



UMT



Get Ahead Faster with Industry Specific **Minor**



Pakistan's Premier General Research University

GREAT PLACE - GREAT LEARNING - GREAT FUTURE

Eligibility Criteria for Opting Minors

The Minor courses can be registered by the students of Undergraduate programs

A student may register for Minor after successful completion of 3 semesters

The minimum CGPA required for opting a Minor is 2.60 CGPA for Undergraduate Programs

Why Get A Minor Specialization?

Career Flexibility

Better Employability Options

Interdisciplinary Understanding

Acquisition of Diverse Skills and Knowledge

Readiness for the Dynamic Job Market

Personal Growth and Development

Key Points:

- A special provision has been created in ERP for all students having CGPA 2.60 & above can register up to 21 credit hours opting for minors
- Minor courses with their titles will be reflected on the student's transcript
- Minor courses CGPA will have no effect on SGPA/ CGPA
- Credit hours for minor courses will be in addition to the standard requirement of degree
- "W" and "F" grades in case of a Minor subject will not be reflected on the student's transcript
- The student has to complete a minimum of 12 CHs (4 courses) to earn a Minor
- In case the student does not clear the minimum required courses for minors, then the remaining courses with pass grades will be reflected in the transcript as 'Additional Courses'
- The tuition fee of each minor course is Rs 7500/- per semester only.
- Recognition (sash, certificates, medals etc.) for the students who complete requirements of Minor Courses in Rector Merit Ceremonies irrespective of their CGPA
- Once a student has selected a stream of minors, they will have to pursue that specific stream.

School of Science (SSC)

Chemistry

List of Minor Courses

- Principles of Chemistry
- Environmental Chemistry
- Applied Chemistry
- Chemistry in Every day Life
- Industrial Chemistry-I
- Industrial Chemistry-II
- Spectroscopy-Theory & Applications
- Separation Techniques
- Environmental Analytical Chemistry
- Fundamentals of Computational Chemistry
- Industrial Safety and Health

Course Code	Credit Hours
CH100	3
CH205	3
CH208	3
CH210	3
CH311	3
CH315	3
CH417	3
CH419	3
CH428	3
CH435	3
CH440	3



Mathematics

List of Minor Courses

- Calculus with Applications
- Extensions of Set Theory
- Ordinary Differential Equations
- Computational Physics & Numerical Analysis
- Group Theory
- Real Analysis
- Partial Differential Equations
- Complex Analysis
- Vector and Tensor Analysis
- Mathematics Modeling
- Introduction to Graph Theory
- Fluid Mechanics

Course Code	Credit Hours
MA100	3
MA104	3
MA218	3
MA223	3
MA308	3
MA312	3
MA321	3
MA324	3
MA330	3
MA402	3
MA403	3
MA407	3



Physics

List of Minor Courses



- Mechanics
- Electricity and Magnetism
- Waves and Oscillations
- Modern Physics
- Heat and Thermodynamics
- Optics
- Mathematical Methods of Physics
- Quantum Mechanics
- Electronics
- Nuclear Physics
- Solid State Physics

Course Code	Credit Hours
PH101	3
PH102	3
PH103	3
PH204	3
PH205	3
PH206	3
PH307	3
PH308	3
PH316	3
PH417	3
PH421	3

Life Sciences (Biotechnology)

List of Minor Courses



- Cell Biology
- Genetics
- General Virology
- Fundamentals of Microbiology
- Industrial Microbiology
- Clinical Bacteriology and Virology
- Food Microbiology
- Epidemiology and Public Health

Course Code	Credit Hours
BT101	3
BT201	3
MB202	3
MB203	3
MB302	3
MB311	3
MB401	3
MB402	3

Life Sciences (Biochemistry)

List of Minor Courses



	Course Code	Credit Hours
■ Industrial Biochemistry	BC404	3
■ Clinical Biochemistry	BC314	3
■ Nutritional Biochemistry	BC402	3
■ Metabolism and Bioenergetics	BC313	3
■ Cell Biology	BT101	3
■ Amino Acids, Proteins and Nucleic Acids	BC211	3
■ Carbohydrates and Lipids	BC202	3
■ Analytical Techniques in Biochemistry	BC311	3

Life Sciences (Microbiology)

