Module 3 Informatics

Contents

Module designation	*Information Retrieval*
Semester(s) in which the module is taught	*3rd semester*
Person responsible for the module	*Shanshan Shang*
Language	*Chinese*
Relation to curriculum	*Compulsory* *Information Retrieval is a foundation course for cultivating students' ability to acquire information and for improving information literacy. This course adopts a teaching method that combines classroom teaching and computer practice to systematically present basic knowledge of information retrieval, characteristics of various types of literature, and how to use Chinese and foreign language search engines and databases, to train students to perform information collection, consolidation and utilization scientifically and effectively, which can improve learning efficiency and level of research, that will benefit their paper writing, research project application and their own competitiveness.*
Teaching methods	*Lecture*
Workload (incl. contact hours, self-study hours)	*(Estimated) Total workload: 30 hours* *Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 16 hours (theoretical teaching)* *Private study including examination preparation, specified in hours: 14 hours*
Credit points	*1.0*
Required and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	*The main tasks of this course are to enable students to learn basic knowledge of information retrieval, characteristics of various types of literature, and how to use Chinese and foreign language search engines and databases. Specific objectives include:* ***Knowledge:*** *1. Basic knowledge of information retrieval, basic principles and main approaches of information retrieval, main resources and services of the library;* *2. The characteristics of journal papers, theses, conference papers, books, patents, etc.;* *3. Resources and main functions of commonly used Chinese and foreign language databases and search platforms.* ***Skill:***

	1. Select the appropriate retrieval tool based on the search topic or actual needs; *2. Learn how to construct a search strategy, identify appropriate search terms based on the topic concerned, develop an appropriate search expression, and to optimize and adjust accordingly;* *3. Be able to access literature through various channels.* ***Competences:*** *Strengthen information literacy and be able to collect, consolidate and utilize information in scientific and effective ways to efficiently solve problems in life and improve the efficiency of learning and research.*
Content	***Theoretical teaching (16 contact hours; 14 self-study hours)*** ***Chapter 1 Basic Concept of Information Retrieval (2 contact hours; 2 self-study hours)*** • *Basic concepts and theories of information retrieval*** • *Common types of information resources*** • *Introduction to University library** ***Chapter 2 Basic Methods of Information Retrieval (3 contact hours; 2 self-study hours)*** • *Two retrieval approaches: Classification search and subject search** • *Structure of search expressions*** ***Chapter 3 Chinese Language Database Retrieval (3 contact hours; 2 self-study hours)*** • *Resource content, characteristics, and sub-database of Chinese language databases** • *Basic retrieval methods for Chinese language databases*** ***Chapter 4 Foreign Language Database Retrieval (2 contact hours; 2 self-study hours)*** • *Resource types and characteristics of foreign language databases** • *Basic retrieval methods for foreign language databases*** ***Chapter 5 E-Book Retrieval and Document Delivery (2 contact hours; 2 self-study hours)*** • *Search fore-books on Duxiu Academic Platform*** • *Perform document delivery on Duxiu Academic Platform** ***Chapter 6 Academic Search Platform Retrieval (2 contact hours; 2 self-study hours)*** • *Common academic search platforms** • *Academic search platform functions, e.g. literature retrieval, literature acquisition, knowledge mining, etc.*** ***Chapter 7 Patent Database Retrieval (2 contact hours; 2 self study hours)*** • *Basic patent knowledge** • *Retrieval methods of patent literature**

Examination forms	*1. Basic requirements for class (no late arrivals, no early departures, and no unauthorized absences) 5%.* *2. Discussion & interaction 5%* *3. Class assignments 50%.* *4. Final exam 40%.*
Study and examination requirements	*Only students with class attendance rate over 2/3, assignment the completion rate over 2/3 and performing required experiments are allowed to take the exam.* *Achieve a score of 60 points or above.*
Reading list	*1.Required books* *[1] XU Qingning, CHEN Xuefei. Information Retrieval and Utilization (4th Edition). Shanghai: East China University of Science and Technology Press, 2018* *2.Reference books* *[l] ZHAO Naixuan. Practical Information Retrieval and Utilization (3rd Edition). Beijing: Chemical Industry Press,2018* *[2] XIE Zhaoying. Information Retrieval and Utilization. Beijing: Publishing House of Electronks Industry, 2017* *[3] LI Xuefei. Information Resource Retrieval and Utilization. Beijing: Tsinghua University Press, 2018* *[4] CHEN Qing, CHEN Meihua. Information Retrieval and Utilization. Beijing: Tsinghua University Press, 2017* *[5] WANG Xirong. Literature Information Retrieval and Paper Writing (6th Edition). Shanghai: Shanghai Jiao Tong University Press, 2017* *[6] Lill Jing. Retrieval and Utilization of Network Information Resources. Beijing: Publishing House of Electronics Industry, 2018* *[7] WEI Sheng, WU Xiaochuan. Information Retrieval. Beijing:Posts & Telecom Press, 2018*

