Nirma University, Ahmedabad

(Statutory University Established under the State Act and recognized by the University Grants Commission under section -2(f) of the UGC Act, 1956)

NIRMA UNIVERSITY
NAAC ACCREDITED 'A+' GRADE

TRANSCRIPT

The statement showing the Semester and Course wise performance of the student

Name of the Institute : Institute of Technology
Programme : B. Tech. in Computer Science and Engineering **Duration** : 4 years (8 semesters)

Roll No.	Student's Name	Month & Year of Admission	Month & Year of Completion
19BCE230	Sachi Chaudhary	July - 2019	June - 2023

Course Code & Title		CG	Cr
Semester : I			
2MA101	Linear Algebra	B+	4
2PY101	Physics	A+	4
2CL102	Environmental Studies	A	2
2CS101	Computer Programming	B+	4
2EE101	Elements of Electrical and Electronics Engineering	A	4
2EE102	Electrical Workshop	B+	1
2SP101	Design Thinking	A+	-
2SP102	ICT Tools and Cyber Security	A	-
SPI : 8.74		**Credits Earned : 19**	
Semester : II			
2MA201	Calculus and Differential Equations	B+	4
2CY101	Chemistry	A	3
2ME101	Engineering Graphics	A+	4
2HSI101	English Communication	A	3
2CS201	Introduction to Computer Science and Engineering	A	1
2ME102	Mechanical Workshop	A	1
2SP103	Critical Thinking	A	-
2SP104	Yog and Meditation	A	-
SPI : 9.00		**Credits Earned : 16**	
PPI : 8.86		**Progressive Credits Earned : 35**	
Semester : III			
2CS301	Data Structures and Algorithms	B+	4
2CS302	Object Oriented Programming	A	4
2CS303	Digital Electronics	B	3
2CS304	Digital Communications	A+	3
2CS305	Discrete Mathematics	B+	3
2HS342	Principles of Economics	B+	2
2SP301	Community Services	A	-
SPI : 8.37		**Credits Earned : 19**	
PPI : 8.69		**Progressive Credits Earned : 54**	
Semester : IV			
2CS401	Computer Architecture	B	4
2CS402	Database Management Systems	B+	4
2CS403	Operating Systems	B+	4
2CS404	Programming for Scientific Computing	B+	3
2MA402	Probability and Statistics	B+	3
2HS341	Principles of Management	A+	2
2CS405	Web Technologies	B+	2
SPI : 8.00		**Credits Earned : 22**	
PPI : 8.49		**Progressive Credits Earned : 76**	

Course Code & Title		CG	Cr
Semester : V			
2CS501	Machine Learning	B+	4
2CS502	Computer Networks	A	4
2CS503	Design and Analysis of Algorithms	B	4
2CS504	Software Engineering	B+	4
2HSOE53	Organizational Behaviour	A+	3
2HSOE01	Personality Development	A	3
SPI : 8.41		**Credits Earned : 22**	
PPI : 8.47		**Progressive Credits Earned : 98**	
Semester : VI			
2CS601	Theory of Computation	B+	4
2CSDE53	Information Retrieval Systems	A+	3
2CSDE67	Cloud Computing	A	4
2CSDE70	Natural Language Processing	A+	3
2CHOE02	Air Pollution Control Techniques	A	3
UEIM006	Human Resource Management	A+	3
SPI : 9.25		**Credits Earned : 20**	
PPI : 8.60		**Progressive Credits Earned : 118**	
Semester : VII			
2CS701	Compiler Construction	A+	4
2CS702	Big Data Analytics	A	3
2CSDE80	Software Testing and Quality Assurance	A	4
2CSDE93	Blockchain Technology	A	3
2CLOE28	Road Safety and Management	A	3
2EEOE02	Electrical Power Utilization and Safety	A+	3
2CS703	Minor Project	B	2
2CS704	Summer Internship	B+	1
SPI : 9.09		**Credits Earned : 23**	
PPI : 8.68		**Progressive Credits Earned : 141**	
Semester : VIII			
2CS801	Major Project / Internship	A+	11
SPI : 10.00		**Credits Earned : 11**	

