC-03) [Modern Indian Language (MIL) & English language focused on language and communication skills.]	Ability Enhancement Course	100-199 Foundation/ Introductory	2	2	0
CS-302	Statistical Methods and Data Analysis (MDC: Multi-Disciplinary Course) (Student will opt any one course of multi-disciplinary nature from other than the computer Science and Application faculty)	Multi-Disciplinary	200-299 Intermediate Level Course	4	4	0
CS-303	Data Structure Using C++	Major Course	300-399 Higher Level Course	4	2	4
CS-304	Java Programming-1	Major Course	300-399 Higher Level Course	4	2	4
CS-305	Relational Database Management System	Major Course	300-399 Higher Level Course	4	2	4
	Practical (Based on CS-303,CS-304 and CS-305)	No separate credits allocated for practical. The Practical exam/viva-voce will be based on Course-CS-303,CS-304 and CS- 305.				
CS-306	**Skill Enhancement Course-III (SEC-03)** [The student will undergo field training/ internship training OR Select minimum one University approved and recognized 3 credit certificate course from the skill based courses list offered by the respective institute/department.] (The student need to enrol separately and pay the fees as decided by the respective institute/department)	Skill Enhancement Course (Audit Course)	200-299 Intermediate Level Course	2	2	0
CS-307	**Value Addition Course – III (VAC-03)** [The student will select minimum one University approved and recognized 2 credits certificate course from the Value Addition courses list offered by the respective institute/department.] (The student need to enrol separately and pay the fees as decided by the respective institute/department)	Value Addition Course (Audit Course)	200-299 Intermediate Level Course	2	2	0
Other Activities	The student is expected to participate in activities related to National Service Scheme (NCC), National Cadet Corps (NCC), adult education/literacy initiatives, mentoring school students, Elderly literacy program/ Environment preservation activities and other similar activities.			-	-	-
Total				22	16	12

Course Code	Course Title	Course Credit	University Exam Type	Exam Duration	External Marks	Internal Marks	Total Marks
CS-301	The Prominent Gujarati Literary Texts (પ્રસિદ્ધ ગુજરાતી સાહિત્યિક કૃતિઓ) (AEC-03)	2	Theory/ Written	1 Hours	25	25	50
CS-302	Statistical Methods and Data Analysis (MDC-03)	4	Theory/ Written	2 Hours	50	50	100
CS-303**	Data Structure Using C++	4	Theory/ Written : Practical :	1 Hours 2 Hours	25 25	25 25	100
CS-304**	Java Programming-1	4	Theory/ Written : Practical :	1 Hours 2 Hours	25 25	25 25	100
CS-305**	Relational Database Management System	4	Theory/ Written : Practical :	1 Hours 2 Hours	25 25	25 25	100
	Practical : Based on Course Code:CS-303, 304 & CS-305)	-	No separate credits allocated for practical. The Practical exam/viva-voce will be based on Course-CS-303,CS-304 and CS- 305.				
CS-306	Skill Enhancement Course-I (SEC-03)	2	As prescribed in the course evaluation method	-	25	25	50
CS-307	Value Addition Course-I (VAC-03)	2	As prescribed in the course evaluation method	-	25	25	50
Total		22			275	275	550

For Practical and Project:

- Batch Size – 30 Maximum (Desirable). Maximum 40 students can be accommodated in a batch. Separate batch should be considered if the student strength exceed 40 numbers.
- The journal must be certified by the concerned faculty and by the Head of the Department, failing which the student will not be allowed to appear for External Practical Examination. Student will submit softcopy of Minor Project duly certified by the internal guide.

Internship: A student who wish to exit after successfully completion of first year (Semester-3 and Semester-4) without any backlog is required to obtain Four credits at the end of the year either through the summer internship or university approved skill based certificate courses(two courses of 2-credits each or one 4-credit course). Student is required to enroll for the certificate courses separately by paying the course fees as decided by the college/institute. For summer training, the Institute/college will grant the permission and evaluate the training outcomes. Based on satisfactory completion of the summer training, the Institute head will recommend to the university to grant four credits for summer training. The Internship/summer training/skill based certificate courses will be an audit course.[The internship cost/fees will be bear by the student.]

Skill Enhancement Course : As per NEP(National Education Policy-2020), it is mandatory for students to select a 2 credit skill enhancement course out of the choices given by the college/institute. It will be mandatory for the student to opt minimum one 2-credit Skill enhancement course out of offered courses recognized by University during semester-3 to semester-4. This course will be an Audit course*.

Value Addition Course: As per NEP(National Education Policy-2020), it is mandatory for students to select minimum one 2-credit Value Addition Course out of offered courses recognized by the University during semester-3 to semester-3.

[The student is required to pay separately for these courses as prescribed by the college. The college will decide the fees for audit courses based on the norms of University certificate course per credit fees.]

** Major Practical based Subjects: Course 303,304 and 305 are major courses consists of two components: Theory and Practical. These courses are carrying 4 credits.

For Course-303 : 2 Hours of Theory and 4 hours of practical per week are allocated.

For Course 304 and 305, 2 Hours of theory and 4 hours of practical per week are allocated. Major courses carry 100 marks of exam weightage (50 theory and 50 practical). External and Internal distribution of marks are in ratio of 50:50 respectively. Students are required to acquire minimum passing marks from theory and practical collectively. Practical exams for course-303 (2 hours duration), course-304(2 hours duration) and course-305(2 hours duration) will be conducted.

External Theory/Practical exam marks (25 marks each for course-303, course-304 and course-305)

Division of marks for External Practical: Exam evaluation: 20 marks + Viva-voce: 5 Marks.

Students are required to pass in both components (Theory and Practical) collectively for course 303,304 and 305 as combined head (Theory + Practical) for each major course. It is mandatory for Students to appear for internal and external theory and practical exams for all courses. Similarly, In case a student remain absent in any of the component of Theory or Practical of major subject, the student will be considered fail.

Program Passing Rules:	As per University rules.
Program Fees : (Per Semester) (One time fees and exam fees are additional as prescribed by the university) (w.e.f. Academic Year : 2023-24)	Semester Tuition Fees : As per University norms. Semester Laboratory Utilization fees : (For Govt. and GIA colleges) : As per University norms. (For Self Finance Institutes) : Rs.1500/- [Other one time /affiliation /exam fees, will be as per the norms of the University] [The fees for all certificate courses, Skill Enhancement Courses and Value Addition Courses; fees will be as per the prescribed limit for per credit as per the SOP of certificate courses decided by the university.]

SEMESTER – 4

Course Code	Course Title	Course Category	Level of Course	Course Credits	Teaching per week	
					Theory	**Practical/ Fieldwork/ Project/ Internship**
CS-401	Organizational Soft-skills in Software Industry [Ability Enhancement Course-IV] (AEC-04)[%] [Modern Indian Language (MIL) & English language focused on language and communication skills.]	Ability Enhancement Course	200-299 Intermediate Level Course	2	2	0
CS-402	Software Engineering	Minor Course	200-299 Intermediate Level Course	4	4	0
CS-403	PHP Programming	Major Course	300-399 Higher Level Course	4	2	4
CS-404	Web Designing-2	Major Course	300-399 Higher Level Course	4	2	4
CS-405	Application and Web Development using C#.Net	Major Course	300-399 Higher Level Course	4	2	4
	Practical (Based on Course Code: CS-403, CS-404 and CS-405)	The Practical exam/viva-voce will be based on Course-CS-403,CS-404 and CS- 405.				
CS-406	**Skill Enhancement Course-IV (SEC-04)** [The student will undergo field training/ internship training OR Select minimum one University approved and recognized 3 credit certificate course from the skill based courses list offered by the respective institute/department.] (The student need to enrol separately and pay the fees as decided by the respective institute/department)	Skill Enhancement Course (Audit Course)	200-299 Intermediate Level Course	2	2	-
CS-407	**Value Addition Course – IV (VAC-04)** [To be selected minimum one University approved and recognized 2 credit certificate course from the Value Addition Courses list offered by the respective institute/department.] (The student can select and enrol separately for the course offered by the respective institute/department and need to pay separately as decided by the institute as per norms of university for certificate courses.)	Value Addition Course	200-299 Intermediate Level Course	2	2	-
Other Activities	The student is expected to participate in activities related to National Service Scheme (NCC), National Cadet Corps (NCC), adult education/literacy initiatives, mentoring school students, Elderly literacy program / Environment preservation activities and other similar activities.			-	-	-
Total				22	16	12

Course Code	Course Title	Course Credit	University Exam Type	Exam Duration	External Marks	Internal Marks	Total Marks
CS-401%	Organizational Soft-skills in Software Industry OR Institute/College will offer any one course from given list of Ability Enhancement Courses approved by the University.	2	Theory/ Written	1 Hours	25	25	50
CS-402	Software Engineering	4	Theory/ Written :	2 Hours	50	50	100
CS-403**	Php Programming	4	Theory/ Written : Practical :	1 Hours 2 Hours	25 25	25 25	100
CS-404**	Web Designing-2	4	Theory/ Written : Practical :	1 Hours 2 Hours	25 25	25 25	100
CS-405**	Application and Web Designing using C#.NET	4	Theory/ Written : Practical :	1 Hours 2 Hours	25 25	25 25	100
	Practical Based on Course Code:403,404,405		No separate credits allocated for practical. The Practical exam/viva-voce will be based on Course-CS-403,CS-404 and CS- 405				
CS-406	Skill Enhancement Course – II (SEC-02)	3	Audit Courses	-	-	-	50#
CS-407	Value Added Course – II (VAC-02)	2	Audit Course	-	-	-	50#
Total		24			275	275	550

For Practical and Project:

- Batch Size – 30 Maximum (Desirable). Maximum 40 students can be accommodated in a batch. Separate batch should be considered if the student strength exceed 40 numbers.
- The journal must be certified by the concerned faculty and by the Head of the Department, failing which the student will not be allowed to appear for External Practical Examination. Student will submit softcopy of Minor Project duly certifiedby the internal guide.

