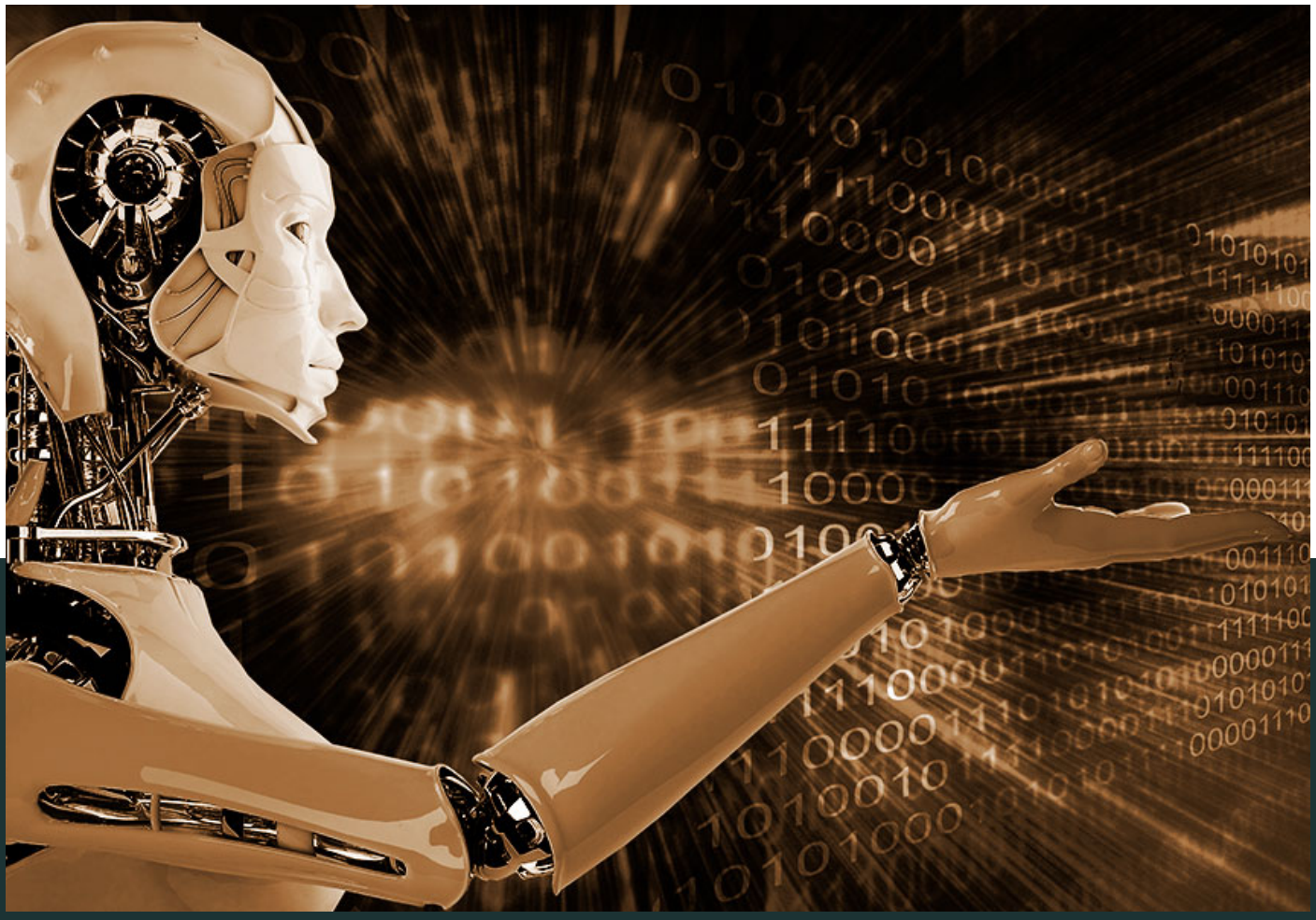
PRESENTED TO YOU BY:
FICTRON INDUSTRIAL SUPPLIES SDN BHD
& IRS TRAINING SDN BHD



# INTELLIGENT SYSTEM DESIGN

## PIC & AVR MICROCONTROLLERS
## UTILIZING PIC BASIC PRO & BASCOM

## FOR INTERMEDIATE LEVELS ONLY

# DIFFICULTY LEVELS

## BEGINNER

**A BEGINNER** in the electronics field, is considered one whom may have a small knowledge of electricity or may know nothing at all. Such individual would need to learn about electricity, circuitry, how components function in an electrical circuit, and so on to advance in this field.