Total Credits Earned	Cumulative Performance Index (CPI)	Equivalent % Marks	Class obtained
152	8.78/ 10	82.8	First Class with Distinction

CG = Course Grade Cr = Credit SPI = Semester Performance Index PPI = Progressive Performance Index

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Date : 22-Jun-2023

NIRMA UNIVERSITY

Deputy Registrar,
Examination

- **Medium of Instructions :** English
- **Eligibility Criteria for Admission:**
  (i) Higher Secondary Certificate Examination (10+2) or recognized examinations considered equivalent by the University passed with Chemistry, Physics and Mathematics students are admitted in the first semester of the B.Tech. programme. (ii) Diploma Examination in the concerned discipline from Technical Examination Board, Gujarat State or from the Nirma University or recognized examinations considered equivalent by the Nirma University in addition to the Secondary Certificate Examination (10^{th}) passed students are admitted in the third semester of B.Tech. programme.

THE PROVISION OF DIFFERENT RELEVANT REGULATIONS

Performance level of the student in the course

Grade (G)	Qualitative Meaning (GQ)	Equivalent Grade Point (g)	Grade (G)	Qualitative Meaning (GQ)	Equivalent Grade Point (g)
A+	Excellent	10	B	Good	7
A	Creditable	9	C+	Satisfactory	6
B+	Very Good	8	C	Average	5

PASSING STANDARDS

- Minimum passing grade for a course – 'C'
- Minimum CPI required for passing a programme – 5.00

CALCULATION OF INDICES

PIC -- Performance index for the course = Equivalent grade point (g) corresponding to the course grade

PPI = (Up to any stage under consideration)
$(i_1 c_1 + i_2 c_2 + i_3 c_3 .....) / (\text{Sum of credits of all courses registered up to that stage})$, where, i_1, i_2, i_3 .... are PIC values of credit courses passed and c_1, c_2, c_3..... are the credit values of the respective courses.

SPI = This index is similar to PPI except that the stage to be considered is the end of a semester.

CPI = This index refers to the entire programme. It is calculated when the student passes the programme. The method of calculation is the same as for PPI or SPI but the summation is for the courses of all semesters of the programme.

All index values will be rounded off to the second place of decimal.

CLASS AND PERCENTAGE MARKS

CPI value, its equivalent class and formula for computing the percentage of marks from the CPI obtained by the student are given below.

CPI value	Equivalent class
5.00 To 6.49	Second
6.50 To 7.49	First
7.50 and above	First with Distinction

Percentage marks = (CPI – 0.5) × 10

SYLLABUS

NIRMA UNIVERSITY

NAAC ACCREDITED 'A+' GRADE

e Name : Institute of Technology
gramme Name : B. Tech. in Computer Science and Engineering
oll No : 19BCE230
Student's Name : Sachi Chaudhary

Semester : I

2MA101 L T P C
Linear Algebra 3 1 - 4

Rank and Inverse of Matrix, Solution of System of Linear Equations, Vector Space, Subspace, Basis of Vector Space, Rank Nullity Theorem, Linear Transformation, Matrix of General Linear Transformation, Change of Basis and Similarity, Eigen Values and Vectors, Caley- Hamilton Theorem, Diagonalization & Quadratic forms.

2PY101 L T P C
Physics 2 1 2 4

Physics of Nanomaterials, Lasers and Holography, Introduction to Fiber Optics, Nuclear and Plasma Physics, Basic concepts of Plasma physics, Physics of Vacuum Techniques and Cryogenics, Engineering of Auditorium and Ultrasonics

2CL102 L T P C
Environmental Studies 1 1 - 2

Environment and its Multidisciplinary nature, Biodiversity and its conservation, Concepts of sustainability, Environment Impact Assessment, Types of Pollution and pollutant, Causes , effects and control measures: Water, Air, Noise, Soil and Radioactive pollution; Role of individual in prevention of pollution, Solid waste management, Environmental ethics-issues and solutions, Water conservation, Environmental Protection acts.