Internship: A student who wish to exit after successfully completion of first year (Semester-3 and Semester-4) without any backlog is required to obtain Four credits at the end of the year either through the summer internship or university approved skill based certificate courses(two courses of 2-credits each or one 4-credit course). Student is required to enroll for the certificate courses separately by paying the course fees as decided by the college/institute. For summer training, the Institute/college will grant the permission and evaluate the training outcomes. Based on satisfactory completion of the summer training, the Institute head will recommend to the university to grant four credits for summer training. The Internship/summer training/skill based certificate courses will be an audit course.[The internship cost/fees will be bear by the student.]

Skill Enhancement Course : As per NEP(National Education Policy-2020), it is mandatory for students to select a 2 credit skill enhancement course out of the choices given by the college/institute. It will be mandatory for the student to opt minimum one2-credit Skill enhancement course out of offered courses recognized by University during semester-3 to semester-4. This course will be an Audit course*.

Value Addition Course: As per NEP(National Education Policy-2020), it is mandatory for students to select minimum one 2-credit Value Addition Course out of offered courses recognized by the University during semester-3 to semester-3.

[The student is required to pay separately for these courses as prescribed by the college. The college will decide the fees for audit courses based on the norms of University certificate course per credit fees.]

**: External Theory/Practical exam marks (25 marks each for course-403, course-404 and course-405)

Division of marks for External Practical: Exam evaluation: 20 marks + Viva-voce: 5 Marks.

Students are required to pass in both components (Theory and Practical) collectively for course 403,404 and 405 as combined head (Theory + Practical) for each major course. It is mandatory for Students to appear for internal and external theory and practical exams for all courses. Similarly, In case a student remain absent in any of the component of Theory or Practical of major subject, the student will be considered fail.

% : Institute/College will offer any one course from given list of Ability Enhancement Courses approved by the University.

Program Passing Rules:	As per University rules.
Program Fees : (Per Semester) (One time fees and exam fees are additional as prescribed by the university) (w.e.f. Academic Year : 2023-24)	Semester Tuition Fees : As per University norms. Semester Laboratory Utilization fees : (For Govt. and GIA colleges) : As per University norms. (For Self Finance Institutes) : Rs.1500/- [Other one time /affiliation /exam fees, will be as per the norms of the University] [The fees for all certificate courses, Skill Enhancement Courses and Value Addition Courses; fees will be as per the prescribed limit for per credit as per the SOP of certificate courses decided by the university.]

Semester - 3

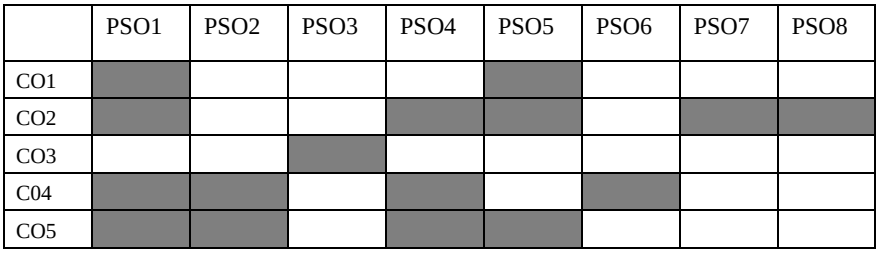
Course Code: 301

Course Title: The Prominent Gujarati Literary Texts

(પ્રસિધ્ધ ગુજરાતી સાહિત્યિક કૃતિઓ)

Course Category: A.E.C. (Ability Enhancement Course)

Course Code	301
Course Title	The Prominent Gujarati Literary Texts (પ્રસિધ્ધ ગુજરાતી સાહિત્યિક કૃતિઓ) [The student is independent to select any other course as per the NEP standards (online/MOOC/Recognied university approved AEC course) or from courses offered by college/institute out of the course basket offered by the University under the Ability Enhancement courses (AEC) basket.]
Credits	2
Course Category	**(AEC) Ability Enhancement Course**
Level of Course	100-199 (Foundation / Introductory)
Course Intake	As per the division intake allocated by University
Course Resource Person:	The institute can invite a professional/expert resource person of the concerned field from any other institute.
Course Fees:	-
Teaching per Week	2 Hrs
Minimum weeks per Semester	15 (Including class work, examination, preparation etc.)
Review / Revision	-
Implementation Year:	A.Y. 2024-2025
Purpose of Course	The prominent Gujarati Literary Texts aims to deepen participants' understanding of the rich literary heritage of Gujarat. This program focuses on exploring the prominent literature and characters within Gujarati novels, fostering a nuanced appreciation for cultural nuances, historical contexts, and literary techniques. By delving into the intricacies of Gujarati literature, participants can enhance their analytical and critical thinking skills while gaining a broader cultural perspective. [Modern Indian Language (MIL) & English language focused on language and communication skills.]
Course Objective	**1) Cultural Appreciation:** Foster a deep appreciation for the cultural heritage of Gujarat by studying prominent literature and characters in Gujarati texts, allowing participants to understand the societal values, traditions, and historical contexts depicted in the literary works. **2) Literary Analysis Skills:** Develop participants' analytical and critical thinking skills through an in-depth examination of the narrative structures, themes, and character developments found in Gujarati texts, thereby enhancing their ability to critically assess and interpret literature. **3) Historical Contextualization:** Provide participants with the necessary historical background to comprehend the evolution of Gujarati literature, enabling them to connect literary movements and periods with the societal changes and influences that shaped the works. **4) Communication Proficiency:** Enhance participants' communication skills by encouraging them to articulate their interpretations and analyses of Gujarati literature effectively, fostering the ability to express complex ideas and perspectives both verbally and in writing. **5) Cultural Sensitivity:** Promote cultural sensitivity and cross-cultural understanding by exploring the diverse characters and narratives within Gujarati texts, encouraging participants to recognize and appreciate the pluralistic nature of Gujarati literature and its reflections on society.
Pre-requisite	Knowledge of Gujarati (Reading, Writing and Speaking)

Course Outcomes	**CO1: Comprehensive Knowledge of Prominent Gujarati Novels:** Students will gain a deep understanding of the historical context, cultural nuances, and literary themes of four prominent Gujarati texts that explore historical facts and events. This outcome aims to foster a critical appreciation of the literature's connection to historical narratives. **CO2: Analysis of Key Characters in Gujarati Novels:** Students will analyze and evaluate the main characters in the selected Gujarati texts, examining their motivations, development, and significance within the historical context. This outcome encourages students to delve into character studies and understand the author's portrayal of individuals against the backdrop of historical events. **CO3: Cultural Sensitivity and Contextual Awareness:** Through the exploration of Gujarati texts, students will develop cultural sensitivity and contextual awareness, gaining insights into the social, political, and historical aspects that influence the literature. This outcome aims to enhance students' ability to interpret literature within its broader cultural and historical framework. **CO4: Critical Evaluation of Literary Techniques:** Students will critically evaluate the literary techniques employed by prominent Gujarati novelists, examining narrative structures, symbolism, and stylistic choices. This outcome encourages students to develop a discerning eye for the artistic elements that contribute to the richness of Gujarati literature. **CO5: Understanding Mahatma Gandhi's Autobiography in Gujarati Literature:** By studying Mahatma Gandhi's autobiography written in Gujarati, students will gain insights into his life, philosophy, and the socio-political landscape of the time. This outcome aims to connect the literary exploration of historical events with the personal narrative of one of the most influential figures in history, fostering a holistic understanding of the period.
Mapping between Course Outcomes(CO) with Program Specific Outcomes(PSO)	
Course Content	**Unit-1: "જય સોમનાથ " - લેખક : કનૈયાલાલ મુન્શી** - પરિચય અને ઐતિહાસિક સંદર્ભ: નવલકથાના પ્લોટ અને થીમ્સની ઝાંખી સોમનાથ મંદિરની ઐતિહાસિક પૃષ્ઠભૂમિ અને પાત્રોનું વિશ્લેષણ અને તેમનું ઐતિહાસિક મહત્વ. - ગુજરાતનું સાંસ્કૃતિક વિહંગલોકન : નવલકથામાં દર્શાવવામાં આવેલા સાંસ્કૃતિક તત્વોનું અન્વેષણ. નવલકથા અને સમકાલીન ગુજરાતમાં સાંસ્કૃતિક વ્યવહારનો તુલનાત્મક અભ્યાસ. **Unit-2 : "સત્યના પ્રયોગો" - લેખક: મહાત્મા ગાંધી** - સાહિત્યિક સ્વરૂપ તરીકે આત્મકથા: ગાંધીજીની વર્ણન શૈલીનું મહત્વ. ગાંધીજીની ફિલસૂફી પર વ્યક્તિગત અનુભવોની અસરનું વિશ્લેષણ. - નૈતિક અને તાત્વિક પ્રતિબિંબ: સત્ય અને અહિંસા સાથે ગાંધીજીના પ્રયોગોનું અન્વેષણ.સમકાલીન સમાજમાં ગાંધીવાદી સિદ્ધાંતોની સુસંગતતા પર ચર્ચા. **Unit-3 : "સિંહપુરુષ" - લેખક : ડો. શરદ ઠાકર** - પરિચય અને ઐતિહાસિક સંદર્ભ: સ્વતંત્રતા આંદોલન અને સ્વાધીનતા સંગ્રામ ના વિવિધ પાસા. - વીર સાવરકરની જીવનયાત્રા અને વિચારો. - કાળાપાણીની સજા અને આંદામાન-નિકોબારની જેલમાં વિતાવેલ કઠિન સમય. - જીવન ચરિત્ર અને સ્વતંત્રતા માટેની દ્રઢતા. **Unit-4: "પેલે પાર નો પ્રવાસ" : લેખક : રાધાનાથ સ્વામી** - આધ્યાત્મિક અને વ્યક્તિગત વૃદ્ધિ: સ્વામી રાધાનાથની ભારત યાત્રા . - સ્વ ની ખોજ માટે ભારતના તત્વજ્ઞાન અને આધ્યાત્મિક જ્ઞાન માટે ના અનુભવો. - સ્વ-શોધની ભૂમિકા પર ચર્ચા - આંતર-સાંસ્કૃતિક અનુભવો - વિવિધ સંસ્કૃતિઓના નવલકથાના ચિત્રણનું વિશ્લેષણ, વિવિધતામાં એકતા સંબંધિત તત્વનું