Module designation	*Fundamentals of Computer Applications A*
Semester(s) in which the module is taught	*semester*
Person responsible for the module	*Qiang Chen*
Language	*Chinese*
Relation to curriculum	*Compulsory* *This course is a foundation course in computer science covering computer technologies that college students must master, including: information technology, multimedia technology, computer network technology, web design basics, etc., with application of operating systems and office software (Word, Excel, PowerPoint, Visio) and multimedia software (PS, Flash, Dreamweaver) added in the experiment part. Upon completion of this course, students will learn basic theories of information science and information technology, understand basic knowledge of information technology, multimedia technology, and network technology; and master basic abilities of computer operation and software application through practice teaching, to lay a solid foundation for subsequent core courses and applying computer technologies in related courses of their program.*
Teaching methods	*Lecture and practice*
Workload (incl. contact hours, self-study hours)	*(Estimated) Total workload: 60 hours* *Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 32 hours (Theoretical teaching: 16 hours, Experiment/practice teaching: 16 hours)* *Private study including examination preparation, specified in hours: 28 hours*
Credit points	*2.0*
Required and recommended prerequisites for joining the module	*NIA*
Module objectives/intended learning outcomes	*The main task of this course is to enable students to master basic computer knowledge and gain the competence of mathematics and natural science needed for the engineering program. Specific objectives include:* ***Knowledge:*** *1. Basic knowledge of compute technology;* 2. Basic knowledge of multimedia technology and network technology; 3. Knowledge of common computer software. ***Skill:*** *1. Basic Windows operation and common operation of office software;*

	2. Ability to use multimedia technology for basic editing and designing of graphics and animations; *3. Using Dreamweaver to perform basic webpage designing.* ***Competences:*** *Competence in computer operation and software application; thinking in computer information security, application innovation and practical problem solving, which lays a foundation for subsequent training on computer-aided design analysis, and computing.*
Content	***Part A: Theoretical teaching (16 contact hours, 14 self-study hours)*** ***Chapter 1 Fundamental Knowledge of Computer Applications (2 contact hours, 2 self-study hour)*** • *Concept and development history of computer*** • *Uses of computer*** • *Numerical system and data representation in computer*** • *Computer systems*** • *Informatization and information technology*** ***Chapter 2 Operation Systems (2 contact hours, 2 self-study hours)*** • *Windows overview*** • *Basic operation of Windows 7*** • *Desktop operation of Windows 7*** • *Files and folders*** • *Control panel and accessories*** ***Chapter 3 Network and Security (2 contact hours, 1 self-study hours)*** • *Fundamentals of network technology** • *Cybersecurity and protection** • *Internet technology and its application** • *Virus and firewall** ***Chapter 4 Application Innovation and Emerging Technologies (1 contact hours, 1 self-study hours)*** • *"Internet plus"* • *Internet of Things* • *Cloud computing* • *Blockchain* • *Artificial intelligence* ***Chapter 5 Word Processing Software Application (2 contact hours, 2 self-study hours)*** • *Word basic components * ** • *Word document editing*** • *Word document formatting*** • *Word document operation***