List of Minor Courses



	Course Code	Credit Hours
■ Cell Biology	BT101	3
■ Genetics	BT201	3
■ General Virology	MB202	3
■ Fundamentals of Microbiology	MB203	3
■ Industrial Microbiology	MB302	3
■ Clinical Bacteriology and Virology	MB311	3
■ Food Microbiology	MB401	3
■ Epidemiology and Public Health	MB402	3

Dr Hasan Murad

School of Management (HSM)

Accounting and Finance



List of Minor Courses

	Course Code	Credit Hours
■ Financial Accounting	ACT130	3
■ Accountant in Business	MG221	3
■ Cost Accounting	AC230	3
■ Business Finance	FN340	3
■ Introduction to Islamic Banking and Finance	IB380	3
■ Financial Management	FN440	3

Economics



List of Minor Courses

	Course Code	Credit Hours
■ Principles of Microeconomics	EC111	3
■ Principles of Macroeconomics	EC121	3
■ Issues in Pakistan's Economy	EC270	3
■ Islamic Economics	EC345	3
■ Theory of Development Economics	EC355	3
■ Managerial Economics	EC360	3

Information Systems



List of Minor Courses

	Course Code	Credit Hours
■ Database Management Systems	IS250	3
■ Datawarehousing and Data Mining	IS351	3
■ Introduction to Data Science	IS371	3
■ Business Analytics	IS391	3
■ IT Project Management	IS412	3
■ Enterprise Resource Planning	IS495	3

Human Resource Management



List of Minor Courses

	Course Code	Credit Hours
■ Organizational Behavior	MG330	3
■ Managing Development in Organization	MG465	3
■ Managing Knowledge in Organization	MG470	3
■ Managing Alliance and Partnership	MG475	3
■ International Business	MG490	3

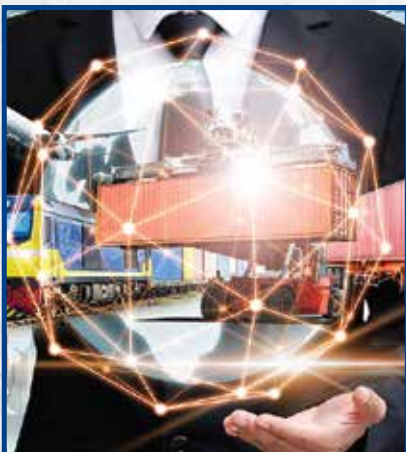
Marketing



List of Minor Courses

	Course Code	Credit Hours
■ Principles of Marketing	MK210	3
■ Retail Marketing	MK401	3
■ Consumer Behaviour	MK450	3
■ Selling Skills	MK470	3
■ Digital Marketing	MK477	3

Operations and Supply Chain



List of Minor Courses

	Course Code	Credit Hours
■ Production Operations Management	OM345	3
■ Total Quality Management	OM460	3
■ Project Management	OM470	3
■ Supply Chain Performance	SM473	3
■ Supply Chain Design	SM476	3

School of Food and Agricultural Sciences (SFAS)

Food Science and Technology



List of Minor Courses

	Course Code	Credit Hours
■ Introduction to Food Science and Technology	FST101	3(2-1)
■ Food Safety and Hygiene	FST102	3(3-0)
■ Basic Agriculture	FST104	3(3-0)
■ Food Processing and Preservation	FST105	3(2-1)
■ Introduction to Food Supply Chain	FQM202	3(3-0)
■ Food Chemistry	FST206	3(3-0)
■ Food Quality Management	FST301	3(3-0)

Human Nutrition and Dietetics



List of Minor Courses

	Course Code	Credit Hours
■ Fundamentals of Human Nutrition	HND101	3(3-0)
■ Macronutrients in Human Nutrition	HND102	3(3-0)
■ Micronutrients in Human Nutrition	HND203	3(3-0)
■ Community Nutrition and Public Health	HND211	3(2-1)
■ Functional Foods and Nutraceuticals	HND305	3(3-0)
■ Global Hunger and Food Security	HND306	3(3-0)

School of Professional Psychology (SPP)