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	■				■			
CO2	■			■	■		■	■
CO3			■					
C04	■	■		■		■		
CO5	■	■		■	■			

	અન્વેષણ. - ભારત પ્રવાસ દરમ્યાન થયેલ અનુભવો. **Unit-5: "મહા-માનવ સરદાર " - લેખક: દિનકર જોશી** - જીવન ચરિત્ર અને ઘડતર. - લોહપુરુષ ની જીવન યાત્રા અને આઝાદી ની ચળવળમાં ભૂમિકા. - આઝાદ ભારતના શિલ્પી અને રાજ્યોનું એકત્રીકરણ - આધુનિક ભારત અને ભવિષ્યના ભારત અંગેના વિચારો.
Reference Books	1) "**મહા-માનવ સરદાર** " - **લેખક**: **દિનકર જોશી** , ISBN: 9788177907032 (ISBN10: 8177907034), Pravin Prakashan 2) "Pele Parno Pravas" (Gujarati Of The Journey Home), Radhanath Swami, Publisher: Tulasi Books, ISBN: 9788191035537 3) "**સિંહપુરુષ**" - **લેખક** : **ડો. શરદ ઠાકર**, Publisher: Navbharat sahity Mandir, ISBN-10. 8190240897 ; ISBN-13. 978-8190240895. 4) "Saty na prayogo", **લેખક** : Mahatma Gandhi, Publisher: Navjivan Trust ,ISBN(13): 978-8172290429. 5) "**જય સોમનાથ** " - **લેખક** : **કનૈયાલાલ મુન્શી**, ISBN(13): 978-9351751328
Teaching Methodology	Class Work, Discussion, Self-Study, Case-Study, Seminars , Assignments
Evaluation Method	50% Internal assessment. - Attendance, Class and home Assignment, - One presentation by the student on given topic, - A book review report on given topic of the book and participation in group discussion. 50% External assessment. Seminar exam will be conducted by the two appointed examiners by the college/institute (Criteria for examiner appointment: Similar to the practical examiners appointed at graduation level who are expert in the subject.) - Final review report consist of minimum 3000 words will be prepared and presented by the student on one of the book selected from the five books of the syllabus. (40% weightage) - Student will also prepare detailed critical analysis of any two characters from the available books in the syllabus and prepare a presentation and report(minimum 600 words on each character selected by the student.) (40% weightage) - The examiners can also conduct Viva-voce on the presentation given by the student interaction with the student to evaluate student's understanding about the books and characters. (20% weightage)

Course Code: **302**
Course Title: Statistical Methods and Data Analysis

<table>
<tr><td>Course Code</td><td>302</td></tr>
<tr><td>Course Title</td><td>Statistical Methods and Data Analysis
(Multi-Disciplinary Course – 03)
[Title of the course will be the one selected by the student from courses offered by college/institute out of the course basket offered by the University under the Multi-Disciplinary courses or Inter-disciplinary courses.]</td></tr>
<tr><td>Credits</td><td>4</td></tr>
<tr><td>Course Category</td><td>Multidisciplinary Course (MDC-03)</td></tr>
<tr><td>Level of Course</td><td>200-299 (Intermediate Level Course)</td></tr>
<tr><td>Teaching per Week</td><td>4 Hrs.</td></tr>
<tr><td>Minimum weeks per Semester</td><td>15 (Including class work, examination, preparation etc.)</td></tr>
<tr><td>Review / Revision</td><td>-</td></tr>
<tr><td>Implementation Year:</td><td>A.Y. 2024-2025</td></tr>
<tr><td>Purpose of Course</td><td>To equip students with the fundamental principles and techniques necessary to analyze and interpret data across various disciplines. Through hands-on experience and theoretical understanding, students will gain proficiency in statistical methods essential for making informed decisions and drawing meaningful insights from complex datasets, fostering interdisciplinary problem-solving skills. [Student will opt any one course of multi-disciplinary nature from other than the computer Science and Application faculty. The course will be offered by the institute/college passed by the Board of Studies of University faculties other than the computer science and application faculty.]</td></tr>
<tr><td>Course Objective</td><td>1. Develop fundamental level knowledge of statistical data analysis, including data manipulation, visualization, and modelling using R programming language.
2. Understand and apply basic statistical concepts and techniques such as descriptive statistics,
3. Gain practical experience in cleaning, exploring, and preparing datasets for analysis, emphasizing reproducible research practices.
4. Enhance critical thinking and problem-solving skills by applying statistical methods to real-world datasets and interpreting results effectively using R.</td></tr>
<tr><td>Pre-requisite</td><td>Knowledge of Fundamentals of Statistics and Mathematics of 10th Grade Level</td></tr>
<tr><td>Course Outcomes</td><td>CO1: Understand foundational statistical concepts including descriptive statistics, probability theory, and basic inferential statistics.
CO2: Apply statistical techniques such as hypothesis testing, confidence intervals, and correlation analysis to analyze and interpret data accurately.
CO3: Demonstrate proficiency in data visualization methods to effectively communicate statistical findings and insights.
CO4: Utilize basic statistical software tools or programming languages like R or Python to perform data analysis and visualization tasks.
CO5: Develop critical thinking skills to assess the validity and reliability of statistical analyses and draw appropriate conclusions from data.
CO6: Apply statistical reasoning to real-world scenarios and make informed decisions based on data-driven insights.</td></tr>
<tr><td>Mapping between Course Outcomes(CO) with Program Specific Outcomes(PSO)</td><td>
<table>
<tr><th></th><th>PSO1</th><th>PSO2</th><th>PSO3</th><th>PSO4</th><th>PSO5</th><th>PSO6</th><th>PSO7</th><th>PSO8</th></tr>
<tr><td>CO1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>Course Outcome</td><td>After studying the course, students will be able to Implement acquired skills in writing codes using programming languages.</td></tr>
</table>

Course Content	**Unit-1: Basic concepts of statistic** 1.1 Population vs. sample,variables (categorical vs. numerical), datatypes. 1.2 Descriptive statistics: measures of central tendency (mean, median, mode), 1.3 Measures of dispersion (range, variance, standard deviation) **Unit-2: Data Representation and Sampling technique** 2.1 Graphical representation of data (histograms, box plots, scatter plots) 2.2 Probability theory: basic probability concepts 2.3 Probability distributions (binomial, normal distributions) 2.4 Sampling techniques: random sampling, stratified sampling, 2.5 sampling distributions. 2.6 Understanding Bell curve. **Unit-3: Introduction to R and working with Data** 3.1 Overview of R and its applications in data analysis and statistics. 3.2 Installing R and RStudio. 3.3 Basic R syntax, variables, and data types. 3.4 Importing data into R from different file formats (CSV, Excel, etc.). 3.5 read, write and view data using data frames. **Unit-4: Data Filtering and cleaning** 4.1 Subsetting and filtering data. 4.2 Adding, removing, and renaming variables/Attributes. 4.3 Data Cleaning and Transformation 4.4 Identifying and handling missing values. 4.5 Data type conversion and recoding variables. **Unit-5: Working with Data in R** 5.1 Reordering and reshaping data frames. 5.2 Merging and joining data frames. 5.3 Calculating summary statistics (mean, median, mode, standard deviation). 5.4 Generating frequency tables and cross-tabulations. 5.5 Commands to measures of central tendency and dispersion. 5.6 Concepts of normal distribution. 5.7 Commands to explore view data distributions graphically (Bell curve).
Reference Books	1. "An Introduction to Statistical Learning: with Applications in R" by Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani, Publisher: Springer, ISBN: 978-1461471370 2. "R for Data Science: Import, Tidy, Transform, Visualize, and Model Data" by Hadley Wickham and Garrett Grolemund, Publisher: O'Reilly Media, ISBN: 978-1491910399 3. "Discovering Statistics Using R" by Andy Field, Jeremy Miles, and Zoe Field Publisher: SAGE Publications Ltd, ISBN: 978-1446200469 4. "Practical Data Science with R" by Nina Zumel and John Mount Publisher: Manning Publications, ISBN: 978-1617291562 5. "Statistics: Unlocking the Power of Data" by Robin H. Lock, Patti Frazer Lock, Kari Lock Morgan, and Eric F. Lock, Publisher: Wiley, ISBN: 978-1119325572 6. "The Art of R Programming: A Tour of Statistical Software Design" by Norman Matloff, Publisher: No Starch Press, ISBN: 978-1593273842 7. "Introduction to Probability and Statistics Using R" by G. Jay Kerns, Publisher: RStudio, PBC, ISBN: 978-1886529450 8. “Business Analytics – The science of Data-Driven Decision Making” by U.Dinesh Kumar, Publsher: Wiley, ISBN: 978-81-265-6872-2
Teaching Methodology	Class Work, Discussion, Self-Study, Seminars and/or Assignments
Evaluation Method	50% Internal assessment. 50% External assessment.