2CS101 L T P C
Computer Programming 2 1 2 4

Introduction to Computers, Typical C Program Development Environment and steps, Flowchart, Algorithm, Test Cases, Introduction to Programming, Data types, Decision Statements and control Structures, Arrays, Characters and Strings, Library functions and User defined functions in C, Passing Arguments by value and by reference, Pointers, Structures, File processing.

2EE101 L T P C
Elements of Electrical and Electronics Engineering 3 - 2 4

Review of DC Circuits, Single Phase AC Circuits, Three Phase AC Circuits, Electromechanical Energy Conversion, Analog Electronics, Digital Electronics.

2EE102 L T P C
Electrical Workshop - - 2 1

Wiring Techniques, Introduction to Electronic Components, Laboratory Equipment, Introduction to Electrical Components, Soldering Techniques, Basics of Household Electrical Equipment, Electrical Safety and Protection, Design of Electrical Panels, Introduction to DC Machines.

2SP101 L T P C
Design Thinking - 2 - -

Defining Design Thinking and the process. Creativity Myths. Barriers and Self reflection. Ideas and tools. History of successful/unsuccesful products. Diversity and collaboration.

2SP102 L T P C
ICT Tools and Cyber Security 2 - - -

Internet as a Learning tool, Search Engines, Online learning resources, Sharing and Collaboration Tools, Teaching/learning tools, Information development, and Management Tools, Information Analysis Tool, Presentation tools, Audio/video resource creation tools, Internet and Cyber Security, Attacks and prevention Zombies and Trojan Horses, Security Dangers in Browsers, Worms, and viruses.

Semester : II

2MA201 L T P C
Calculus and Differential Equations 3 1 - 4

Calculus, Beta, Gamma function, Surface area, Volume, Infinite Series, Multivariable Calculus: Differentiation & Integration, Ordinary Differential Equations, Partial Differential Equations (First Order)

2CY101 L T P C
Chemistry 2 - 2 3

Water and its treatment, Fuel and its analysis, Lubricants and Greases, Polymer and Polymer composites, Green Chemistry, Fullerenes, Explosives, Nano materials, Organic electronic materials, Liquid crystals, Fuel cells, Electrochemical systems and Advanced engineering materials

2ME101 L T P C
Engineering Graphics 2 - 4 4

Importance and Applications of Engineering Drawing, Engineering curves and conic curves, Projection of points, straight lines, planes and solids, section of solids and development of surfaces, orthographic projection, isometric projection, Computer aided drafting tools

2HSI101 L T P C
English Communication 1 1 2 3

Vocabulary Building, Writing Skills, Nature and style of writing, Communication and its types, Oral Communication, Presentation skills, Group Discussions, Persuasive Communication, Formal modes of communication, Listening Skills, Short stories, Poems.

2CS201 L T P C
Introduction to Computer Science and Engineering 1 - - 1

Introduction to Computer Systems, Data Storage and Operations, Algorithms and Flow-charting, Algorithm to Program, Loops and Controls Construct, Errors, and Debugging: Structured Programming, Coding Conventions, Functions, Arrays, Pointers, Strings, Structures, and File processing.

2ME102 L T P C
Mechanical Workshop - - 2 1

Demonstration and job preparation of Joining process, Plumbing, Fitting, Sheet Metal work, Carpentry, Blacksmithy, use of conventional and CNC machines

2SP103 L T P C
Critical Thinking - 2 - -

Introduction to Thinking, Brain and Thinking, Anatomy of Brain for thinking, Rationality and its model, Fast and Slow Thinking, Objectivity, Subjectivity, Assumptions and Skepticism, Paradigm shift, Perception, Prejudice and stereotype, Attribution, Heuristics, Cognitive Biases and Errors ,Deductive and Inductive Reasoning, Forma and Informal fallacies, Arguments, Problem Solving, Case Studies.

2SP104 L T P C
Yog and Meditation - - 2 -

Introduction of "YOG", Astangyog, Sukshmayog (Light exercises), Suryanamaskar, Rules for asanas (Before & After), Asanas for brain & stomach, Asanas for relaxation and rest,Kriya (Kapalbhranti and Tratak), Bhastrika, Tribandha, Ujjayi, Pranayama (Anuloma, Viloma), Omkar (Bhramari), Importance of diet for "Total Health", Meditation for mind relaxation

Semester : III

2CS301 L T P C
Data Structures and Algorithms 3 - 2 4

Introduction to Data Structures, Linear Data Structures and their Sequential Storage Representation, Non Linear Data Structure, Indexing structure, Sorting and Searching Techniques.