Although the **beginner information is easy to obtain**, a fundamental and proper understanding of them will go a long way in understanding more complicated topics later on in more advanced courses.

## INTERMEDIATE

**The INTERMEDIATE level** in electronics engineering is considered to be the level of an individual whom has at least a diploma in electrical engineering, or has been repairing or building electronic circuits as a hobby.

At this level, one would know about the function of components and how to build different smaller scale circuits with them. In the intermediate level, electronic topics become wider and slightly more difficult to understand.

Therefore, **building the relevant circuit** of every topic is crucial to a deep understanding of higher level discussions and problems later on.

## ADVANCED

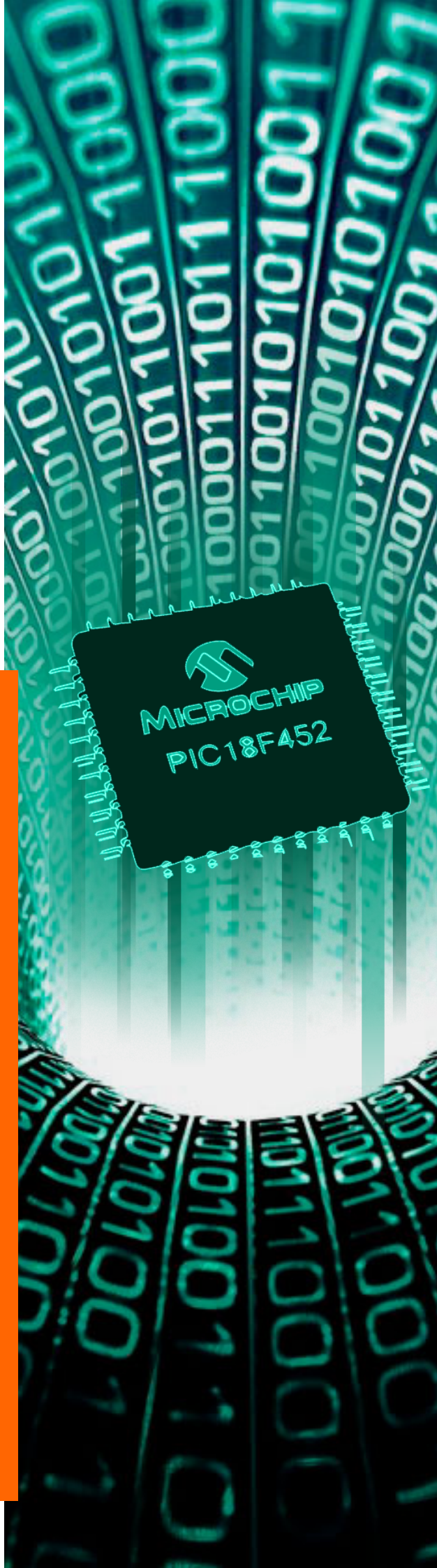
**The ADVANCED level** in electronic engineering field belongs to individuals whom have finished their bachelors or masters in electronic engineering and have finished quite a few projects in this field.

**Such engineers** are capable of designing and repairing high-level electronic systems and have no problem tackling different types of electronic circuits. They can learn the methods of repair very quickly and benefit the most from our courses.

As a result of their advanced level of knowledge, it helps to save time when explaining different methods of repair and advanced circuitry.