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT
S Y B. Sc. (Computer Science)
Syllabus for S. Y. B. Sc. Semester-III
Effective From: June 2024
Course: 303: Data Structure using C++

Course Code	CS-303
Course Title	Data Structure using C++
Credit	4
Teaching per Week	4 Hrs (2 hrs theory + 4 hrs Prctical)
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Implementation Year:	A.Y. 2024-25
Purpose of Course	This course imparts the knowledge of Data Structure. The concepts of Primitive and non-primitive data structures are covered in this course. It covers concepts of Arrays, Stack, Queue, Link list and sortingsearching methods. The course is aimed to give inner depth and practical implementation of non-primitive data structures and its related applications.
Course Objective	To make students understand concepts of Primitive and non-primitive Data structure. To make students understand concepts of stack, queue and types of queues. To make students understand the implementation of Link-list and related applications. To make students understand concept of polish notation. To make students work with searching and sorting techniques.
Pr-requisite	C++ programming Language.
Course Out come	At the end of the course, student is expected to have clear concepts about the primitive and non-primitive data structure. Implementation of non-primitive data structure. Application implementation using stack, queue, link list.
Mapping between COs withPSOs	

	PSO1	PSO2	PSO3	PSO4	PsSO5	PSO6
CO1						
CO2						
CO3						
CO4						
CO5						

Course Content	**Unit 1: Introduction** 1.1 Introduction data structure and its types 1.2Array, structure, union, self referential structure 1.3 Concept of Algorithm analysis 1.4 Algorithm performance Analysis criteria (Time / Space) Average case / Best Case / Worst case **Unit 2: Linear Data Structures** 2.1Stack data structure, operations on stack (Push, Pop, Peep) 2.2Applications of stack(Recursion, Evaluation of postfix, converting infix to postfix) 2.3Simple Queue data structure and its operations (insert, deleteand view) 2.4Circular queue, Dequeue and Priority queue 2.5Applications of queue (printer queue simulation, round robin Algorithm, Simulation) **Unit 3: Non-linear data structures** 3.1Linked list - representation, advantages and disadvantages 3.1.1 Various operations on one way (singly) linked list 3.1.2Various operations on two way (doubly) linked list 3.1.3Various operations on circular linked list 3.2 Introduction to Tree and Binary tree 3.2.1Tree traversal methods 3.2.2Concept and Applications of Binary Search Tree (No practicalimplementation) **Unit 4: Searching and Sorting** 4.1Searching Techniques- linear search, Binary search 4.2Sorting - Internal and external sort 4.3Quick sort 4.4Merge sort 4.5Insertion sort 4.6Selection sort
Reference Books:	1. An Introduction to Data Structure with Applications : Trembley & Sorenson – McGraw Hill 2. Data Structures Using C & C++ - Langsam, Augenstein & Tanenbaum - PHI 3. Wirth, Niclaus, Algorith+Data Structure Programs, Prentice Hall. 4. Horwith E and Sahni S, Fundamental of Data Structure, Computer Science Press. 5. Aho A.V., Hopcrott and Ullman, Data Structure and Algorithms , Addition – Wesslely.
Teaching Methodology	Discussion, Independent study, Seminars and Assignment
Evaluation Method	50% Internal assessment. 50% External assessment.

Note: Practical should be done using C++

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT

S. Y. B. Sc. (Computer Science)

Syllabus for S. Y. B. Sc. Semester-III

Effective From: June-2024

Course: CS-304: Java Programming – I

<table>
<tr><td>Course Code</td><td>CS-304</td></tr>
<tr><td>Course Title</td><td>Java Programming – I</td></tr>
<tr><td>Credit</td><td>4</td></tr>
<tr><td>Teaching per Week</td><td>4 Hrs (2 hrs theory + 4 hrs practical) (Major Course)</td></tr>
<tr><td>Minimum weeks perSemester</td><td>15 (Including Class work, examination, preparation, holidays etc.)</td></tr>
<tr><td>Last Review / Revision</td><td>June, 2024</td></tr>
<tr><td>Purpose of Course</td><td>To teach object oriented programming concepts through programming using Java asthe computer Programming language.</td></tr>
<tr><td>Course Objective</td><td>1. To make students understand object oriented programming.
2. To make students understand various inbuilt java classes those are available alongwith its working.
3. To make students understand the importance of OOP methodology.
4. To make students understand various types of OOP programming techniques.</td></tr>
<tr><td>Pre-requisite</td><td>Fundamentals of Object Oriented Programming Language.
Knowledge of C andC++.</td></tr>
<tr><td>Course Out come</td><td>CO1. Explain students the fundamental aspects of the java programmingCO2. Explain students JVM & garbage collection
CO3. Train students to develop Java programs for the real-world objects usingObject-oriented concepts like Classes and Objects, Inheritance, Polymorphism, Interfaces and Abstraction.
CO4. Train students to understand various Java In-built classes and itsworking.
CO5. Train students to implement exception handling in java program.</td></tr>
<tr><td>Mapping between COs withPSOs</td><td>
<table>
<tr><td></td><td>PSO1</td><td>PSO2</td><td>PSO3</td><td>PSO4</td><td>PsSO5</td><td>PSO6</td></tr>
<tr><td>CO1</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO2</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO3</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO4</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO5</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
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Course Content	**Unit 1. Introduction to Java** 1.1 Properties of Java 1.2 Comparison of java with C++ 1.3 Java Compiler and Interpreter 1.4 Use of JDK, JVM, JIT, JRE 1.5 Garbage Collection **Unit 2. Basic Concepts of String** 2.1String and String Buffer class 2.2Basic String operations 2.3String comparison, concatenation 2.4 Important functions of String Buffer class. **Unit 3. Classes and Objects** 3.1 java class structure, Inheritance and Access Control 3.2 Polymorphism: Overriding and overloading. 3.3 this and super 3.4 Construction and Initialization 3.5 Concepts of Data Hiding and Encapsulation, Access control 3.6 final, finalize(), finally, transient, volatile, memory leak 3.7 Static members, static class 3.8 Concept of Abstract class 3.9 Interfaces 3.9.1Introduction to Interfaces. 3.9.2Interface Declaration, implementing and extending. 3.9.3Difference between Abstract class and Interfaces. 3.10 Packages 3.10.1.Package Naming, Type Imports 3.10.2. Package Access, Contents, Defining and Importing Package **Unit-4: Concepts of Thread**. 4.1 Basics of Thread 4.2 Thread Life cycle, working of Thread. 4.3 Creating Thread using Thread class and Runnable Interface. 4.4 Extending, Stopping and Pausing Threads. 4.5 Concepts of Daemon Thread. 4.5.1 Priority of Thread and Thread scheduling 4.5.2.Parallel execution of Thread in Synchronous and asynchronousmode. **Unit 5. GUI Programming using Java Applet** 5.1Introduction to applet 5.2Difference between Applet and Application. 5.3Life cycle of Applet 5.4 Invoking Applet, Passing parameters to Applet 5.5 Abstract Window Toolkit (AWT)- Component Class: Container, Panel, LayoutManager 5.6 UI Controls:- Lables, TextFields, CheckBoxes, RadioButtons, ChoiceList, ChoiceMenu, List 5.6 Event handling 5.6.1 Handling Button, Checkbox, RadioButton Events 5.6.2 Handling Combobox, List, TextField, TextArea Events

Reference Book	1.The Complete Reference Java2 Herbert Schildt TMH, New Delhi 2. Mastering JAVA2 John Zukowski BPB 3. Teach Yourself Java2 platform in 21 days Lamey& Cadenhead TeachMedia 4 Java in Nut shell - O'Relly Publication 5 Java Language Reference - O'Relly Publication
Teaching Methodology	Class Work, Discussion, Self-Study, Seminars and/or Assignments
Evaluation Method	50% Internal assessment. 50% External assessment

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT
S Y B. Sc. (Computer Science)
Syllabus for S.Y. B. Sc. (Comp.Sc.) Semester-III
Effective From: June 2024
Major CS-305: Relational Database Management System

Corse Code	CS-305
Course Title	Relational Database Management System
Course Credit	4 (Major Course)
Teaching Per Week	4 (2 (Th) + 4 (Prac))
Minimum Weeks per Semester	15
Implementation Year:	A.Y. 2024-2025
Purpose of Course	This course imparts the knowledge of Relational Database Management System, SQL (DDL, DML and DCL) and PL/SQL
Learning Outcome	• To provide Fundamental knowledge about Relational database management System • To understandthe concepts of Relational model • To make students understand and carryout Database Normalization. • To understand and implement SQL (DDL,DML,DCL) • To understand the concept of PL/SQL • To understand and implement various concepts of PL/SQL(cursor, function, procedure and trigger)
Course Outcome	CO 1: Understand the concepts of RDBMA and Relational model CO 2: Understand the concepts and importance of normalization CO 3: Understand and implement the SQL CO 4: Understand the programming concepts of PL/SQL CO 5: Student will able to implement various concepts like cursor, function, procedure and trigger.
Pre-requisite	Basic programming skills
Course Content :	**Unit-1: Introduction to DBMS** **1.1** Concepts of Database and Database System **1.2** Requirement of database system. (Data integrity, data isolation, data consistency, Data redundancy, Concurrency) **1.4**Introduction to Database Administrator, DDL, DML **1.5** Entities and Entity sets, Relationship and relationship sets, Mapping constrains **1.6** Super Key, Candidate Key, Primary keys, Foreign Key, Unique Key **Unit-2: Entity Relationship Model** **2.1** Entity Relationship diagram **2.2** Overview of SQL and Database system (mySQL / SQLServer / PostgreSQL / Oracle etc) **2.3** Various data types and operators **2.4** DDL Statements: CREATE TABLE command - Declaring Constraints, Table level Constraints, PRIMARY KEY constraint, FOREIGN KEY constraint, altering a table, dropping a table.