Nirma University
Recognised as 'Centre of Excellence' by the Government of Gujarat
Sarkhej-Gandhinagar Highway, Ahmedabad 382 481, INDIA, Ph.: +91-02717-241911-15, 079-71652000 Website: www.nirmauni.ac.in

SYLLABUS

Institute Name : **Institute of Technology**
Programme Name : **B. Tech. in Computer Science and Engineering**
Roll No : **19BCE230**

Student's Name : **Sachi Chaudhary**

2CS302 L T P C
Object Oriented Programming 2 - 4 4

Introduction and Overview of Java, Data Types, Variables, Operators, Arrays, Control Statements, Classes and Methods, String Handling, Inheritance, Packages and Interfaces, Various Packages of Java Development Kit, Exception Handling, Multithreaded Programming, Managing I/O, Networking.

2CS303 L T P C
Digital Electronics 2 - 2 3

Binary Systems, Boolean Algebra and Logic Gates, Boolean Function Simplification, Combinational, Logic, Sequential Logic, Registers, Counters, Memory Unit, Digital Integrated Circuits

2CS304 L T P C
Digital Communications 2 1 - 3

Introduction to Data Communication, Network Types and Topologies, Network Models, Types of Signals, Transmission Impairments, Network Performance Measures, Digital Transmission, Multiplexing and Spreading Techniques, Transmission Media, Types of Errors, Error Detection and Correction Techniques.

2CS305 L T P C
Discrete Mathematics 2 1 - 3

Set Theory, Propositions and Computability, Permutations, Combinations and Discrete Probability, Proof Techniques, Relations and Functions, Algebraic Structures, Graphs and Trees, Recurrence Relations, and Recursive Algorithms.

2HS342 L T P C
Principles of Economics 2 - - 2

Introduction to Economics Micro and Macro Economics, Demand Function, Supply Function, Elasticity of Demand and Elasticity of Supply, Production Function, short run production function-the law of variable proportion - Cost Function, Market and Revenue Function, Price Determination, National Income Accounting, Inflation, Money and Banking, International Trade

2SP301 L T P C
Community Services - - 1 -

The Student is required to offer his/her services to the NGOs/ Government Organizations for a period of three weeks during the summer vacation. The student has to prepare a report of the activities carried out and has to make presentation before a jury.

Semester : IV

2CS401 L T P C
Computer Architecture 3 1 - 4

Introduction to Computer Architecture, Register Transfer and Micro operations, Instruction Codes, Micro-programmed Control, Central Processing Unit, Computer Arithmetic, Input Output Organization, Memory Organization.

2CS402 L T P C
Database Management Systems 3 - 2 4

Introductory concepts of DBMS, An architecture for a DBMS, Relational Databases, Relational Data Objects, Relational Data Integrity, Relational Operators, The Entity Relationship Model, Functional Dependencies, Database Design, Data Storage and Querying, Transactions, Recovery, Concurrency.

2CS403 L T P C
Operating Systems 3 - 2 4

Evolution of Operating Systems, OS services, types of OS, Process Scheduling, Interprocesses Communication (IPC), Classical IPC problems, Deadlock, Memory Management, Paging, IO Management, Principles of IO, Disks, File Systems.

2CS404 L T P C
Programming for Scientific Computing 2 - 2 3

Introduction to Computational Science, Applications involving Scientific Computing, Tools and Languages to Solve Complex Scientific Problems, Programming in Python- Interpreter and its environment, Object-oriented Programming, Classes and Methods, Encapsulation, Inheritance, Array Computing and Curve Plotting, Vectors and Higher Dimensional Arrays, Matrices, numPy, sciPy and Matplotlib, Python Pandas, Scientific computation using Python.