Psychology

List of Minor Courses



	Course Code	Credit Hours
■ Brain, Bio chemistry & Behavior	CP203	3
■ Personality Theories	PSY206	3
■ Perspective Psychology	PSY209	3
■ Developmental Psychology	PSY306	3
■ Gender Psychology	PSY310	3
■ Cognitive Psychology	PSY315	3
■ Social Psychology	CP403	3
■ Cross-Cultural Psychology	PSY496	3

School of Social Sciences & Humanities (SSSH)

Sociology

List of Minor Courses



	Course Code	Credit Hours
■ Sociological Theories (Contemporary)	SOC101	3
■ Cultural Anthropology	SOC302	3
■ NGO Management	SOC305	3
■ Sociological Research Methods	SOC308	3
■ Population Studies and Social Demographics	SOC333	3
■ Sociology of Human Rights	SOC336	3
■ Sociology of Health and Illness	SOC411	3
■ Criminology	SOC440	3

International Relations

List of Minor Courses



	Course Code	Credit Hours
■ Introduction to Strategic Studies	IR130	3
■ International Relations Theory	IR200	3
■ International Political Economy	IR240	3
■ Peace and Conflict Studies	IR330	3

Institute of Aviation Studies (IAS)

Aviation Professional Pilot

List of Minor Courses



- Introduction to Aviation
- Principles of Flights
- Air Law
- Radio Telephony
- Aviation English
- Aircraft General Knowledge
- Meteorology
- Practical Flight Training-I
- Practical Flight Training-II

Course Code	Credit Hours
AS101	3
PT101	3
PT122	3
PT123	3
AS220	3
PT223	3
PT231	3
PT312	3
PT313	3

Aviation Management

List of Minor Courses



- Introduction to Aviation
- Aviation Sciences
- Airport Fundamentals
- Aviation Law
- Airspace and Air Traffic Management
- A/C Performance and Flight Simulations
- Aviation English
- Aviation Safety Management
- Aviation Security
- Environmental Factors in Aviation

Course Code	Credit Hours
AS101	3
AM114	3
AM124	3
AM161	3
AM201	3
AM212	2-1
AS220	3
AM221	3
AM411	3
AM417	3

School of Liberal Arts (SLA)

Communication and Creative Skills

To earn the minor, student must choose 4 courses out of given 6 courses

English and Literary Studies

	Course Code	Credit Hours
■ Visual Arts	LR411	3
■ Theatre studies	LR417	3
■ Social and cultural History of the Subcontinent	LR329	3

Linguistics and Communications

	Course Code	Credit Hours
■ Presentation skills	EN301	3
■ Creative writing	LL117	3
■ Critical Thinking	TDS104	3



School of Systems and Technology (SST)

Data Science (SST Students)

Core: Core courses must be passed before taking any elective. Every SST student enrolled in Minor must pass the following two (2) core courses:

	Course Code	Credit Hours
■ Advanced Statistics	DS3052	3
■ Introduction to Data Science (pre-req DS3052)	DS2136	3

Electives: Must pass any two (2) courses from the following list of electives but cannot take both Machine Learning and Deep Learning:

	Course Code	Credit Hours
■ Big Data Analytics	DS3136	3
■ Data Warehousing and Business Intelligence	DS3137	3
■ Data Visualization	DS3139	3
■ Deep Learning	CS4152	3
■ Cloud Computing	CS439	3
■ Machine Learning	CS446	3
■ Data Mining	CS458	3



Data Science (Non-SST Students)

Eligibility Criteria: Student has studied the following course or its equivalent in their undergraduate or they have to enroll in the following course in order to be eligible to enroll in this Minor along with core courses.

	Course Code	Credit Hours
■ Probability & Statistics	MA150	3

Core: Core courses must be passed before taking any elective. Every student enrolled in this minor must pass the following two (2) core courses:

	Course Code	Credit Hours
■ Programming Fundamentals	CC1021	3+1
■ Introduction to Data Science (pre-req CC1021)	DS2136	3

Electives: Must pass any two (2) courses from the following list of electives but cannot take both Machine Learning and Deep Learning:

	Course Code	Credit Hours
■ Data Mining	CS458	3
■ Machine Learning	CS446	3
■ Big Data Analytics	DS3136	3
■ Data Visualization	DS3139	3
■ Data Warehousing and Business Intelligence	CS474	3
■ Deep Learning	CS4152	3