	2.5 DML Statements: INSERT statement, UPDATE statement, DELETE statement 2**.6** DQL statements: SELECT statement- FROM and WHERE clause, ORDER BY, with NULL ,Use of relational operators, use of Boolean operators, IN, BETWEEN, LIKE, NOT IN,GROUP BY clause, HAVING , Join Queries (Basic concept of Joining table, Inner Join, Outer Join (Left, Right, Full), self-Join), sub queries **2.7** Introduction to Commit, Rollback, saves point **UNIT – 3 Relational Database Design** **3.1** Normal forms (1NF, 2NF, 3NF and B.C.N.F.) **3.2** Data Dictionary **3.3**PL/SQL Block Structure **3.4** Using Variables, Constants and Data Type, Assigning Values to Variables **3.5** Control Statements (IF…THEN statement, Loop, FOR...Loop, While Loop) **3.6** Exception handling **3.7** Concepts of Cursor (Implicit, explicit cursor, cursor attributes, cursor for loops) **Unit 4: PL/SQL Programs** 4.1 Procedures and Function 4.2 Triggers 4.3 Packages
Reference Books	1. Henry Kroth&Silbershats, Database System Concept. 2. C.J. Date, Introduction to Database Design, Addition Wesley, Nasora. 3. Martin Gruber, Understanding SQL, BPB Pub., New Delhi. 4. Ivan Bayross, SQL, PL/SQL The Programming Language of ORACLE, BPB Pub., New Delhi. 5. SQL / PLSQL programming By P.S. Despandewiley Dream Tech Pub. 6. J Ullman, Principles of Database Systems, Galgotia Pub., New Delhi. 7. ORACLE Manuals. 8. SQL Manuals 9. ORACLE 10g The Complete Reference, ORACLE Press, TMH, Delhi. 10. Oracle PL/SQL programming - Oracle press - Tata McGraw hill.
Teaching Methodology	Class Work, Discussion, Self-Study, Seminars and/or Assignment
Evaluation Method	50% Internal assessment. 50% External assessment

Course code: CS-306:
Course Title: Skill Enhancement Course (SEC-03)

Course Code	306
Course Title	Skill Enhancement Course - III (SEC – 03)
Credit	2
Category of Course	Skill Enhancement Course
Level of Course	200-299 (Intermediate Level)
Teaching per Week	2 Hrs (Any or Combination of Theory/Practical/Fieldwork/Internship/Project)
Minimum weeks per Semester	15 (Including class work, examination, preparation etc.)
Review / Revision	-
Implementation Year:	A.Y. 2024-2025
Purpose of Course	- As per NEP(National Education Policy-2020), it is mandatory for students to select a 2 credit Skill Enhancement Course out of the choices given by the college/institute. - It will be mandatory for the student to opt minimum one 2-credit Skill Enhancement Course out of the list of offered courses recognised by the University during semester-1 to semester-5. - The student can start an alternative career in the field by obtaining higher degree of knowledge in the area. - It's aimed at imparting practical skills, embedded internship, hands-on training, soft skills, life skills, such approved online courses etc. to enhance the employability of students. This may also include courses as per the need of new evolving technology.
Course Objective	Obtaining skill in particular field along with the regular curriculum of the selected program is essential. It not only enhance the skill but also provide an opportunity to develop skill in particular area where one can pursue career in future. Skill enhancement provides the opportunity and knowledge for an individual to develop and strengthen the necessary skills to gain, maintain, and advance in a chosen area. Skill enhancement programs are focused around training that combines the best practices from varieties of areas. Skill enhancement or training typically uses a combination of cognitive and behaviour problem solving approaches, both of which are used to strengthen a person's positive skill develop.
Pre-requisite	-
Course Content and Implementation road-map.	(i) University has categorized and prepared the basket of the courses including approved online courses that can be offered as Skill Enhancement Course. (ii) The institute/college/department can design and implement skill enhancement course by getting approval from the relevant apex body of the university considering the SOP of the certificate course policies of the University. (iii) The institutes/college/departments can select more than one course out of the given sets of courses and offer them to their students. (iv) The students can select any of the courses offered by the institute/college/department from the given choices and enrol for the course. (v) The institute/college/department will arrange appropriate resource person(s) for the course. (vi) The course evaluation will be taken place at the college/institute/department level based on the nature of the course. (vii) The institute/college/department will assess the student based on the nature of the course. The student will be granted the credits on successful completion of the course.

Reference Books	- The reference materials and books will be decided by the Institutes/Colleges/Departments based on the selected Courses. - Minimum five copies of relevant topics are recommended to keep in the library.
Teaching Methodology	Class Work/ Discussion/ Self-Study/ Seminars/ field works/ practical training/ field work and/or Assignments.
Evaluation Method	50% Internal assessment. 50% External assessment. Maximum Marks: 50 (Evaluation and Assessment will be carried out based on the nature of the course. On successful completion of the course, the student will be granted 2 credits.)

Course code: 307
Course Title: Value Addition Course-III (VAC-03)

Course Code	307
Course Title	Value Addition Course - III (VAC – 03)
Credit	2
Category of Course	Value Addition Course
Level of Course	200-299 (Intermediate Level Course)
Teaching per Week	2 Hrs (Any or Combination of Theory/Practical/Fieldwork/Internship/Project)
Minimum weeks per Semester	15 (Including class work, examination, preparation etc.)
Review / Revision	-
Implementation Year:	A.Y. 2024-2025
Purpose of Course	As per NEP(National Education Policy-2020), it is mandatory for students to select a 2 credit Value Addition Course out of the choices given by the college/institute. It will be mandatory for the student to opt minimum one 2-credit Value Addition Course out of the list of offered courses recognised by the University during semester-1 to semester-4. The student can start an alternative career in the field by obtaining higher degree of knowledge in the area.
Course Objective	Obtaining knowledge in all or any of the components/fields like (i) Understanding India (ii) Environmental Science/Education (iii) Digital/Technological solutions (iv) Health & Wellness, Yoga education, sports, and fitness are essential for holistic development (v) Indian Knowledge system (IKS). The course components should be among these five categories/fields and as per the Curriculum and Credit Framework for Undergraduate Programmes of the UGC (Page-22 of the document). The purpose is to impart knowledge and understand the necessities of these aspects in life to make the healthy society and nation. It help in development of a dedicated and responsible citizen of the country by adding value to the life.
Pre-requisite	-
Course outcome	CO1: Student select the area of Value addition as per his/her interest. The choices will be given by the institute/department. CO2: The student acquire basic and fundamental level of knowledge in the field that the student opted. CO3: Understand the insight of the area and possibility of to explore more in the field. CO4: Understand effective representation of problems, solutions and insights of the challenges and problems of the peer subject relevant to value addition. CO5: Learn to upskill and upgrade the knowledge in the area of selected subject.
Course Content and Implementation road-map.	(i) The university has categorised and prepared the list of the courses that can be offered as Value Addition Course. (ii) The institute/college/department can design and implement skill enhancement course by getting approval from the relevant apex body of the university considering the SOP of the certificate course policies of the University. (iii) The institutes/college/departments can select more than one course out of the given sets of courses and offer them to their students. (iv) The students can select any of the courses offered by the institute/college/department from the given choices and enrol for the course. (v) The institute/college/department will arrange appropriate resource person(s) for the course. (vi) The evaluation will be taken place at the college/institute/department based on the nature of the course. (vii) The institute/college/department will assess the student based on the nature of the course. The student will be granted the credits on successful completion of the course.

Reference Books	- The reference materials and books will be decided by the Institutes/Colleges/Departments or as per the university guidelines based on the selected Courses. - Minimum five copies of relevant topics are recommended to keep in the library.
Teaching Methodology	Class Work/ Discussion/ Self-Study/ Seminars/ field works/ practical training/ field work and/or Assignments.
Evaluation Method	50% Internal assessment. 50% External assessment. Maximum Marks: 50 (Evaluation and Assessment will be carried out based on the nature of the course. On successful completion of the course, the student will be granted 2 credits.)

Internship: Student willing to exit the program at the end of the two semesters and to avail the Certificate in Computer Application or exit the program at the end of the first four semesters and to avail the Diploma in Computer Application, it is essential to acquire four credits from internship. A key aspect of the internship is induction into actual work situations. Internships involve working with local industry, government or private organizations, business organizations, artists, crafts persons, and similar entities to provide opportunities for students to actively engage in on-site experiential learning. In option to these internships, the student can avail such four credits by availing two 2-credit university approved courses during any of these semesters. The student is required to enroll and avail these 4-credits and produce the evidence in process to opt the multi-level exit option after successfully completion of first year (two semester) or second year(four semesters).

Semester - 4

Course Code: **401**

Course Title: Organizational Soft-skills in Software Industry

Course Code	401
Course Title	Organizational Soft-skills in Software Industry Ability Enhancement Course – 04 [In option to this course, the course will be selected by the student and required 2 credits can be opted from the list of courses mentioned in Table-6 (Page number 51 – 52) from NEP-2020 S.O.P. of Gujarat State implementation handbook for NcrFr. The credits can be acquired through any valid MOOC, online courses recognized and approved by UGC or from courses offered by college/institute out of the course basket offered by the University under the Ability Enhancement courses]
Credits	2
Course Category	**Ability Enhancement Course (AEC-04)**
Level of Course	200-299 (Intermediate Level)
Teaching per Week	2 Hours
Minimum weeks per Semester	15 (Including class work, examination, preparation etc.)
Review / Revision	-
Implementation Year:	A.Y. 2024-2025
Purpose of Course	Computer Science professionals work at different levels in the hierarchy of various jobs in IT. It is essential to understand the Organization Structure and behavior. - Integration of Knowledge and Skills: One objective of a multidisciplinary course is to foster the integration of knowledge and skills from different disciplines. By combining various areas of study, students can gain a holistic understanding of a particular topic or problem. This objective aims to break down the traditional boundaries between subjects and encourage students to see connections and relationships across different fields. - Promoting Critical Thinking and Problem Solving: Another objective is to enhance students' critical thinking and problem-solving abilities. Multidisciplinary courses often involve complex real-world issues that require a multifaceted approach. By engaging with diverse perspectives and methodologies, students develop the capacity to analyze problems from multiple angles, think creatively, and propose innovative solutions. - Enhancing Collaboration and Communication Skills: Collaboration and effective communication are essential skills in today's interconnected world. Multidisciplinary courses aim to cultivate these skills by providing opportunities for students to work collaboratively with peers from different disciplines. Through group projects, discussions, and presentations, students learn how to articulate their ideas, listen actively to others, and collaborate effectively to achieve common goals. This objective prepares students for interdisciplinary work environments and encourages the exchange of ideas across disciplinary boundaries.
Course Objective	These courses are designed as combination of Indian Languages (from the Eighth Schedule of the Indian Constitution) and English language courses, with a specific focus on enhancing language and communication skills. The primary objective of these courses is to help students acquire and demonstrate essential soft-skills in discipline specific(software industry), linguistics skills, including critical reading, expository writing and academic writing. HEIs have flexibility to introduce courses that are tailored to specific disciplines or are applicable across all undergraduate programmes. A list of a few AEC courses is provided in Table-6 (3.3.4) of Implementation of NEP-2020 for the

	state of Gujarat S.O.P.
Pre-requisite	Knowledge of English at H.Sc.(10th) Level
Course Outcomes	**CO1:** After completion of the course the student will be aware about the Structure of an organization **CO2:** Also, will have better understanding of human behaviour in an organization **CO3:** Students will understand and develop their attitude **CO4:** Students will learn the importance of motivation **CO5:** Students will be able to understand the leader, skills of leader and leadership styles **CO6:** students will have idea about BPO and call centers
Mapping between Course Outcome(CO) and Program Specific Outcome (PSO):	