2MA402 L T P C
Probability and Statistics 2 - 2 3

Probability and Probability Models, Probability and Probability Distributions, Discrete & Continuous Random Variables, Discrete & Continuous Distributions, Descriptive Statistics and Point Estimation of Parameters, Statistical Intervals for a Single Sample, Confidence interval, Hypothesis testing, Least square estimator, Hypothesis tests in simple and multiple linear.regression, Prediction of new observations, correlation.

2HS341 L T P C
Principles of Management 2 - - 2

Significance of management, Evolution of Management thoughts, levels of management Planning, Organizing, Directing, Coordinating, Controlling, Budgeting , role of management Various functions of Management like Finance, Marketing, HR etc.

2CS405 L T P C
Web Technologies - - 4 2

Introduction to various HTML tags, Cascaded Style Sheets, JavaScript, AngularJS and AJAX.

Semester : V

2CS501 L T P C
Machine Learning 3 - 2 4

Theory and Practices in machine learning, Supervised Learning, Unsupervised Learning, Kernel Methods, Reinforcement Learning, Evolutionary Computing, Evaluation Techniques, Classification techniques.

2CS502 L T P C
Computer Networks 3 - 2 4

Use of Computer Networks, Network Hardware, Network Software, OSI and TCP/IP Reference Model, Network Examples, and Standards, Data Link Layer, Medium Access Control Sub Layer, Network Layer, Transport Layer, Application Layer.

2CS503 L T P C
Design and Analysis of Algorithms 2 1 2 4

Elementary Algorithmic, Analysis Techniques, Analysis of Algorithms, Solving Recurrences, Data Structures, Greedy Algorithms, Divide and conquer, Dynamic Programming, Branch and Bound, Backtracking, Randomized and approximation algorithms.

2CS504 L T P C
Software Engineering 3 - 2 4

Software Process and Life cycle, Software Requirement Engineering, Design Concepts, Risk Management, Software Testing, Verification and Validation of Software.

SYLLABUS

2HSOE53	L	T	P	C
Organizational Behaviour	2	1	-	3

Concept of Individual Differences, Values and attitude,Determinants of Personality, Fundamentals of Learning, Learning Theories, Definition of Perception, Perceptual Process, Motivation and its theories. Leadership theories,Group dynamics, Managing Change in Organization, an importance of Organizational culture.

2HSOE01	L	T	P	C
Personality Development	2	1	-	3

Personality Development,Attitude,Habits,Digital Etiquettes,Communication Skills,Time and Stress Management,Facing Failures,Interpersonal Relationship,Art of Networking

Semester : VI

2CS601	L	T	P	C
Theory of Computation	3	1	-	4

Review of Mathematical Terms and Theory, Finite Automata, Context Free Grammar, Pushdown Automata, CFL and NFL, Turing Machines, Recursive Language

2CSDE53	L	T	P	C
Information Retrieval Systems	2	-	2	3

Overview and Architecture of IRS, Document Representation, Retrieval Models, Data structures, Search and Filtering Techniques, Scoring and Vector Space Models and Language Models, Document Classification and Clustering, Web based IR: Web crawling, web search and link analysis, Meta search engines, Multimedia IR

2CSDE67	L	T	P	C
Cloud Computing	3	-	2	4

Cloud Fundamentals and Virtualization, Cloud delivery model: IaaS, PaaS and SaaS, Cloud Computing Mechanisms, Cloud Computing Architecture, working with the cloud, Security, Achieving production readiness for cloud services.

2CSDE70	L	T	P	C
Natural Language Processing	2	-	2	3

Introduction and Text Classification, Language Modelling: Hidden Markov models, Viterbi algorithm, Forward - backward algorithm, EM training, Vector Space Models, Maximum Entropy Classifiers, Sequence to Sequence Modelling, Encoder and Decoder architecture, Attention mechanism

2CHOE02	L	T	P	C
Air Pollution Control Techniques	3	-	-	3

Air pollution in India and the world, sources and classification of air pollutants, global concern of air pollutants, effects of air pollutants, emission inventory, Air quality criteria and standards, Air quality monitoring, sampling, and analysis, , Air pollution control methods and equipments, Control of Specific Pollutants like VOC, Odour, Control of Mobile Sources, Indoor Air Quality, Industrial air pollution control system like thermal power plant, petroleum refinery etc.