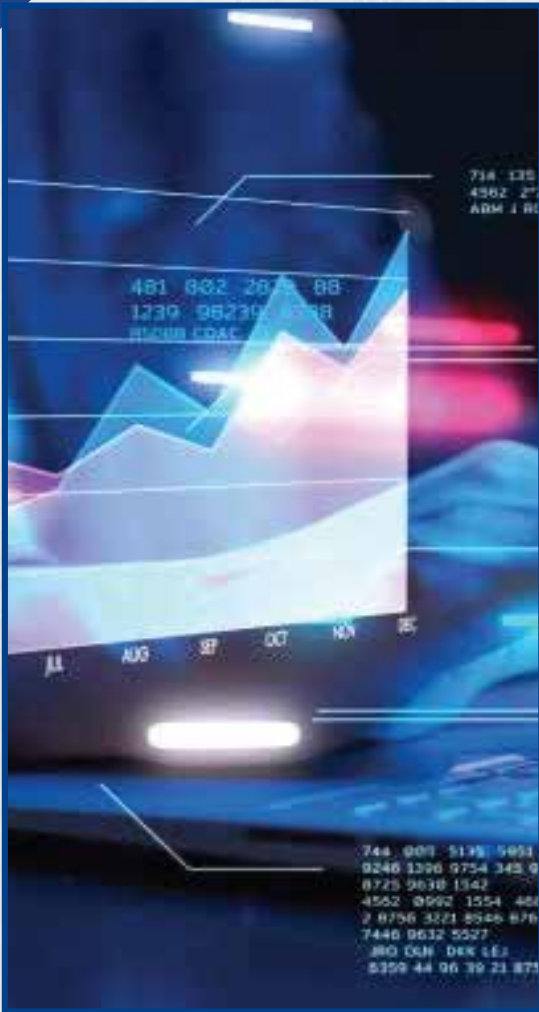
Computer Science

Core: Core courses must be passed before taking any elective. Every student enrolled in this minor must pass the following three (3) core courses:

	Course Code	Credit Hours
■ Programming Fundamentals	CC1021	3+1
■ Object Oriented Programming (pre-req CC1021)	CC1022	3+1
■ Data Structures & Algorithms (pre-req CC1022)	CC2042	3+1

Electives: Must pass any one (1) course from the following list of electives:

	Course Code	Credit Hours
■ Database Systems	CC230	3+1
■ Computer Networks	CC251	2+1
■ Operating Systems	CC323	3
■ Analysis of Algorithms	CC342	3



Software Application Development (Non-SST Students)

Core: Core courses must be passed before taking any elective. Every student enrolled in this minor must pass the following three (3) core courses:

	Course Code	Credit Hours
■ Programming Fundamentals	CC1021	3+1
■ Object Oriented Programming (pre-req CC1021)	CC1022	3+1
■ Database Systems (pre-req CC1022)	CC2141	3+1

Electives: Must pass any one (1) course from the following list of electives:

	Course Code	Credit Hours
■ Web Application Development	IT310	3
■ Mobile Application Development	CS436	3
■ Game Design and Development	CS443	3
■ iPhone Application Development	CS465	3
■ Advanced Web Technologies	CS554	3

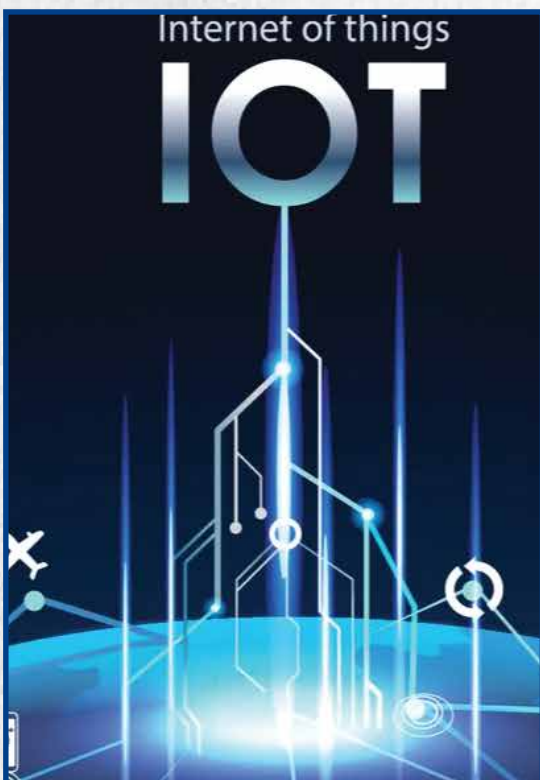
Internet of Things (Non-SST Students)