# CONTENT

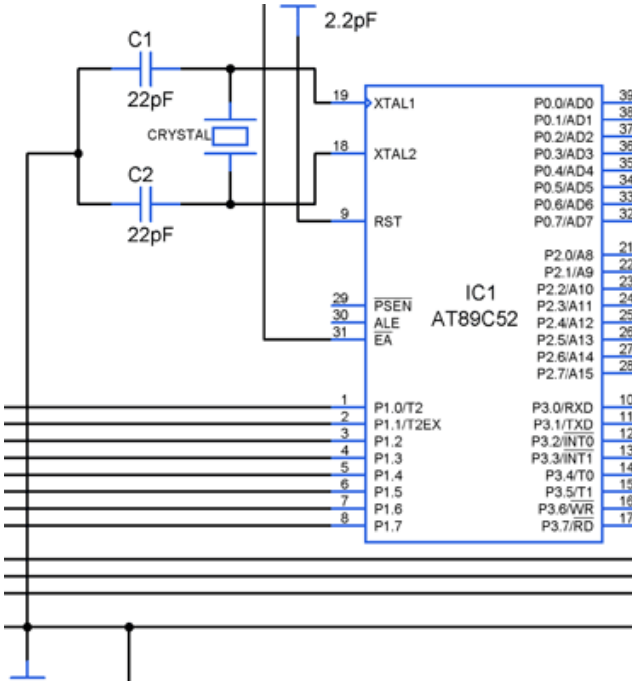




# INTRODUCTION

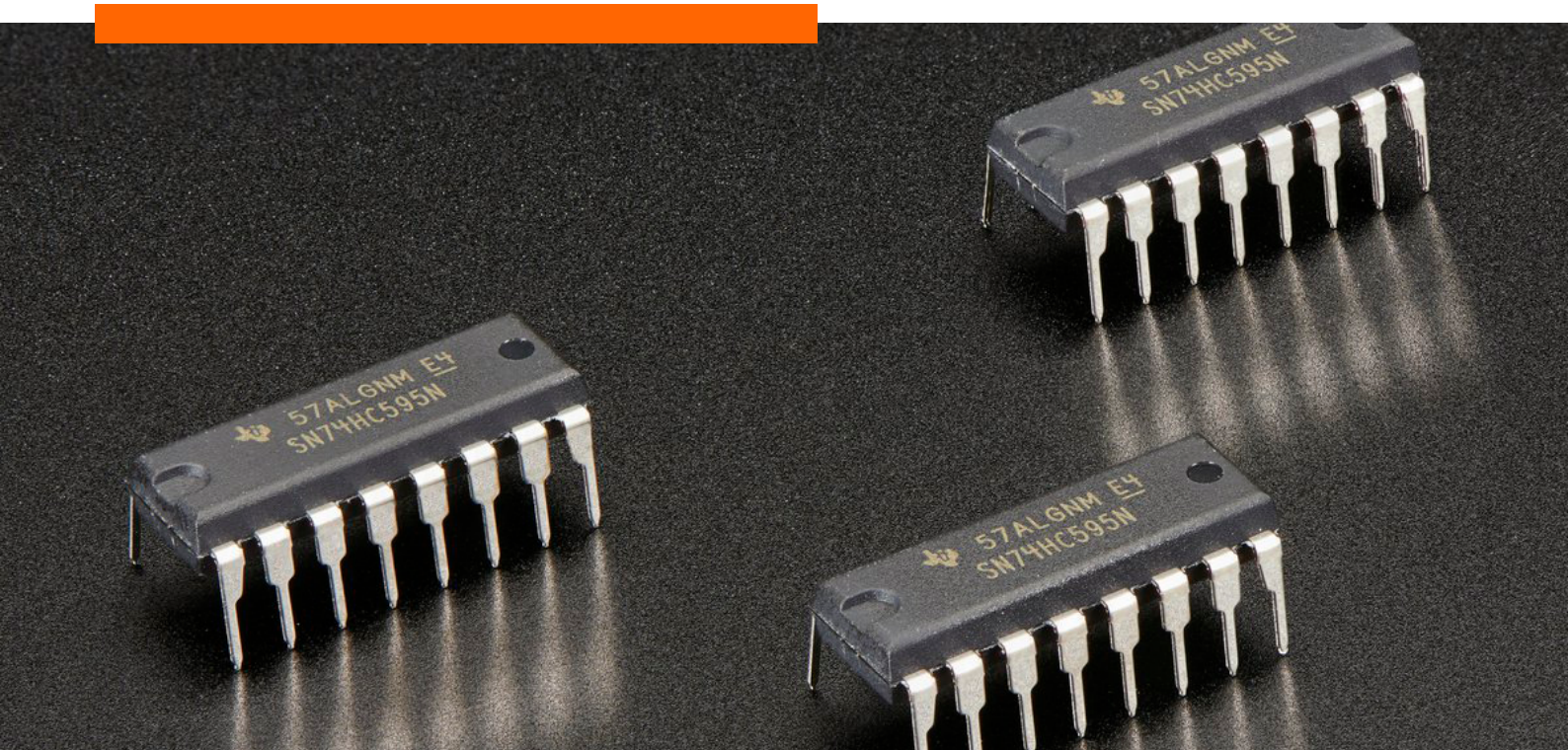
**MICROCONTROLLER CHIPS** are at the heart of all our favorite gadgets. They help us in our daily lives while most are unaware of their existence. Your computer mouse, keyboard, monitor, motherboard phone (SoC), washing machine and almost any other digital system has a microcontroller at heart. You can find them inside PLC systems as well as many machinery automation modules.