	• *Word text & graphics*** • *Word table processing*** ***Chapter 6 Excel Software Application (2 contact hours, 2 self-study hours)*** • *Excel workbook components*** • *Excel table operations*** • *Excel worksheet and cell format*** • *Excel formula application*** • *Excel data processing*** • *Common Excel functions*** ***Chapter 7 PowerPoint (2 contact hours, 1 self-study hours)*** • *PowerPoint overview*** • *PowerPoint document editing*** • *Insertion of objects in PowerPoint*** • *PowerPoint animation and playback*** ***Chapter 8 Visio 2010 (1 contact hours, 1 self-study hours)*** • *Introduction to Visio 2010* • *Introduction to Visio 2010* • *Major concepts of diagramming using VISIO 2010* • *Common operation skills* ***Chapter 9 Audio and Video (1 contact hours, 1 self-study hours)*** • *Multimedia technology overview* • *Audio information processing* • *Video information processing* ***Chapter 10 Photoshop (1 contact hours, 1 self-study hours)*** • *Basic knowledge of colors** • *Basics of graphics and image processing** • *Image file formats** • *Compression of digital image files** • *Image processing software: Photoshop CS6** ***Part B. Experiment/practice teaching: (16 contact hours, 14 self-study hours)*** ***Experiment 1: Basic Operation of Windows* (3 contact hours,3 self-study hours)*** *Content of the experiment: Desktop theme settings, start menu organization, shortcut creation; taskbar use and settings, task switching; folder and file creation, properties view and settings; file and folder search; use of clipboard.* ***Experiment 2: Basic Operation of Word** (3 contact hours, 3 self-study hours)*** *Content of the experiment: Input and editing of text and other basic objects; search and replacement of formatted characters and special*

	characters; format settings of characters and paragraphs; insertion of pictures, clip art, etc. ***Experiment 3: Basic Operation of Excel** (3 contact hours, 2 self-study hours)*** *Content of the experiment: Basic worksheet operation; editing of cell content and comments; application of cell formulas and functions; settings and automatic application of cell format; diagram operations.* ***Experiment 4: Basic Operation of PowerPoint** (3 contact hours, 2 self-study hours)*** *Content of the experiment: Basic operation of slides; applying pictures, clip arts and SmartArt in slides; applying tables, diagrams and logic sections to slides; apply themes and slide layouts; settings of masters, headers/footers, backgrounds, and applying hyperlinks.* ***Experiment 5: Basic Operation of Visio* (2 contact hours, 2 self-study hours)*** *Content of the experiment:* *Draw an "online shopping flowchart";* *Use Maps and Floor Plans -> Building Plan template in Visio 2010 to draw an interior furniture layout plan.* ***Experiment 6: Basic Operation of Photoshop* (2*** ***contact hours, 2 self-study hours)*** *Content of the experiment:* *Colour fill and modification of blending mode; basic usage of tools, e.g. gradient paint bucket; basic operation of layers.*
Examination forms	*1. Basic requirements for class (no late arrivals, no early departures, and no unauthorized absences) 10%.* *2. Assignments (including computer assignments 40% and experiment reports 60%) 30%.* *3. Final exam 60%.*
Study and examination requirements	*Only students with class attendance rate over 2/3, assignment the completion rate over 2/3 and performing required experiments are allowed to take the exam.* *Achieve a score of 60 points or above.*

Reading list	*1.Required books* *[l] CHEN Qiang. Fundamentals of Computer Application. Beijing: China Railway Publishing House, 2018* *[2] HUANG Rong. Experiment Guidance for Fundamentals of Computer Application. . Beijing: China Railway Publishing House, 2018* *2.Reference books* *[l] WANG Xiehua, ZHANG Shizheng. Fundamental Computer Application. Shanghai: East China Normal University Press. 2014* *[2] WANG Xiehua, ZHANG Shizheng. Experiment Guidance for Fundamentals of Computer Application. Shanghai: East China Normal University Press. 2014* *[3] HU Haornin. Fundamental Computer Application Tutorial. Beijing: Tsinghua University Press. 2013* *[4] ZHOU Jing. Practice Tutorial for Fundamentals of Computer Application. Beijing: Tsinghua University Press. 2013* *[5] CHEN Juan. Practice Tutorial for Fundamentals of Computer Application. Beijing: Publishing House of Electronics Industry. 2017* *[6] Adobe Inc. Adobe Photoshop CSS Classroom in a Boo) [M]. Beijing: Posts & Telecom Press. 2013* *[7] Adobe Inc. Adobe Photoshop CSS Classroom in a Book Beijing: Posts & Telecom Press. 2013* *[8] ZHANG Mei. Adobe Flash CSS Animation Design And Production Skills Training Tutorial. Beijing: Science Press. 2018* *[9] HE Xin, HAO Jianhua. Adobe Dreamweaver CSS Web Design And Production Skills Basic Tutorial. Beijing: Science Press. 2018*

