National Center for Supply Chain Automation
RESOURCES FOR EDUCATION & INDUSTRY

NCSCA 10 Year Anniversary
4/28/2021

Ned Young – Sinclair Community College
Bob Sompolski – Oakton Community College

Goals for Today's Discussion

National Center for Supply Chain Technology Education

NCSCTE Model Program

- NCSCA Updates

Introduction to the Automated Warehouse

- NCSCA Update
  - iBook vs. ePub

- Instructor's manual

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NCSCTE 2011-2015

NORCO COLLEGE	Kevin Flemming Norco, CA
Jefferson Community & Technical College	Vince DeNoto Louisville, KY
Oakton Community College	Bob Sompolski Des Plaines, IL
SINCLAIR	Ned Young Dayton, OH
TACOMA COMMUNITY COLLEGE	Erika Bowles Tacoma, WA

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NCSCA Model Program 2014

Course	Units
Introduction to the Automated Warehouse	3
General Mechanics	3
Direct Current Theory & Service	4
Alternating Current Theory & Service	4
Microprocessors & Microcontrollers	4
Technical Communications	3
Blueprint Reading	2
Technical Mathematics	3
OSHA Safety Standards	2
Hydraulics & Pneumatics	3
Welding Basics	3
Programmable Logic Controllers	3
Total	**37**

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NCSCA 2016-present

NORCO COLLEGE	Colleen Molko & Valorie Piper Norco, CA
Oakton Community College	Bob Sompolski Des Plaines, IL
SINCLAIR	Ned Young Dayton, OH
CENTRAL PIEDMONT COMMUNITY COLLEGE	Jami Dale Charlotte, NC

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NCSCA Model Program 2021

Course	Units
Introduction to the Automated Warehouse	3
General Mechanics	3
AC/DC Theory & Service	4
Microprocessors & microcontrollers	4
Technical Communications	3
Technical Mathematics	3
OSHA Safety Standards	2
Hydraulics & Pneumatics	3
Welding Basics	3
PLC & Variable Frequency Drives	4
Introduction to Networking	3
IOT/Cybersecurity	3
Robotics	4
Total	**42**

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NCSCA Model Program 2021

Course	Units
Introduction to the Automated Warehouse	3
General Mechanics	3
AC/DC Theory & Service	4
Microprocessors & microcontrollers	4
Technical Communications	3
Technical Mathematics	3
OSHA Safety Standards	2
Hydraulics & Pneumatics	3
Welding Basics	3
PLC & Variable Frequency Drives	4
Introduction to Networking	3
IOT/Cybersecurity	3
Robotics	4
Total	**42**

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NCSCA Model Program 2021

Course	Units
Introduction to the Automated Warehouse	3
General Mechanics	3
AC/DC Theory & Service	4
Microprocessors & microcontrollers	4
Technical Communications	3
Technical Mathematics	3
OSHA Safety Standards	2
Hydraulics & Pneumatics	3
Welding Basics	3
PLC & Variable Frequency Drives	4
Introduction to Networking	3
IOT/Cybersecurity	3
Robotics	4
Total	**42**

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NCSCA Model Program Courses Modified

OSHA Safety Standards

- Implement OSHA30 certification

Programmable Logic Controllers

- Create PLC and Variable Frequency Drives

Direct Current Theory & Service
Alternating Current Theory & Service

- Create AC/DC Theory & Service

Introduction to the Automated Warehouse

- Networking, Robotics, Cybersecurity

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NCSCA Model Program 2021

Course	Units
Introduction to the Automated Warehouse	3
General Mechanics	3
AC/DC Theory & Service	4
Microprocessors & microcontrollers	4
Technical Communications	3
Technical Mathematics	3
OSHA Safety Standards	2
Hydraulics & Pneumatics	3
Welding Basics	3
PLC & Variable Frequency Drives	4
Introduction to Networking	3
IOT/Cybersecurity	3
Robotics	4
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NCSCA Model Program Course Additions
Introduction to Computer Networking

Course Description

Introduction to computer networking including the technologies, terminology, and skills used in the world of data networking. Emphasis is on practical applications of networking and computer technology to solve automated warehousing problems. Topics include network standards and models, topologies, Ethernet standards, network hardware, remote connectivity, wireless networking, network troubleshooting and network management.

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NCSCA Model Program Course Additions
Introduction to Computer Networking