Core: Core courses must be passed before taking any elective. Every student enrolled in this minor must pass the following three (3) core courses:

	Course Code	Credit Hours
■ Programming Fundamentals	CC1021	3+1
■ Digital Logic Design	CS2031	3+1
■ Internet of Things (pre-req CC1021 and CS2031)	CS4176	3

Electives: Must pass any one (1) course from the following list of electives:

	Course Code	Credit Hours
■ Embedded Systems	CS4033	3
■ Cloud Computing	CS439	3
■ Computer Vision	CS456	3
■ Robotics	CS5113W	3



Artificial Intelligence (Non-SST Students)

Core: Core courses must be passed before taking any elective. Every student enrolled in this minor must pass the following three (3) core courses:

	Course Code	Credit Hours
■ Programming Fundamentals	CC1021	3+1
■ Programming for AI (pre-req CC1021)	AI2101	3+1
■ Machine Learning (pre-req AI2101)	CS446	3

Electives: Must pass any one (1) course from the following list of electives:

	Course Code	Credit Hours
■ Artificial Intelligence	CS3151	3
■ Data Visualization	DS3139	3
■ Deep Learning and Neural Networks	AI4152	3
■ Natural Language Processing	CS438	3



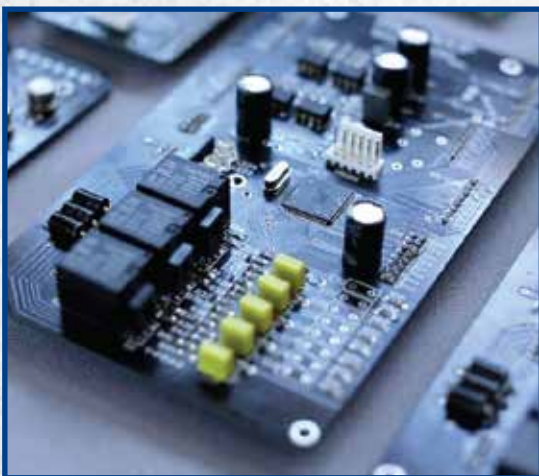
School of Engineering (SEN)

Electrical Engineering

(Electronic Systems)

List of Minor Courses

	Course Code	Credit Hours
■ Circuit Analysis	EE110	3
■ Electrical Network Analysis	EE212	3
■ Electronic System Design	EE323	3
■ Digital Electronics	EE445	3
■ Power Electronics	EE446	3
■ Industrial Electronics	EE455	3





Electrical Engineering

(Integrated Circuit Design)

List of Minor Courses

	Course Code	Credit Hours
■ Circuit Analysis	EE110	3
■ Electronic Devices and Circuits	EE208	3
■ CMOS Analog Integrated Circuits	EE449	3
■ CMOS Digital Integrated Circuits	EE450	3
■ VLSI Circuit Design	EE458	3



Electrical Engineering

(Network and Communication Technologies)

List of Minor Courses

	Course Code	Credit Hours
■ Computer Networks	EE330	3
■ Communication Systems	EE410	3
■ Digital Communications	EE420	3
■ Network and Protocols	EE461	3
■ Wireless Communications	EE480	3



Electrical Engineering

(Renewable Energy Technologies)

List of Minor Courses

	Course Code	Credit Hours
■ Renewable Electrical Energy Resources	EE407	3
■ Power Distribution and Utilization	EE422	3
■ Electrical Machine Design	EE424	3
■ Power Electronics	EE446	3



Electrical Engineering

(Electrical Power and Energy Conversion)

List of Minor Courses

	Course Code	Credit Hours
■ Electrical Machines	EE340	3
■ Control Systems	EE360	3
■ Electrical Machine Design	EE424	3
■ Power Electronics	EE446	3