Module designation	*VB Programming*
Semester(s) in which the module is taught	*2nd semester*
Person responsible for the module	*Haomin Hu*
Language	*Chinese*
Relation to curriculum	*Compulsory* *This course is about learning computer programming languages and methods, which primarily introduces object oriented programming methods, including the properties methods and events of common controls, structured programming, arrays, procedure, animation design, etc. Upon completion of this course, students will begin to be able to solve regular practical problems in mathematics, engineering and management through programming methods.*
Teaching methods	*Lecture and practice*
Workload (incl. contact hours, self-study hours)	*(Estimated) Total workload: 90 hours* *Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 48 hours (Theoretical teaching: 24 hours, Experiment/ practice teaching: 24 hours)* *Private study including examination preparation, specified in hours: 42 hours*
Credit points	*3.0*
Required and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	*The main task of this course is to enable students to master structured programming and object-oriented programming methods, and begin to be able to solve regular practical problems in engineering through programming methods. Specific objectives include:* ***Knowledge:*** *1. Basic knowledge of VB.NET programming; structure control of programming;* *2. The application of arrays in ordered batch data;* *3. Basic principles of software development.* ***Skill:*** *1. Be able to determine decision variable, define system constraints, and build appropriate computer language mathematical model based on system objectives.* *2. Become familiar with the visual programming environment of VB .NET; be proficient in using basic controls for visual programming;* *3. Have the basic ability of program testing, analysis and development.*

	Competences: *Be able to apply mathematical and computer thinking as well as basic algorithms of programming design and computer programming techniques in identifying and analyzing complex engineering problems in order to obtain effective solutions, and to gradually develop a correct programming thinking.*
Content	***Part A: Theoretical teaching (24 contact hours, 21 self-study hours)*** ***Chapter 1 Visual Basic.NET Overview (2 contact hours, 2 self-study hours)*** • *Computer programming language** • *Visual Basic .NET integrated development environment** • *Visual programming steps** • *.NET framework** ***Chapter 2 VB .NET Basics (4 contact hours, 4 self-study hours)*** • *Data types*** • *Variables and constants*** • *Operators and expressions*** • *Common functions*** • *Namespace*** ***Chapter 3 Visual Basic.NET Controls (2 contact hours, 2 self-study hours)*** • *Basic concept** • *Form** • *Basic controls** • *More properties, events and methods** ***Chapter 4 Control Structure (6 contact hours, 4 self-study hours)*** • *Sequence structure*** • *Selection structure*** • *Loop structure*** • *Exception handling and debugging*** ***Chapter 5 Array (4 contact hours, 4 self-study hours)*** • *Concept of array*** • *Declaration and call of array*** • *Common algorithms for array processing*** • *Structure data type and array of structures*** • *Array type and control array*** ***Chapter 6 Procedure (4 contact hours, 4 self-study hours)*** • *Concept of procedure*** • *Sub-procedure*** • *Function procedure*** • *Parameter passing***

	• *Scope and lifetime of variables*** • *Recursive*** • *Multithreading*** ***Chapter 7 User Interface Design (2 contact hours, 1 self-study hour)*** • *Common controls** • *Common dialog box** • *Multiple form programming** • *Menu design** • *Extended learning** ***Part B. Experiment/practice teaching: (24 contact hours, 21 self-study hours)*** ***Experiment 0 1: Getting Familiar with VB .NET Integrated Development Environment* (2 contact hours, 1 self-study hour)*** *Content of the experiment: Integrated environment of VB.NET; how to use forms and controls and coding steps; execution and debugging methods of programs.* ***Experiment 02: Basic VB.NET Programming** (2 contact hours, 2 self-study hours)*** *Content of the experiment: Use of data types, variables and constants, operators, and expressions in programming; use of common system functions.* ***Experiment 03: Basic Controls* (2 contact hours, 2 selfstudy hours)*** *Content of the experiment: How to use command buttons, labels, text boxes, check boxes and radio buttons; and the coding design for the events related to these controls.* ***Experiment 04: Selection Structure** (2 contact hours, 2 self-study hours)*** *Content of the experiment: Use of single-branch, double branch and multi-branch conditional statements.* ***Experiment 05: Loop Structure (1)** (2 contact hours, 2 self-study hours)*** *Content of the experiment: How to use counting loops.* ***Experiment 06: Loop Structure (2)** (2 contact hours, 2 selfstudy hours)*** *Content of the experiment: Control of conditional loops and nested loops.* ***Experiment 07: Array (1)** (2 contact hours, 2 self-study hours)*** *Content of the experiment: Declaration of array, array reference and assignment; array input, output, lookup and swap.* ***Experiment 08: Array (2)** (2 contact hours, 2 self-study hours)*** *Content of the experiment: Common algorithms for array application*** ***Experiment 09: Function Procedure** (2 contact hours, 2 self-study hours)***