This course would enable you to design intelligent systems using common-used industry-standard PIC and AVR microcontrollers. We will be utilizing PIC Basic Pro and BASCOM which are high level languages that are easy to learn. Upon finishing this course, you will be able to design your personalized industrial or consumer digital hardware or PLC.




A microcontroller has all components of a computer inside one chip making it very easy to code and deploy, while making it possible to automate anything at low cost.

**NOTES:** This course has been designed for those whom are at the intermediate level. There is nothing to worry about if you are not familiar with basic electronic engineering concepts. You are welcomed to take our **INDUSTRIAL ELECTRONIC REPAIR LEVEL 1** course.



# TARGET AUDIENCE

This course would suite those individuals whom have sufficient experience with electronic circuitry and now wish to automate at a low cost for industrial or consumer purposes.

In the industrial applications, it will help to develop machine-specific automation hardware at a very low cost that can have all of the functionality of a high-end PLC system.

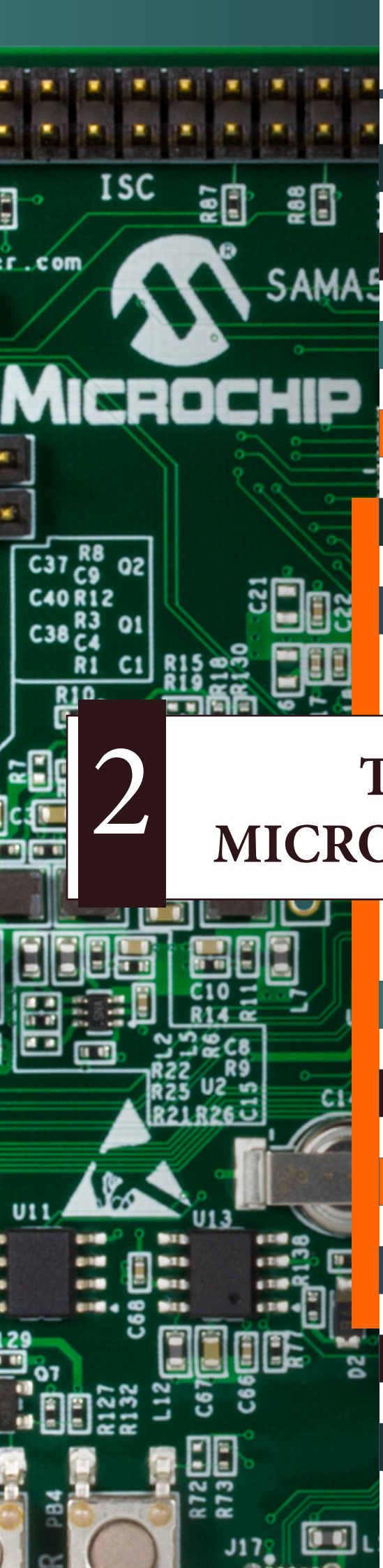
As for the consumer applications, it will allow you to design hardware that could be mass-produced. You can automate your own house at the very least.

Let's code some microcontrollers!