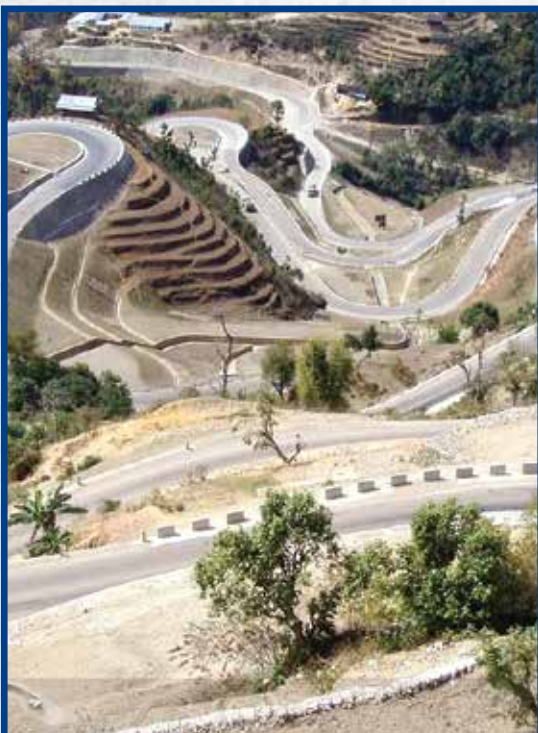


Civil Engineering

(Structural Engineering)

List of Minor Courses

	Course Code	Credit Hours
■ Engineering Mechanics	CE102	3
■ Mechanics of Solids	CE203	3
■ Structural Analysis - I	CE204	3
■ Structural Analysis - II	CE306	3
■ Plain and Reinforced Concrete - I	CE363	3
■ Steel Structures	CE461	3



Civil Engineering

(Geotechnical Engineering)

List of Minor Courses

	Course Code	Credit Hours
■ Engineering Mechanics	CE102	3
■ Mechanics of Solids	CE203	3
■ Geotechnical Engineering - I	CE242	3
■ Geotechnical Engineering - II	CE343	3
■ Foundation Engineering	CE445	3
■ Pavement Engineering	CE474	3



Civil Engineering

(Hydraulics Engineering)

List of Minor Courses

	Course Code	Credit Hours
■ Engineering Mechanics	CE102	3
■ Fluid Mechanics	CE251	3
■ Hydrology and Water Resources Management	MS303	3
■ Advanced Fluid Mechanics	CE352	3
■ Hydraulics Engineering	CE457	3
■ Irrigation Engineering	CE459	3



Mechanical Engineering

(Mechanical Engineering Design)

List of Minor Courses

	Course Code	Credit Hours
■ Engineering Mechanics-I: Statics	ME122	3
■ Engineering Mechanics-II: Dynamics	ME123	3
■ Mechanics of Materials-I	ME221	3
■ Mechanics of Machines	ME222	3
■ Machine Design & CAD-I	ME223	3
■ Machine Design & CAD-II	ME321	3
■ Mechanics of Materials-II	ME323	3
■ Mechanical Vibrations	ME421	3
■ Finite Element Analysis	ME422	3



Mechanical Engineering

(Thermofluids)

List of Minor Courses

	Course Code	Credit Hours
■ Thermodynamics-I	ME131	3
■ Thermodynamics-II	ME232	3
■ Fluid Mechanics-I	ME231	3
■ Fluid Mechanics-II	ME331	3
■ Heat & Mass Transfer	ME332	3
■ Refrigeration & Air Conditioning	ME333	3
■ Internal Combustion Engines	ME431	3
■ Power Plants	ME432	3
■ Computational Fluid Dynamics (CFD)	ME434	3



Industrial Engineering

(Engineering Management)

List of Minor Courses

	Course Code	Credit Hours
■ Operations Research	EF202	3
■ Computer Simulations	CS312	3
■ Project Management	MS301	3
■ Production Planning and Control	IE324	3
■ Supply Chain Management	IE412	3
■ Industrial Maintenance	IE422	3
■ Industrial Facility Design	EF431	3



Industrial Engineering

(Quality Management)