	PS01	PS02	PS03	PS04	PS05	PS06	PS07	PS08
CO1								
CO2								
CO3								
CO4								
CO5								
CO6								

Course Content

Unit 1: Introduction to Software development Organization Structure

1.1 What makes an organization

1.2 Overview of software organizational structure and its importance in software development

1.3 Structure of organization:

1.4 Traditional vs. Agile organizational structures in software development

1.5 Roles and responsibilities within software development teams

1.6 Management in Software Organization : Scope and Role of Management

Unit 2: Writing Skills for Effective Communication in Organizations

2.1 Importance of writing skills in software organizations

2.2 Principles of effective written communication (clarity, conciseness, coherence)

2.3 Techniques for writing professional emails, reports, and documentation

2.4 Best practices for writing technical documents and user manuals in software development

Unit-3 : Software Organizational Hierarchy and team building

3.1 Hierarchy in software development organization and roles of Project manager, System Analyst, System Architect, Business Model Developer, Team Leaders, Coders, Debuggers.

3.2 Managerial Skills (Technical Skills, Human Skills, Conceptual Skills)

3.3 Importance of verbal communication skills in software development teams

3.3.1 Effective communication in meetings, stand-ups, and presentations

3.3.2 Active listening techniques for better understanding and collaboration

3.3.3 Strategies for conveying technical concepts to non-technical stakeholders

Unit 4: Communication Strategies for Collaboration

4.1 Importance of communication in team collaboration and project management.

4.2 Strategies for resolving conflicts and addressing disagreements in software teams.

4.3 Effective communication techniques for remote and distributed teams.

4.4 Building rapport and fostering team cohesion through effective communication practices.

	4.5 Opportunities for automation, intelligent decision-making, and impact on software development teams.
Reference Books	1.) Title: "Software Engineering at Google: Lessons Learned from Programming Over Time", Author: Titus Winters, Tom Manshreck, Hyrum Wright, Publisher: O'Reilly Media, ISBN: 978-1492082798 2.) Title: "The Elements of Style", Author: William Strunk Jr., E.B. White, Publisher: Pearson, ISBN: 978-0205309023 3.) Title: "Writing That Works: How to Communicate Effectively in Business", Author: Kenneth Roman, Joel Raphaelson, Publisher: HarperBusiness, ISBN: 978-0060956431 4.) Title: "Technical Communication: A Reader-Centered Approach", Author: Paul V. Anderson, Publisher: Cengage Learning, ISBN: 978-1305667884 5.) Title: "Crucial Conversations: Tools for Talking When Stakes Are High", Authors: Kerry Patterson, Joseph Grenny, Ron McMillan, Al Switzler, Publisher: McGraw-Hill Education, ISBN: 978-0071771320 6.) Title: "Nonviolent Communication: A Language of Life", Author: Marshall B. Rosenberg, Publisher: Puddledancer Press, ISBN: 978-1892005038. 7.) Title: "The Silent Language", Author: Edward T. Hall, Publisher: Anchor, ISBN: 978-0385055499 8.) Title: "Emotional Intelligence 2.0", Authors: Travis Bradberry, Jean Greaves, Publisher: TalentSmart, ISBN: 978-0974320625 9.) Title: "Leadership and Self-Deception: Getting Out of the Box", Authors: The Arbinger Institute, Publisher: Berrett-Koehler Publishers, ISBN: 978-1576759776 10.) Title: "Difficult Conversations: How to Discuss What Matters Most" Authors: Douglas Stone, Bruce Patton, Sheila Heen, Publisher: Penguin Books, ISBN: 978-0143118442.
Teaching Methodology	Class Work, Discussion, Self-Study, Case-study, Seminars and/or Assignments
Evaluation Method	50% Internal assessment. 50% External assessment. External Assessment: Each student will be given a case-study of software industry to study organizational structure, hierarchy of the employee structure, environment and interpersonal communication among the teams. Tools and techniques used to interact within the organization and with the clients. The students will create a report/document based on the given case study and give presentation at the end of the semester for final evaluation. The examiner panel will consist of two examiners including one faculty member/resource person who handled the course and one person from the software industry. (Incase the person from software industry is not available, both examiners can be faculty members/resource person of the institute.) Assessment : - Writing skills and report/documentation abilities (20%) - Oral presentations evaluating verbal communication skills (20%) - Viva-voce (20%) - Case study analysis and problem-solving exercises focusing on communication strategies in software organizations (40%)

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT
S Y B. Sc. (Computer Science)
Syllabus for S. Y. B. Sc. Semester-IV
Effective From: June-2024
Course: CS-402: Software Engineering

Course code	CS-402
Course Title	Software Engineering
Credit	4 (Minor Course)
Teaching per week	4 hrs
Minimum week persemester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June 2024
Purpose of the course	• To make students understand how to develop software in correct way. • To make students understand various components of software processmodel and their working. • To make students understand the importance of requirement analysis. • To make students understand various approaches of system design. • To make students get idea of software teams develop skill of projectmanagement.
Course Objective	1) Students should be able to understand how software is developed andimportance of various aspects of software engineering. 2) Help students appreciate the role of various design principles. 3) Students should be able to perform requirement analysis and systemdesign for their applications.
Pre-requisite	Prior knowledge of basic software.
Course out come	CO1: Students understand software characteristics and problems andEngineering approach to develop software. CO2: Students understand importance of requirement analysis andTechniques to elicitation. CO3: Students understand various components of software processModel and their working. CO4: Students understand the importance of design and principles and concepts and learn how to make system design and detailed design CO5: Students understand about effort estimation, various software teams management and skill of project management.

Mapping Between COsand PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	■					
CO2	■	■	■	■		■
CO3	■	■			■	
CO4	■	■	■	■		■
CO5		■	■	■		

Course Content	**Unit 1. Introduction to Software Engineering** 1.1 Software 1.1.1.Software & Software Types 1.1.2.Software characteristics & problems 1.1.3.Software quality factors 1.2. Software Engineering & problem related to it 1.3. Software engineering approach 1.3.1.Introduction to phased development approach 1.3.2.Introduction to effort distribution 1.4. Software process models • Linear sequential / waterfall model • Prototype model • RAD model • Incremental model, • Spiral model. **Unit 2. Software Requirement analysis & specification** 2.1 Requirement gathering formal & informal techniques 2.2 Interviews, Questionnaires, System walk through,Document survey 2.2.1.Introduction to FAST , QFD & JAD 2.3 Requirement modeling 2.4 Data Modeling - Data, attribute, relationship, EntityRelationship Diagram. 2.5 Functional modeling – DFD & process specification 2.6 Data Dictionary 2.7 Software Requirement Specification 2.7.1Structure & Component of SRS 2.7.2.Characteristics of SRS **Unit 3. Software Designing** 3.1 Introduction to Design - Importance of design, Relationship between analysis & design, Design Principals 3.2 Design Concepts 3.2.1 System level design concepts – Abstraction, Refinement , Modularity, Information hiding, Polymorphism and reusability 3.2.2 Module level design concepts – Coupling, Cohesion 3.3 Detailed Design 3.3.1 Database design - Normalization, Indexing, constraints 3.3.2 Overview of Designing software architecture 3.3.3 UI / UX Design guidelines 3.3.4 Procedural design - PDL, Decision table **Unit 4. Software implementation and Project management** 4.1 Programming practices - Pair programming, Extreme Programming, Coding rules and guidelines. 4.2 Project management 4.2.1 Software estimation - COCOMO Model – II 4.2.2 Project scheduling and tracking - Time line charts andproject table. 4.2.3 Software team management - CC, CD, DD team structure 4.3 Software project maintenance **Unit 5. Fundamentals of Testing** **5.1 Testing concepts** 5.1.1 Terminology - Error, Fault, Failure, Bug, Cost of bug, 5.1.2 Testing,Testcase, Test Data, Test Result, Test suite, Test Reports 5.1.3 Testing life cycle, Test Exit criteria 5.1.4 Testing and debugging, software reliability

	5.2.1 Test driven development **5.2 Testing practices** 5.2.1. Overview of testing types - Ad-hoc testing, Gorilla testing,Random testing and Systematic testing, Static testing and Dynamic Testing, Functional, Non functional and Behavioural 5.2.2 Testing, Usability Testing, Configuration Testing and Compatibility Testing 5.3 White box testing - Data and code coverage testing techniques 5.4. Black box testing - Equivalence partitioning, Boundary value Analysis 5.5 Levels of testing - Unit, Integration, System and Acceptance testing 5.6 Smoke testing, Sanity Testing and Regression Testing 5.7 Practices for static testing
Reference Books	1. Integrated Approach to Software Engineering Pankaj Jalote Narosa Publication. 2. Software Engineering: A Practitioner's Approach 4e/5e, Roger S. Pressmann McGrawHill Publication. 3. Workbook on System Analysis and Design 1e/2e, Garg, Srinivasan PHI. 4. Software Engineering K. K. Aggrawal, Yogesh Singh New Age International Publishers. 5. Fundamentals of Software Engineering Carlo Ghezzi, Mehdi Jazayeri,Dino Mendrilo PHI. 6. Ron Patton ―Software Testing‖, Techmedia Publication, 2000 7. Dr. K.V.K.K prasad, ―Software Testing Tools‖, Dreamtech, 2006 8. Srinivas D and Gopalswamy R, ―Software Testing: Principles and Practices‖. Pearson Education, 2013 9. K. Mustafa and R.A Khan, ―Software Testing -concepts and practices‖, Narosa, 2012
Teaching Methodology	Class Work, Discussion, Self-Study, Seminars and/or Assignments
Evaluation Method	50% Internal assessment. 50% External assessment

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT
S Y B. Sc. (Computer Science) Syllabus for
S. Y. B. Sc. Semester-IV
Effective From: June-2024
Course: 403: PHP Programming

Course code	403
Course Title	PHP Programming
Credit	4 (Major Course)
Teaching per week	4 hrs
Minimum week persemester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	-
Implementation Year:	A.Y. 2024-2025
Purpose of the course	• To make students understand open source php server side scriptinglanguagewith MySql database. • Give students exposer to php language using object oriented concepts andimplementing it practically. • Give students ideasof developing dynamic websiteusing php alongwithMySql.
Course Objectives	• To make students understand Open source website development.. • To make students understand various inbuilt features of PHP and in-builtfunctions. • Fundamentals of dynamic website development. • Using database like MySQL with PHP.
Pre-requisite	Prior knowledge HTML & any object oriented language.
Course out come	CO1: Students will be able to install php and mysql using Appache server.CO2: Students will be understand features of language and syntax of language and how to embedding it with HTML. CO3: Students will get understanding various inbuilt features of PHP andin-built functions. CO4 : Students will get exposer to php language using object orientedconcepts and implementing it practically. CO5: Student will get knowledge of developing interactive web applicationusing server side scripting language having database interaction.