UEIM006	L	T	P	C
Human Resource Management	3	-	-	3

An Introduction to Human Resource Management; HRD and HRM; Corporate Strategy and Human Resource Management; Human Resource Planning; Job Analysis, Recruitment & Selection; Performance Management; Compensation Management; Learning & Development; Employee Relationship Management; Industrial Disputes & Conflicts; Labour Legislation; HRM in Cross-cultural and Global Environments; Organisation Learning; Ethics and Ethical Issues in HRM; Skills and Competencies of a Human Resource Manager; Human Resource Management in Family owned businesses and Not for profit organizations; Organisational Transformation and HRM; Contemporary Concerns in HRM

Semester : VII

2CS701	L	T	P	C
Compiler Construction	3	-	2	4

Introduction, Lexical Analysis, Syntax Analysis, Syntax directed translation, Intermediate Code Generation, Runtime Environment, Code Generation and Optimization

2CS702	L	T	P	C
Big Data Analytics	2	-	2	3

Introduction to Big Data, Big Data Analytics, Hadoop, The Big data technology landscape, Big data analytics Algorithm, Decision tree on Big Data

2CSDE80	L	T	P	C
Software Testing and Quality Assurance	3	-	2	4

Overview of Software Testing, Unit Testing, Control Flow Testing, Data Flow Testing, System Integration Testing, System Test Categories, Functional Testing, System Test Design and Planning, System Test Planning, Automation, System Test Execution, Acceptance Testing, Software Quality Assurance: Requirements, Metrices and Models

2CSDE93	L	T	P	C
Blockchain Technology	2	-	2	3

Need of Blockchain and its evaluation, Blockchain Architecture, Design and Consensus, Permissioned and Public Blockchains, Blockchain cryptography, Recent trends and research issues in Blockchain

2CLOE28	L	T	P	C
Road Safety and Management	3	-	-	3

Introduction to road safety, road characteristics and cross section elements, Road Geometrics, Traffic Characteristics, Causes, prevention, cost and scientific investigations of Road Accidents, Road Safety Audit, Traffic Regulation and Control, Traffic Management Techniques.

2EEOE02	L	T	P	C
Electrical Power Utilization and Safety	3	-	-	3

Electric Heating, Electric Welding, Refrigeration, Air Conditioning, Illumination Scheme, Electrical Installation, Estimating and Costing of electrical systems, Power Factor, Electrical Safety, Earthing System and Protective Devices

2CS703	L	T	P	C
Minor Project	-	-	4	2

Each student has to carry out project which may be in form of product preparations, working/non-working models, prototype development, fabrication of set-ups, experiment development, process modification/development, simulation, software development, integration of software and hardware, statistical data analysis, survey, creating awareness in society.

2CS704	L	T	P	C
Summer Internship	-	-	-	1

The summer internship is aimed at providing opportunity to the students to gain practical experience in the industries / research institutes. During the summer internship the student will have the exposure to industrial / research environment which will help them to develop the competencies required for professional career, interpersonal and human relationship skills

Semester : VIII

SYLLABUS

Institute Name : **Institute of Technology**
Programme Name : **B. Tech. in Computer Science and Engineering**
Roll No : **19BCE230**

Student's Name : **Sachi Chaudhary**

	L	T	P	C
2CS801				
Major Project / Internship	-	-	-	11

The major project will be aligned with the aims of the engineering program and its areas of specialization. It shall be based on the recent trends in technology, computational techniques, system/process analysis, problem formulation, solution, etc. The student(s) shall carry out a comprehensive project at a relevant Academic / R&D / Industrial organization based on one or more of the following aspects: aspects – Prototype Design, Product Preparation / Development, Working Model, Fabrication of Set up, Laboratory Experiments, Process Modification / Development, Simulation, Software Application / Development, Integration of Software and Hardware, Data Analysis, Survey, etc.

Date : 03-Jun-2023

Nirma University Ahmedabad Examination Section

Deputy Registrar
(Examination)