	Content of the experiment: Definition and calling of user-defined function procedure; relationship between formal parameters and actual parameters, and the use of function return values. ***Experiment 10: Sub-procedure** (2 contact hours, 2 self-study hours)*** *Content of the experiment: Definition and calling of user-defined sub-procedure: passing by value and by reference.* ***Experiment 11: Doubly Linked List Programming** (2 contact hours, 1 self-study hour)*** *Content of the experiment: Layout of doubly linked list;* *coding of list box event; interaction of doubly linked list.* ***Experiment 12: Animation Programming** (2 contact hours, 1 self-study hour)*** *Content of the experiment: Image processing of PictureBox; timer and animation design.*
Examination forms	*1. Base requirements for class (no late arrivals, no early departures, and no unauthorized absences) 10%.* *2. Assignments (including computer assignments 40% and experiment reports 60%) 30%.* *3. Final exam 60%.*
Study and examination requirements	*Only students with class attendance rate over 2/3, assignment the completion rate over 2/3 and performing required experiments are allowed to take the exam.* *Achieve a score of 60 points or above.*
Reading list	*1.Required books* *[1] XIANG Jueliang. Visual Basic NET. Shanghai: Shanghai Jiao Tong University Press, 2013.* *[2] WANG Zejie. Visual BsiscNET Programming Practice 2.Reference books* *[1] GONG Peizeng.Visual Basic.NET Programming Tutorial. Beijing: Higher Education Press, 2010.* *[2] XIANG Jueliang. Visual BasicNET[MJ. Shanghai: Shanghai Jiao Tong University Press, 2013* *[3] ZHENG Aqi. Visual BasicNET Programming Tutorial (2nd Edition). Beijing: Machinery Industry Press, 2011 .* *[4] LAN Shunbi. Visual BasicNET Programming Tutorial. Beijing: Posts and Telecom Press, 2012* *[5] Bryan Newsome, translated by LI Zhoufang, SHI Lei. Beginning Visual Basic 2015 (8th Edition). Beijing: Tsinghua University Press, 2016* *[6] Bill Evjen. Professional Visual Basic 2008 (5th Edition). Beijing: Tsinghua University Press, 2006* *[7] Michael Halvorson. Microsoft Visual Basic 2010 Step b) Step [M]. Redmond, Washington: Microsoft Press, 2010*

Module designation	*C Language Programming*
Semester(s) in which the module is taught	*2nd semester*
Person responsible for the module	*Qiang Chen*
Language	*Chinese*
Relation to curriculum	*Compulsory* *C language programming is one of the foundation courses of Industrial Design. This course introduces the fundamentals of computer programming and basic writing process using the C programming language. The introduction of the basic concepts focuses on practical application needs and emphasizes the cultivation of students' computational thinking to improve students' ability to solve complex practical problems.*
Teaching methods	*Lecture and experiment*
Workload (incl. contact hours, self-study hours)	*(Estimated) Total workload: 90 hours* *Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 48 hours (Theoretical teaching: 24 hours, Experiment/ practice teaching: 24 hours)* *Private study including examination preparation, specified in hours: 42 hours*
Credit points	*3.0*
Required and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	*The main task of this course is to enable students to master the fundamentals of computer programming and basic writing process. Specific objectives include:* ***Knowledge:*** *1. Master the structure of C, the three basic structures of structured program, and the representation methods of algorithms;* *2. Master the definition of arrays and referencing of array elements, and array programming;* *3. Master function definition, function call, data transfer and function declaration.* ***Skill:*** *1. Learn the basic methods of programming and gradually develop a correct programming thinking;* *2. Be proficient in simple C programming and able to debug programs;*