# THE SYLLABUS

# 1 INTRODUCTION TO MICROCONTROLLER SYSTEM

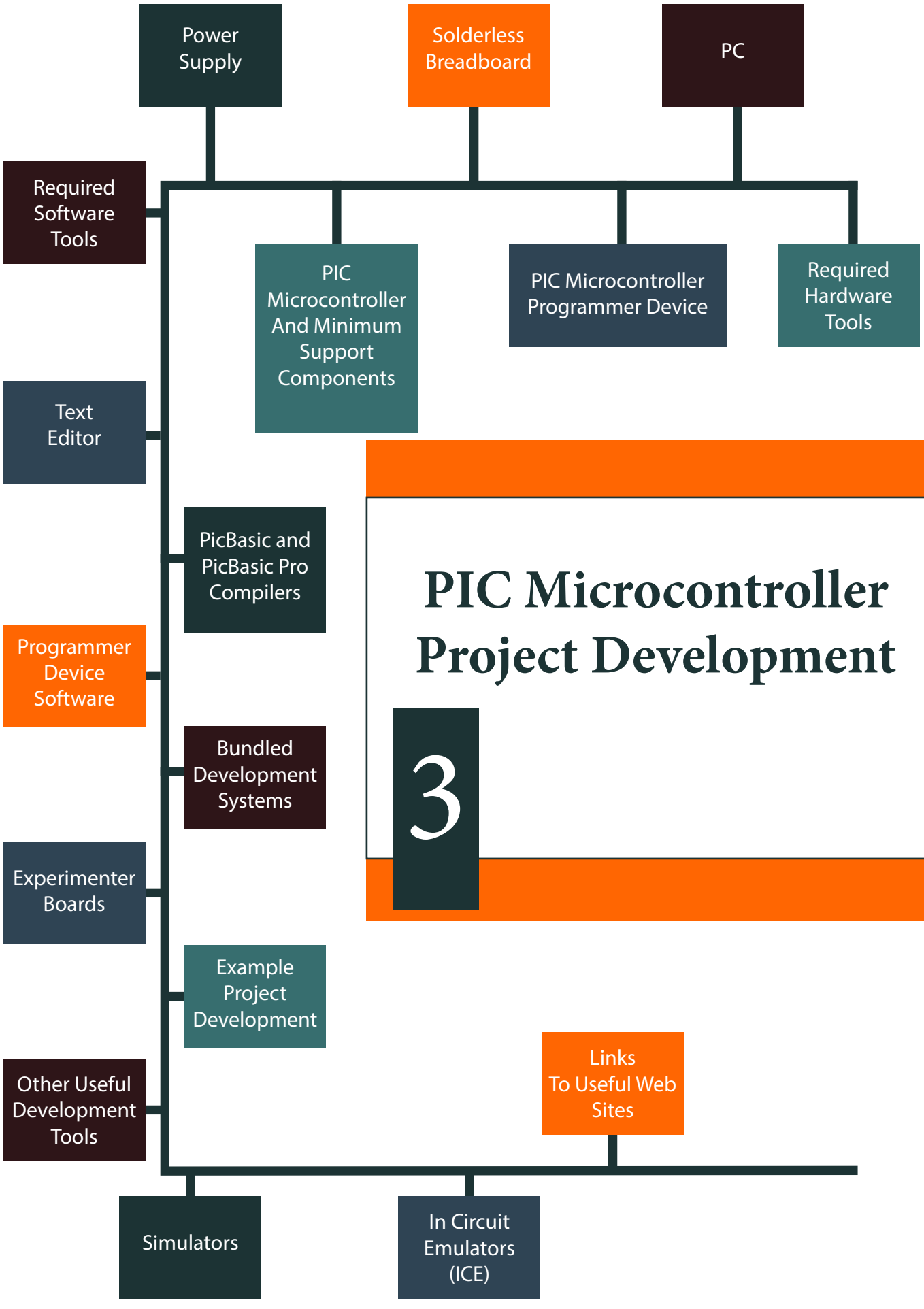
| | | | |
|---|---|---|---|
| RAM | ROM | EPROM | EEPROM |
| Flash EEPROM | Supply Voltage | The Clock | Timers |
| Watchdog | Reset Input | Interrupts | Brown-Out Detector |
| Analogue -To-Digital Con-verter | Serial I/O | EEPROM Data Memory | LCD Drivers |
| Analogue Comparator | Real-Time Clock | Sleep Mode | Power-On Reset |
| Low Power Operation | Current Sink/ Source Capability | Microcontroller Architectures | RISC and CISC |




- 12-Bit Instruction Word
- 14-Bit Instruction Word
- 16-Bit Instruction Word
- Inside A Microcontroller
- Program Memory (Flash)
- Data Memory (RAM)

# 2 THE PIC & AVR MICROCONTROLLER FAMILIES

- Register File Map And Special Function Registers
- Oscillator Circuits
- Reset Circuit
- Interrupts
- The Configuration Word
- I/O Interface