Course Outline

Introduction to Computer Networks

Network Hardware Essentials

Network Topologies and Technologies

Network Media

Network Protocols

IP Addressing

Network Reference Models and Standards

Network Hardware

Wireless Networks

Remote Connectivity

Wide Area Network Essentials

Network Operating System Fundamentals

Network Management and Administration

Troubleshooting and Support

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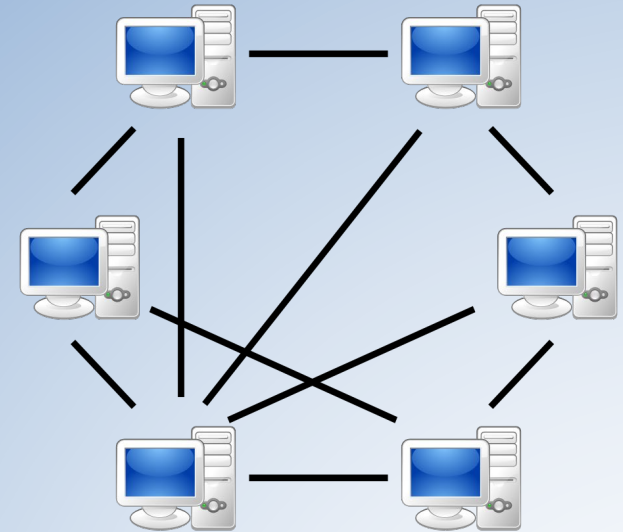
NCSCA Model Program Course Additions
Internet of Things (IoT) and Cybersecurity

Course Description

Course presents the skills and knowledge necessary to install and configure systems to secure applications, networks and IoT devices. Cyber threat analysis and risk management techniques demonstrate the Information vs. Operation Technology relationships. The NIST Cybersecurity Framework describes contingency plans for backups and other components of incident management.

NCSCA Model Program Course Additions
Internet of Things (IoT) and Cybersecurity

Course Outline

IoT and network layers

    Device hardware

    Device software

    Communications

    Cloud platform

    Cloud applications

Edge computing

Impact of cyber attacks

    On businesses, manufactures and supply chains

Information Technology merged with Operational Technology

NIST Cybersecurity Framework and assessment

Asset management

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NCSCA Model Program Course Additions
Introduction to Robotics

Course Description

A primer on the types of robotics commonly utilized in Automation and typical application in manufacturing and warehouse environments and process. Overview of common types and geometry of robots, configurations and suitable implementations. Includes the competencies involved with installing, maintaining and troubleshooting robotic systems. Covering hardware, programming methods, motion control, end effectors and use of sensors to establish safe work zones.

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NCSCA Model Program Course Additions
Introduction to Robotics

Course Outline

Intro to Industrial Robots & Safety awareness

Components of Robotic systems

Robot Classifications & Motion Paths

Programming styles and input methods

End Effectors [End of Arm Tooling]

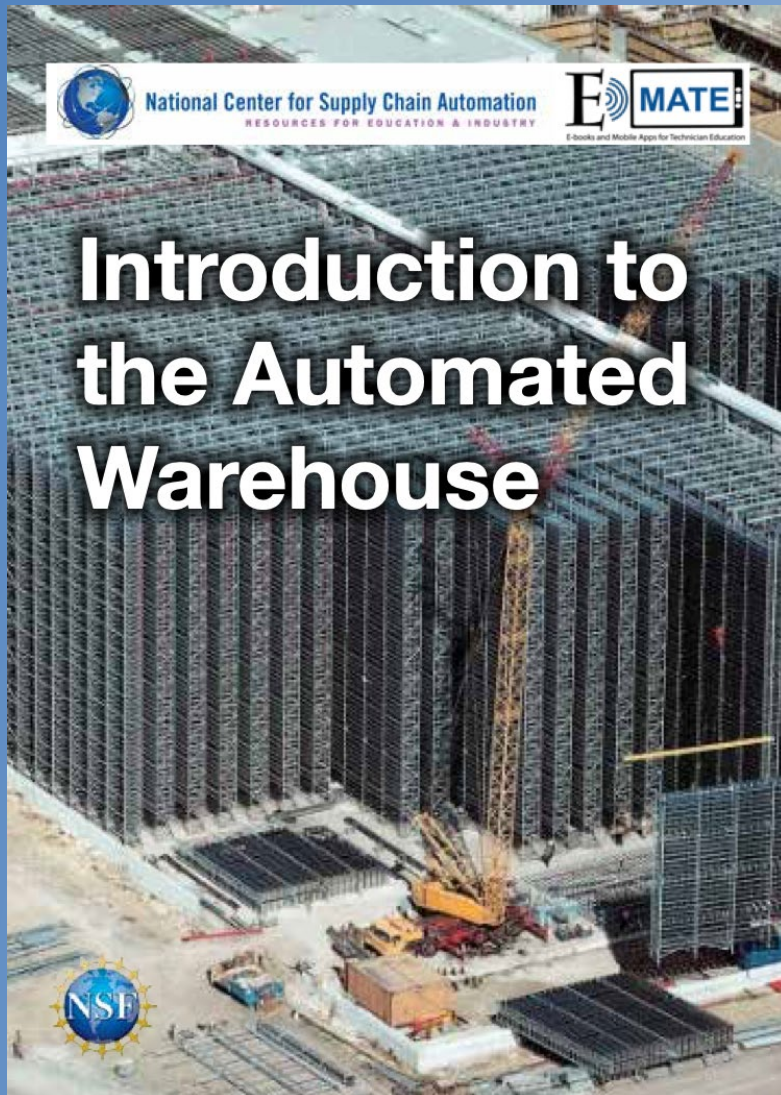Sensors of Robot control and in Work Zone Safety

Robot Integration & Networking

Robot Maintenance & Troubleshooting

When use of Robotics is justified

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IAW Available in PDF and iBook Formats