Mapping between COswith PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	■	■				
CO2	■	■	■		■	■
CO3	■			■		■
CO4	■	■	■	■		
CO5	■		■	■	■	■

Course Content	**Unit-1 Introduction to PHP and Scripting** 1.1. Installation of PHP, MySQL and Apache Web Server PHP Features PHP code parsing Embedding PHP and HTML and executing PHP script Data types, Operators PHP variables: static and global variables Comments in PHP **Unit-2 : PHP Scripting** Control Structures and Looping Array in PHP 2.3. Exit, Die, Return Working With Data FORM element, INPUT elements Validating the user input Passing variables between pages Passing variables through GET , POST, REQUEST State management Managing Sessions - Concept of Session, Starting session,Modifying session variables, Un registering and deleting session variable Managing Cookies - Concept of cookie, Using cookie in PHP 2.10.File uploading and downloading in PHP **Unit 3. Object Oriented Programming using PHP and Exception Handling** Built-in functions Sring Functions: chr, ord, strtolower, strtoupper, strlen,ltrim, rtrim, substr, strcmp, strcasecmp, strpos, strrpos, strstr,stristr, str_replace, strrev, echo, print Math Functions: abs, ceil, floor, round, fmod, min, max,pow, sqrt, rand Array Functions: count, list, in_array, current, next, previous, end, each, sort, rsort, assort, array_merge, array_reverse User Defined Functions Declaring a class and Objects The new keyword and constructor, Destructor Access method and properties using $this variable Public, private, protected properties and methods Static properties and method Inheritance & code reusability Exception handling using Try …catch statement Generic Exception class and its sub classes **Unit-4: Using MySQL** Types of tables in MySQL Database connectivity of PHP with MySQL Query in MySQL: Select, Insert, Update, Delete Using AJAX with PHP and database Using JSON with PHP and MYSQL **Note: Practical will be based on Units-1 to Units-4.**

Reference Books	**1.** Core PHP Programming ;Leon Atkinson ;Pearson publishers **2.** The Complete Reference PHY; SteverHolzner; McGraw Hill **3.** Beginning PHP 5.0 Database; Christopher Scollo, Harish Rawat, Deepak Thomas; Wrox Press **4.** PHP – A beginners; Ashok Appu; Wiley **5.** PHP 5.0 and MySql Bible; Tim Converse, Joyce Park, Clark Morgan John;Wiley & Sons **6.** MySQL Bible; Steve Suehring John; Wiley &Sons **7.** PHP Black Book; Peter Moulding – **8.** PHP 5 and Mysql; Tim converse, Joyce Park and Clark Morgan; Bible Wiley **9.** Beginning PHP 5.3; Matt Doyle; Wrox Publication **10.** WordPress for Beginners THE MISSING GUIDE, 2nd Edition , coveringWordPress 3.5, By Nico Julius WPBRIX publication
Teaching Methodology	Class Work, Discussion, Self-Study, Seminars and/or Assignments
Evaluation Method	50% Internal assessment. 50% External assessment

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT
S Y B. Sc. (Computer Science)
Syllabus for S. Y. B. Sc. Semester-IV
Effective From: June-2024

CS-404: WebDesigning-2

CourseCode	CS-404
CourseTitle	Web Designing – 2
Credit	4 (Major Course)
Teaching per Week	4Hrs (2 Hrs theory + 4 Hrs Practical)
Minimum weeks per Semester	15(Including classwork, examination, preparation etc.)
Implementation Year:	A.Y. 2024-2025
Purpose of Course	Web Design requires designers to create graphics, typography as well as images which are used only on the World Wide Web. While creating any design, web designers need to maintain balance between creating a good design as well as the speed and efficiency for the webpage/ website. This course deals with server-side communication.
Course Objective	To make students aware of web terminology and website designing tools. Student can understand and implement the real functions of website development.
Pre-requisite	Introduction to WebDesigning-1 course of Semester-1.
Course outcome	• Students will be able to create, organize and design websites. • Students gain formal understanding of XML-based technologies which are used in Web-service. • Students will be able to make dynamic changes to a web pages as well as respond to user and browser events through JQuery • Students will be able to learn cross-browser supports via Ajax and Jason • Students will be able to write a synchronous code using various techniques through node.js

CourseContent	**Unit-1:IntroductionofXML:** Characteristic and Use of XML XML syntax(Declaration,Tags,elements) root element, case sensitivity XML document: Document Prolog Section Document element section XML declaration and rules of declaration. **Unit2. Design WebSites Using Bootstrap4** Boot strap Introduction Grid Structure Table, Colours, Alerts, Form Controls Buttons and Button Groups Images, Media Objects Pagination Bootstrap Grids Boot strap Themes **Unit-3:jQueryFundamentals** Introduction and basics: Advantage of jQuery and Syntax jQuery Selectors: jQuery Events(ready(),click(), key press(),focus(),blur(),change()) jQuery Effects: Show/Hide, Fade, Slide, Stop, Chaining, Callback jQueryManipulation methods: Get/Set methods(text(),attr(),html(),val()) Insert methods: (append(),prepend(),text(),before(),after(),wrap()) Remove element methods:(remove(),empty(),unwrap()) jQuery Get and Set CSS properties using css()method. **Unit-4:JSON:(JavaScriptObjectNotation)** Concept and Features of JSON Similarities and difference among JSON and XML JSON objects(withstringandNumbers)) JSON Arrays and their examples: Array of string, Array of Numbers, Array of Booleans Array of objects, Multi-Dimensional Arrays JSON comments **Unit-5:AJAX(Asynchronous JavaScript and XML):** Fundamentals of AJAX technology: Difference between Synchronous and Asynchronous web application XMLHttpRequesttechnology XML Http Request Properties: (onReadyState Change, readyState, responseText, responseXML) XMLHttpRequestMethods:(Open(),send(),setRequestHeader()) Working of AJAX and its architecture

	Unit-6:Node.js: Concepts, working and Features DownloadingNode.js Setting up Node.js server(HTTPserver) Installing on windowComponents Required modules, Create Server(http.createServer() Request and response Built-inModules require() function User defined module: create and include HTTP module Node.jsasWeb-server: createServer(),writeHead() method ReadingQueryString,SplitQueryString FileSystemModule: ReadFiles(readFile()) CreateFiles(appendFile(),open(),writeFile()) Update Files(appendFile(),writeFile()) DeleteFiles(unlink()) RenameFiles(rename())
ReferenceBooks	1. JavaScriptandJQuery(InteractiveFront-EndWebDevelopment)by Jon Duckett 2. JavaScriptandJQuery(Themissingmanual)byDavidSawyer MCFarland 3. EssentialASP.NETWebFormsDevelopment FullStackProgrammingwithC#,SQL,Ajax,andJavaScript Robert E. Beasley, Publisher: Apress 4FoundationsofAjax,RyanAsleson,Schutla,Publisher:Apres 5Ajax: The Complete Reference By Thomas Powell, ISBN:978-0-07-149216-4 6HeadFirstAjax,Author:Rebecca M.Riordan,publisher:O'Reilly 7PracticalNode.js,Author:AzatMardan,ISBN:978-1-4842-3038-1,Publisher: Apress 8Node.JSGuidebook,BPBPublication,ISBN:9789387284432,Author: Dhruti Shah 9JavaScriptforModernWebDevelopment,ISBN:9789389328721,eISBN: 9789389328738, Authors: Abhilasha Sinha, Ranjit Battewad, Alok Ranjan 10 MasteringHTML,CSS&JavascriptWebPublishing,Authors:byLaura Lemay,Rafe Colburn, BPB Publication
	11 JavaScriptbyExample, Author:ElitleQuigley,Publication:PrenticeHall, ISBN: 9780137054893, 9780137054893. 12 XMLineasysteps,Publication:TataMcGrawHill 13 XMLcrashcourse,Publisher:TataMcGrawHill,ISBN:9780071815161, 9780071815161 14 BeginningjQuery:FromtheBasicsofjQuerytoWritingyour OwnPlug- ins, by Jack FranklinRuss Ferguson,978-1484230268
TeachingMethodology	ClassWork,Discussion,Self-Study,Seminarsand/orAssignments
EvaluationMethod	50%Internal assessment. 50%External assessment.