# PIC Microcontroller Project Development

3

PICBASIC Pro
BASCOM AVR
Variables
Program Flow Control Commands
Mathematical And Logical Operations
Other Commands
PicBasic Pro Language
Recommended Program Structure
BASCOM AVR Language
Constants
Comments
Multi-statement Lines
INCLUDE
DEFINE
Line Extension

# PicBasic Pro & BASCOM AVR Programming

# 4

Using Servomotors
Interrupts
Using Stepping Motors
Serial LCDs
Parallel LCDs
Liquid Crystal Display (LCD) Interface And Commands
BASCOM AVR Commands
Arithmetic Operators
PicBasic Pro Commands
vi Contents
Accessing Ports & Other Registers In PicBasic Pro and BASCOM AVR

# PICBASIC PRO & BASCOM AVR PROJECTS

# 5

# TRAINING SCHEDULE

## ITINERARY / EVENT
### DAY 1 - 5

0915 - 1045 (1 HOUR 30 MINS)
- **LESSON**

1045 - 1100 (15 MINS)
- **BREAKTIME**

1100 - 1230 (1 HOUR 30 MINS)
- **LESSON**
- **QUIZ**

1230 - 1330 (1 HOUR)
- **LUNCH**

1330 - 1500 (1 HOUR 30 MINS)
- **LESSON**

1500 - 1515 (15 MINS)
- **BREAKTIME**

1515 - 1645 (1 HOUR 30 MINS)
- **LESSON**
- **QUIZ**

1645 - 1700 (15 MINS)
- **LESSON REVIEW**

## ITEMS

**LESSON** : 4 LESSONS A DAY
**DURATION** : 5 DAYS
**QUIZ TIME** : 2 TIMES A DAY (TOTAL OF 10 QUIZZES FOR 5 DAYS)
**LUNCH TIME** : 1230 - 1330 (1 HOUR)


## NOTES

1. There are 2 quizzes taken from the participant each day. One is before lunch and the other before the ending of the training day.

2. A day of absence will require the participant to join the next course for that particular day. Same applies to half day of absence.

3. The last 15 minutes of the training session (1645 - 1700) is for reviewing what been taught.

4. There is a 15 minutes break in between each class and the lunch time if from 1230 - 1330.

5. The training course book, quizzes, components and tools are provided by **FICTRON**.

6. Every circuit that is taught is practiced and built to ensure a full understanding of subject matter.


# INTRODUCTION

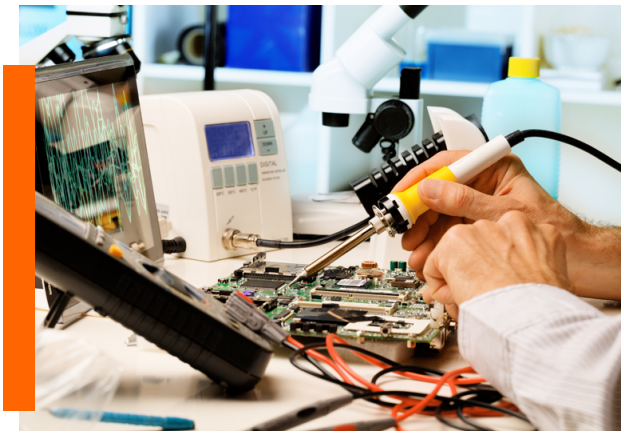
**Fictron Industrial Supplies** has had extensive experience in repairing industrial electronic Motor Drives, PLC systems, Servo Systems as well as Human Machine Interfaces.

**Our engineers** are trained in Germany and we are the authorized repair center for KEB Automation KG. As an industrial solution provider, we believe in an open market whereby the repair information is shared for the greater good of industrial electronics and ease of operation for local factories.