Interactive Widgets

- Puzzles
- Games
- Videos

Instructor's Manual

- Sample syllabi
- Textbook solutions
- Laboratory exercises

Overview of Current Textbook

Chapter	Pages	Widgets	Labs
1. Career Awareness	6	1	Yes
2. Industry Certification	8	15	
3. Supply Chain Principles	6	1	
4. Safety	19	3	
5. Material Handling Equipment	72	26	
6. Fundamentals of Mechanics	25	4	
7. Electrical	36	9	Yes
8. Hydraulics/Pneumatics	15	9	
9. Logic Controllers	13	0	Yes
10. Scanning and Optical Sensors	14	5	Yes
11. Heating, Ventilation and Air Conditioning	31	5	
12. Welding	10	2	Yes
13. Workplace Communications	18	7	Yes

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Redesign of Chapters 1, 2, 3

Chapter 1: Introduction to Supply Chain Automation & Certification

- 1.1 Career Awareness
- 1.2 Industry Certification
  – MSSC CT-SCA
- 1.3 Supply Chain Principles
  – Wisc-Online.com What is Supply Chain Management?

Overview of Current Chapter 5

Section	Title	Pages
1	Material Handling Equipment Overview	3
2	Industrial Trucks	13
3	Engineered Systems	24
4	Automated Storage and Retrieval Systems	6
5	Industrial Robots	11
6	Autonomous Guided Vehicles	4
7	Maintenance Processes	4
8	Prioritization	1
9	Recordkeeping	3
10	Activities	1

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Redesign of Chapter 5

Robotics - Patty Katsaros

- Waypoint Robotics
- iRobot lab activity

Predictive Maintenance + Sensors

- Michael Gueriche
- Metropolitan Community College

New Chapters in the Text

Networking - John Sands
- Morraine Valley Community College
- Tinker CAD lab activity

Cybersecurity - John Romero
- Texas A&M University
- Enigma encryption lab activity

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Overview of the 2nd Edition

Chapter	Pages	Widgets	Labs
1. Introduction to Supply Chain Automation & Certification	20	17	Yes
2. Safety	19	3	
3. Industrial Trucks and Engineered Systems & AS/RS	40	14	
4. Industrial Robots, and AGV & AMR	48		Yes
5. Maintenance Processes, Prioritization, Recordkeeping & Sensors	23	8	Yes
6. Fundamentals of Mechanics	25	4	
7. Electrical	36	9	Yes
8. Networks	27	3	Yes
9. Cybersecurity	25	0	Yes
10. Hydraulics/Pneumatics	15	9	
11. Logic Controllers	13	0	Yes
12. Heating, Ventilation and Air Conditioning	31	5	
13. Welding	10	2	Yes
14. Workplace Communications	18	7	Yes

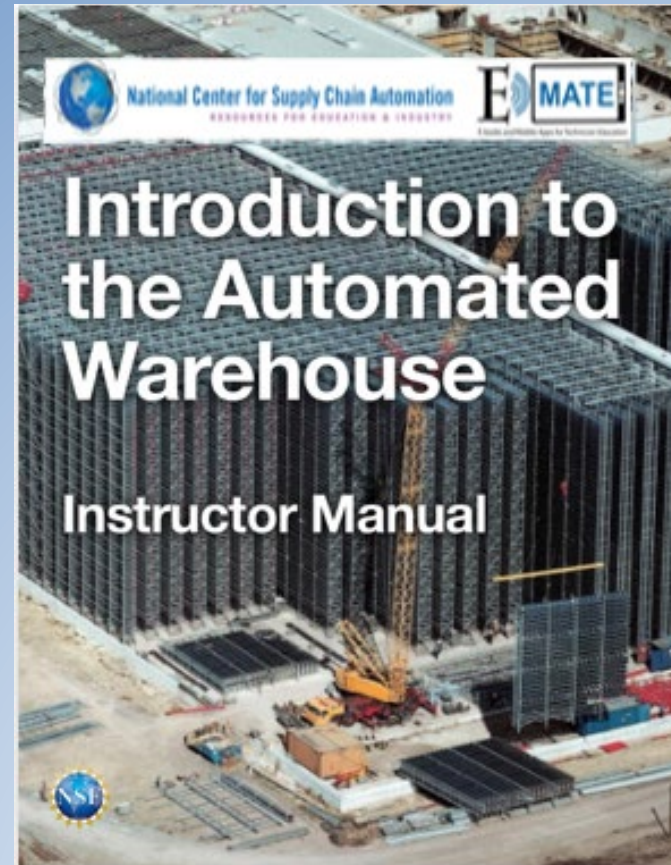# **Electronic Publication with ePub**

International Digital Publishing Forum

Readers

- Adobe Digital Editions (Windows)
- Apple Books (OS X, IOS)
- Calibre (LINUX)
- Lithium (Android)
- Google Play Books

IAW Instructor's Manual

Lab activities

Case studies

Chapter exercises

Sample syllabi

Widget solutions

Websites

Thank You

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National Science Foundation
WHERE DISCOVERIES BEGIN