	3. Be able to identify system objective, determine decision variable, define system constraints, and build appropriate mathematical models in a complex and changeable objective reality. ***Competences:*** *Be able to apply mathematical and computer thinking as well as basic algorithms of programming design and computer programming techniques in identifying and analyzing complex engineering problems in order to obtain effective solutions.*
Content	***Theoretical teaching (24 contact hours; 20 self-study hours)*** ***Chapter 1 Overview (2 contact hours, 1 self-study hour)*** *• Historical background of the emergence of C* *• Structure, programming format and steps of C;** • The concept of algorithm;* • Three basic structures of structured program, and the representation methods of algorithms.*** ***Chapter 2 Writing Simple Programs in C (2 contact hours, 1 self-study hour)*** *• Basic data types of C (integer, floating-point, char)*** *• Difference between constants and variables** *• Use of printfandscanf functions** ***Chapter 3 Branch Structure Programming(3 contact hours, 3 self-study hours)*** *• Relational operator, logical operator, three forms of if statement*** *• Writing selection structure programs*** *• Selection structure switch statement, break statement*** *• Multi-branch selection structure program.*** ***Chapter 4 Loop Structure Programrning(3 contact hours, 3 selfstudy hours)*** *• Use of loop statements*** *• Nested loops*** *• Use of loop break and continue statements*** ***Chapter 5 Data Types and Expressions of C (3 contact hours, 3 self-study hours)*** *• Data types of C*** *• Escape format*** *• ASCII code, stored in binary form*** *• Operator precedence and associativity*** ***Chapter 6 Array (3 contact hours, 1 self-study hour)*** *• Definition of one-dimensional array and referencing of its array elements*** *• Application of one-dimensional array** *• Sort algorithm***

	• *Definition of two-dimensional array and referencing of its array elements*** • *Reference, initialization and application of character array elements*** • *Array application programming*** ***Chapter 7 Functions (4 contact hours, 3 self-study hours)*** • *General forms of function definition*** • *Parameter and value of functions, relationship between actual parameter and formal parameter*** • *Function reference*** • *Array as function parameter** • *In function references, there is data transfer between the calling function and the called function- transfer from actual parameter to formal parameter. There are two types of transfer; understand the storage class, lifetime and scope of variables*** • *Built-in functions and external functions.** ***Chapter 8 Pointer and its Application (4 contact hours, 3 self-study hours)*** • *Concept of address and pointer** • *Definition and reference of pointer variables and pointer variables as parameters*** • *Array and pointer*** • *Character string and pointer*** ***Experiment teaching (24 contact hours; 22 self-study hours)*** ***Experimental item 1: Getting Familiar with Programming Environment of C (3 contact hours, 2 self-study hours)*** *Content of the experiment: Familiarize with VC operating environment. Write simple C programs, analyze the structure of the written programs, debug and execute the program.* *Familiarize with dynamic debugging of VC.* ***Experimental item 2: Three Program Structures of C (3 contact hours, 2 self-study hours)*** *Content of the experiment: Basic data processing, calculation of piecewise functions, loops with specified loops, and use of functions .* ***Experimental item 3: Branch Structure Programming (3 contact hours, 3 self-study hours)*** *Content of the experiment: Use logic expression; use if-else if. .. .. else if-else statement; use switch statement for multibranch structure programming tasks.* ***Experimental item 4: Loop Structure Programming (3 contact hours, 3 self-study hours)*** *Content of the experiment: Write a loop structure program using while statement, do-while statement and for statement respectively; Write a program with nested loops; debug and execute the written program*