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT
S Y B. Sc. (Computer Science)
Syllabus for S. Y. B. Sc. Semester-Iv
Effective From: June 2024
CS-405: Application and Web Development using c#.Net

Course Code	CS-405
Course Title	Application and Web Development using c#.Net
Credit	4 (Major Course)
Teaching per Week	2 hrs theory + 4 hrs Practical
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June, 2024
Purpose of Course	This course imparts the knowledge of primarily an integrated, interactive development environment ("IDE"). The visual studio-IDE has been highly optimized to support rapid application development ("RAD"). It is particularly easy to develop graphical user interfaces and to connect them to handler functions provided by the application and imparts the knowledge of web programming based on .NET technology. It covers the concepts of ASP.NET server controls, Client server communication, ADO .NET technology. It covers concepts of web config. The course is aimed to give inner depth of ASP .NET technology.
Course Objective	To make students understand concepts of GUI and .NET Framework. To make students understand concepts of IDE and CLR. To make students understand optimization to support RAD. To make students understand concepts of ASP .NET. To make students understand concepts of Server controls. To make students understand the basic concepts of client server communication. To make students understand of ADO .NET technology. To make students understand concepts of web config.
Pre-requisite	Concepts of GUI.
Course Out come	At the end of the course, student is expected to have clear concepts about the GUI, IDE , CLR and Rapid Application development Tool. Students can understand the concept of front-end tool as a base for developing interactive project. student is expected to have clear concepts about the ASP .NET. Students can apply .NET technology for implementing applications.
Mapping Between COs and PSOs	

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	■					
CO2	■	■	■	■		■
CO3	■	■			■	
CO4	■	■	■	■		■
CO5		■	■	■		

Course Content	**Unit-1: OVERVIEW OF MICROSOFT .NET FRAMEWORK** 1.1. What is .net framework & its benefits 1.2. The Common Language Runtime(CLR), Purpose of CLR 1.3. Managed/Unmanaged code, Compilation & Exception 1.4. Memory Management, Garbage Collection 1.5. The .Net Framework Class Library.

	1.6. .NET Web Services 1.7. Introduction to Ms Visual Studio .NET **Unit-2: Designing Using Interface** 2.1Working with Forms 2.2 Basic Windows Controls 2.3 Menus, Timer, Common dialog control, Rich Textbox 2.4 Treeview & Listview controls, Toolbar, Statusbar 2.5 SDI & MDI Application **Unit-3: INTRODUCTION TO ASP.NET** 3.1 ASP.NET as Web Development Framework 3.1.1 ASP.NET Application Structure & State 3.1.2 Files & Directories 3.1.2 Web.Config File 3.2 ASP.NET Controls 3.2.1Web Forms : Standard Controls 3.2.2.Navigation Controls: TreeView, Menu, SiteMapPath 3.2.3.Validation Controls 3.3 Designing with ASP.NET 3.3.1 Master Page, Base Page 3.3.2 Themes & Skins 3.3.3 CSS with ASP.NET 3.4 Introduction to AJAX server control toolkit **Unit-4 :** State Management in ASP.NET 4.1 Communication with Web browser 4.2 Request, Response Object 4.3 Cookies, Query String 4.4 Session Management & Variable Scope **Unit-5: Data Access** 5.1 History of Microsoft Data Access Technologies 5.2 Overview of ADO.NET 5.3 The Server Explorer & Query Builder 5.4 ADO.NET Object Model 5.5 Programming ADO.NET-provider, Adapter, Reader, command objects 5.6 Disconnected Architecture 5.7 Data Controls: GridView, FormView, Data Binding,Data Binding events
Reference Books:	1. Beginning c# by wrox publication 2. Programming in c# by E. Balaguruswami TMH 3. Visual C#.Net Black book by Kogent Learnig Solutions 4. Professional C# by wrox Publication 5. Beginning ASP.NET 4.0 in C# and VB by Imar Spaanjaars Wrox Pubs. 6. ASP.NET 4.0 – Black Book - Dream Tech 7. Professional ASP.NET in C# and VB Wrox Pubs. **Web References:** http://www.asp.net http://www.w3cschool.com for ASP.NET http://www.tutorialspoint.com for ASP.NET
Teaching Methodology	Discussion, Independent study, Seminars and Assignment
Evaluation Method	50% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 50% assessment is based on end semester written examination

Course code: 406
Course Title: Skill Enhancement Course (SEC-04)

Course Code	406
Course Title	Skill Enhancement Course - IV (SEC – 04)
Credit	2
Category of Course	Skill Enhancement Course
Level of Course	200-299 (Intermediate)
Teaching per Week	2 Hrs (Any or Combination of Theory/Practical/Fieldwork/Internship/Project)
Minimum weeks per Semester	15 (Including class work, examination, preparation etc.)
Review / Revision	-
Implementation Year:	A.Y. 2024-2025
Purpose of Course	- As per NEP(National Education Policy-2020), it is mandatory for students to select a 2 credit Skill Enhancement Course out of the choices given by the college/institute. - It will be mandatory for the student to opt minimum one 2-credit Skill Enhancement Course from the course baskets of Skill Enhancement courses approved by the university or from any recognized MOOC or from recognised university through online mode subject to transfer of credit through ABC during semester-1 to semester-5. - The student can start an alternative career in the field by obtaining higher degree of knowledge in the area. - It's aimed at imparting practical skills, embedded internship, hands-on training, soft skills, life skills, such approved online courses etc. to enhance the employability of students. This may also include courses as per the need of new evolving technology.
Course Objective	Obtaining skill in particular field along with the regular curriculum of the selected program is essential. It not only enhance the skill but also provide an opportunity to develop skill in particular area where one can pursue career in future. Skill enhancement provides the opportunity and knowledge for an individual to develop and strengthen the necessary skills to gain, maintain, and advance in a chosen area. Skill enhancement programs are focused around training that combines the best practices from varieties of areas as described in NEP-2020 SOP by Gujarat State Higher education Department's SOP. Skill enhancement or training typically uses a combination of cognitive and behaviour problem solving approaches, both of which are used to strengthen a person's positive skill develop.
Pre-requisite	-
Course Content and Implementation road-map.	(i) University has categorised and prepared the basket of the courses including approved online courses that can be offered as Skill Enhancement Course. (ii) The institute/college/department can design and implement skill enhancement course by getting approval from the relevant apex body of the university considering the SOP of the certificate course policies of the University. (iii) The institutes/college/departments can select more than one course out of the given sets of courses and offer them to their students. (iv) The students can select any of the courses offered by the institute/college/department from the given choices and enrol for the course. (v) The institute/college/department will arrange appropriate resource person(s) for the course. (vi) The course evaluation will be taken place at the college/institute/department level based on the nature of the course.

	(vii) The institute/college/department will assess the student based on the nature of the course. The student will be granted the credits on successful completion of the course.
Reference Books	- The reference materials and books will be decided by the Institutes/Colleges/Departments based on the selected Courses. - Minimum five copies of relevant topics are recommended to keep in the library.
Teaching Methodology	Class Work/ Discussion/ Self-Study/ Seminars/ field works/ practical training/ field work and/or Assignments.
Evaluation Method	50% Internal assessment. 50% External assessment. (Evaluation and Assessment will be carried out based on the nature of the course. On successful completion of the course, the student will be granted 2 credits.)

Course code: 407
Course Title: Value Addition Course-IV (VAC-04)

Course Code	407
Course Title	Value Addition Course - IV (VAC – 04)
Credit	2
Category of Course	Value Addition Course
Level of Course	200-299 (Intermediate)
Teaching per Week	2 Hrs (Any or Combination of Theory/Practical/Fieldwork/Internship/Project)
Minimum weeks per Semester	15 (Including class work, examination, preparation etc.)
Review / Revision	-
Implementation Year:	A.Y. 2024-2025
Purpose of Course	As per NEP(National Education Policy-2020), it is mandatory for students to select a 2 credit Value Addition Course out of the choices given by the college/institute. It will be mandatory for the student to opt minimum one 2-credit Value Addition Course out of the list of offered courses recognised by the University during semester-1 to semester-4. The student can start an alternative career in the field by obtaining higher degree of knowledge in the area.
Course Objective	Obtaining knowledge in all or any of the components/fields like (i) Understanding India (ii) Environmental Science/Education (iii) Digital/Technological solutions (iv) Health & Wellness, Yoga education, sports, and fitness are essential for holistic development (v) Indian Knowledge system(IKS). The course components should be among these five categories/fields and as per the Curriculum and Credit Framework for Undergraduate Programmes of the UGC (Page-22 of the document). The purpose is to impart knowledge and understand the necessities of these aspects in life to make the healthy society and nation. It help in development of a dedicated and responsible citizen of the country by adding value to the life.
Pre-requisite	-
Course Content and Implementation road-map.	(i) The university has categorised and prepared the list of the courses that can be offered as Value Addition Course. (ii) The institute/college/department can design and implement skill enhancement course by getting approval from the relevant apex body of the university considering the SOP of the certificate course policies of the University. (iii) The institutes/college/departments can select more than one course out of the given sets of courses and offer them to their students. (iv) The students can select any of the courses offered by the institute/college/department from the given choices and enrol for the course. (v) The institute/college/department will arrange appropriate resource person(s) for the course. (vi) The evaluation will be taken place at the college/institute/department based on the nature of the course. (vii) The institute/college/department will assess the student based on the nature of the course. The student will be granted the credits on successful completion of the course.
Reference Books	- The reference materials and books will be decided by the Institutes/Colleges/Departments or as per the university guidelines based on the selected Courses.

	- Minimum five copies of relevant topics are recommended to keep in the library.
Teaching Methodology	Class Work/ Discussion/ Self-Study/ Seminars/ field works/ practical training/ field work and/or Assignments.
Evaluation Method	50% Internal assessment. 50% External assessment. Maximum Marks: 50 (Evaluation and Assessment will be carried out based on the nature of the course. On successful completion of the course, the student will be granted 2 credits.)

Internship: Student willing to exit the program at the end of the two semesters and to avail the Certificate in Computer Application or exit the program at the end of the first four semesters and to avail the Diploma in Computer Application, it is essential to acquire four credits from internship. A key aspect of the internship is induction into actual work situations. Internships involve working with local industry, government or private organizations, business organizations, artists, crafts persons, and similar entities to provide opportunities for students to actively engage in on-site experiential learning. In option to these internships, the student can avail such four credits by availing two 2-credit university approved courses during any of these semesters. The student is required to enroll and avail these 4-credits and produce the evidence in process to opt the multi-level exit option after successfully completion of first year (two semester) or second year(four semesters).