List of Minor Courses

	Course Code	Credit Hours
■ Mechanical Measurement and Metrology	EF242	3
■ Statistical Quality Control	EF243	3
■ Production planning and control	IE324	3
■ Total Quality Management	IE401	3
■ Six Sigma	IE408	3
■ Health Safety and Environment	IE413	3

School of Design and Textiles (SDT)

Visual Communication Design

List of Minor Courses



- Digital communication - I
- Design Fundamentals
- Graphic Illustration
- Corporate Design
- Interactive Media
- Motion Graphics
- Concept Art

Course Code	Credit Hours
DC101	0+2
GD207	1+2
GD209	0+2
GD324	1+2
GD316	1+2
GD321	0+2
GD325	0+2

Interior Design

List of Minor Courses



- Digital communication - I
- Interior Design - I
- Drawing and Composition
- Computer Aided Interior Design - I
- Rendering Layouts - I
- Sustainable Interior Design
- Portfolio Presentation

Course Code	Credit Hours
DC101	0+2
ID210	0+2
ID206	0+3
ID204	0+2
ID209	0+2
ID363	2+1
DN413	0+2

Textile Design

List of Minor Courses



- Digital communication - I
- Color Theory and Application
- Textile Drawing
- Design Foundation
- Surface Design
- Textile Printing Techniques

Course Code	Credit Hours
DC101	0+2
CT107	1+2
TD218	0+2
TD212	1+2
TD319	1+2
TD304	1+2



Fashion Design

List of Minor Courses

	Course Code	Credit Hours
■ Color Theory and Application	CT107	1+2
■ Fundamentals of Flat Pattern	FD222	0+2
■ Basics of Draping	FD223	0+2
■ Digital Fashion and Forecasting	FD227	0+2
■ Fashion Illustration	FD315	0+2
■ Surface Design	TD319	1+2



Textile and Clothing

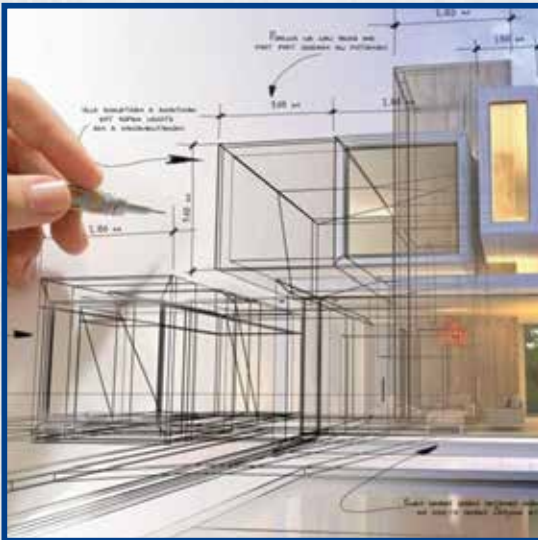
List of Minor Courses

	Course Code	Credit Hours
■ Intro. to Textile and Clothing	TL105	3+0
■ Fabric Manufacturing	TL206	3+1
■ Textile Wet Processing	TL214	2+1
■ Garment Manufacturing	TL208	3+1
■ Garment Illustration	TL315	1+2
■ Anthropometry and Clothing Construction	TL313	1+2

School of Architecture and Planning (SAP)

Architecture and Design

List of Minor Courses



	Course Code	Credit Hours
■ Design Studio-I	DE111	0+3
■ Visual Communication-II	AR126	0+3
■ Design Studio-II	DE121	0+3
■ History and Conservation	DI317	3+0
■ Green and Sustainable Architecture	AR401	3+0
■ Construction Management and Project scheduling	AR514	3+0

Note:

Completion of Minor in Architecture and Design does not qualify the candidate for license in Architecture.

Geographic Information Systems (GIS)

List of Minor Courses



	Course Code	Credit Hours
■ Mapping and Remote Sensing	CRP105	1+2
■ History of Cities and Urban Planning	CRP136	3+0
■ *Introduction to GIS	CRP232	1+2
■ Climate Change and Disaster Management	CRP222	2+1
■ Environmental Planning and Management	CRP242	1+1
■ GIS Analysis and Application in Planning (pre-req CRP232)	CRP328	1+2

Note:

Introduction to GIS course is compulsory for completion of Minor in GIS



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