	Experimental item 5: Comprehensive Exercise on Program Structure (3 contact hours, 3 self-study hours) *Content of the experiment: Comprehensive application of branches and loops* ***Experimental item 6: Array (3 contact hours, 3 self-study hours)*** *Content of the experiment: Program with one dimensional array; program with two-dimensional array;* *program with character array.* ***Experimental item 7: Function (3 contact hours, 3 self-study hours)*** *Content of the experiment: Write a function to achieve a certain purpose and call the written function through the main function to achieve the program task requirements; write a program to achieve the required function through nested calls of functions.* ***Experimental item 8: Application of Pointer (3 contact hours, 3 self-study hours)*** *Content of the experiment: Write program to operate variables through pointers; write program to operate the elements of the array through pointer method and subscript method; write program to operate character string through pointers.*
Examination forms	*1. Attendance (10%): basic requirements for class (no late arrivals, no early departures, and no unauthorized absences)* *2. Assignments (30%): experiment report* *3. Final assessment (60%): final exam*
Study and examination requirements	*Only students with class attendance rate over 2/3, assignment the completion rate over 2/3 and performing required experiments are allowed to take the exam.* *Achieve a score of 60 points or above.*
Reading list	*1.Required books* *[l] HUANG Rong, ZHAO Yi. C Language Programming. Beijing: Tsinghua University Press, 2012* *[2] WANG Mingyan. C Language Programming Experiment Instructions. Beijing: Science Press, 2012.03.* *2.Reference books* *[l] HE Qinming, YAN Hui. C Language Programming. Beijing: Higher Education Press, 2008.* *[2] TAN Haoqiang. C Programming (2nd Edition). Beijing: Tsinghua University Press. 2004* *[3] TAN Haoqiang, LIU Bingwen. C++ Programming Tutorial. Beijing: China Science and Technology Press, 2000.* *[4] Herbert Schildt, translated by DAI Jianpeng. The Complete Reference C (2nd Edition), Beijing: Publishing House of Electronics Industry. 2001*

Module designation	*Python*
Semester(s) in which the module is taught	*2nd semester*
Person responsible for the module	*Xiao Liu*
Language	*Chinese*
Relation to curriculum	*Compulsory* *This course is an introductory course for programs such as data computing, and is also an essential skill training course for scholars involved in research and other innovative projects for undergraduates and those who need to perform data analysis.*
Teaching methods	*Lecture*
Workload (incl. contact hours, self-study hours)	*(Estimated) Total workload: 90 hours* *Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 48 hours (Theoretical teaching)* *Private study including examination preparation, specified in hours: 42 hours*
Credit points	*3.0*
Required and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	***Knowledge:*** *This course focuses on the development of learning outcomes students' programming and data processing skills as well as on the shaping of their moral character.* ***Skill:*** *Students will learn Python and machine learning, and be able to use their knowledge to perform simple data processing and analysis.* ***Competences:*** *Students will learn Python and machine learning, and be able to use their knowledge to perform simple data processing and analysis.*
Content	***Part A. Theoretical Teaching (48 contact hours; 42 selfstudy hours)*** ***Chapter I Basic Part (24 contact hours; 15 self-study hours)*** *Introduction to installing Python on the computer;* *Explanation on the definition and use of variables and character strings;* *Explanation on the definition and use of list objects;* *Explanation on the definition and use of dictionary objects;* *Explanation on conditional statements;* *Explanation on user input and looping statements;* *Explanation on the definition and use of python functions;*

	Explanation on the definition and use of classes. ***Chapter II Introduction to Python Data Analysis (12 contact hours; 15 self-study hours)*** *An overview of Python data analysis;* *NumPy numerical calculation basis;* *Fundamentals of data visualization using Matplotlib;* *Fundamentals of statistical analysis in Pandas;* *Data preprocessing with Pandas.* ***Chapter ill Introduction to Python Machine Learning (12 contact hours; 12 self-study hours)*** *Model evaluation and selection;* *Regression analysis;* *Decision trees;* *Neural networks;* *Cluster analysis.*
Examination forms	*Basic requirements for class (not late, early retirement, absence of absence without reason, etc.) (10%)* *Homework (40%)* *Normal operation (20%)* *Final exam (30%)*
Study and examination requirements	*Only students with class attendance rate over 2/3, assignment the completion rate over 2/3 and performing required experiments are allowed to take the exam.* *Achieve a score of 60 points or above.*
Reading list	*1.Required books* *[1] Matthes, Eric. A Hands-On, Project-Based Introduction to Programming, 2nd Edition. Posts & Telecom Press, 2020.* *(2) Andreas C.Muller, Sarah Guido. Introduction to Machine Learning with Python, Posts & Telecom Press, 2018.* *(3) Liu Yu. Python Programming - From Data Analysis to = Machine Learning Practice. China Water & Power Press,2020.* *2.Reference books* *(1) Zed A.Shaw. Learn Python 3 the Hard Way. Posts & Telecom Press, 2018.* *(2) Dawn Griffiths. Head First Statistics. Publishing House of Electronics Industry, 2018.* *(3) Gao Chunyan, Liu Zhirning. Python Data Analysis From Introduction to Practice, Jilin University Press, 2022.* *(4) Li Qinghui. Head First Pandas. Machinery Industry Press, 2021.*