# ABOUT FICTRON

## FICTRON REPAIR EXPERTISE

- On-site
- In-house
- Rush repair
- 10+ years experience
- KEB GMBH certified
- Parameter setting
- PLC projects and back up
- & many more



## AWARDS

- **16th Asia Pacific** International Honesty Enterprise - Keris Award
- **15th Asia Pacific** International Entrepreneur Excellence Award
- **12th Top Global** Brand Leadership Excellence Award
- **World** Confederation of Businesses - Worldcob-Biz 2019 Award

# ABOUT IRS

**IRS Training Sdn Bhd**, est. in 1997 has been a pioneer in delivering Creativity and Competency based trainings throughout Malaysia and Asia Region. Consistently known for delivering excellent creativity training programs such as **Edward De Bono's Six Thinking Hats & Lateral Thinking**, is also known for LEGO Serious Play and Game Storming. Additionally, IRS is also currently moving into innovative and creativity application on team namely Four Sight Toolset and Mindset certification. Locally, IRS Training is famous for their HRDF Train the Trainer, Evaluation on Effectiveness of Training, Master Trainer and Training Needs Analysis programmes.

IRS believes that in today's era of **VUCA**, there's no other way but to reinvent. We need to engage, embrace, and adopt new ways of learning and working with the latest and emerging technologies. Digital transformation allows us to achieve sustainable advantage we can have over others. As a testament for its effort in consistently providing and delivering quality training programmes, IRS won **SME Awards 2009 for Best Brand in Services Management and Minister of Human Resource Award 2012**.

## AWARDS

- Winner of **Human Resource Minister Award 2012**
- Awarded **The Brand Laureate SMEs Chapter Awards 2009**
- Awarded the **Certificate Of Appreciation for Human Resources Development 2009/2007**
- One of the active and recognised provider in **Edward de Bono's Thinking Systems™** and the first in Malaysia
- The **Brand Laureate Best Personality Award** in 2006 for **Dr. Edward De Bono**

# ABOUT IRS

## QUALIFICATION

**Registered Training Provider** with Pembangunan Sumber Manusia Berhad (PSMB) since 1997 - No.0281 ClassA;

- Approved HRDF TTT, EET, Master Trainer & TNA Consultant for PSMB
- Approved Training Partner for Certification Courses
- Approved Training Partner for SMETAP & PKS programms.

Registered as an Accredited Centre (Pusat Bertauliah) under JPK / DSD (L02279)

Registered with Ministry of Finance "Pendaftaran Kontraktor" – No.357 - 0002287070

Registered with Perbadanan Produktiviti Malaysia (MPC) – 42L-PLPS

Authorised Representative for FOURSIGHT Certification Tools of Thinking and Innovation

Facilitator for LEGO Serious Play Training Methodology

Authorised Representative of Edward de Bono's Thinking Systems™

Authorised Provider for Australia Certification Courses (i.e. Certificate IV, Diploma and Advanced Diploma Programmes) accredited by ASQA (Australia Skills Quality Authority).

A Centre for RPL (Recognition of Prior Learning)

## TRAINING PROGRAMME

- **FOURSIGHT** Certification
- **De Bono** Creativity Programs
- **Lego Serious Play** Training Methodology
- **Game Storming** Training Methodology
- **IRS** Public Course Series – IR4.0
- **HRDF** Train The Trainer
- **HRDF Evaluation** On Effectiveness Of Training (EET)

# THE INSTRUCTOR

## MR. AMIN IZADY SADR

Who is an electronics prodigy from Iran with extensive hands-on design and research experience in the **Electronics field**. He started building his first electronics circuit when he was 7 years old.

He is extremely well-versed with years of experience in PCB Design with Altium, electrical wiring, programming with PIC Basic Pro & Bascom, service and repair of home appliances, car audios, power supplies, portable amplifiers and many more skills acquired through strong desire to learn, love for knowledge, courage and strict discipline in experimenting and R&D. He is certified in **PLC Automation S7 3000, AVR Microcontroller and Digital Circuit Design**.

To learn more about him check out his recently-launched blog at **www.elisha.network**

# CONTACT US

FICTRON INDUSTRIAL SUPPLIES
Serving Industrial Needs

## QR CODE

## THANK YOU

## SOCIAL MEDIA

FICTRON Facebook
FICTRON Twitter
FICTRON WeChat

## BUSINESS HOURS

Monday - Friday
9:00 AM - 6:00 PM
Saturday - Sunday Closed

***Closed on Public Holiday**

## INFORMATION

Please CLICK HERE to download the registration form & learn about the pricing. Kindly fill it up and fax / e-mail it to us.

You can register 2 weeks earlier prior to the Training Date to benefit from an earlybirds discount!

Liking our FACEBOOK PAGE will entitle you to 2% discount as well!

## LOCATION

**HQ:**
5-6, Jalan USJ 9/5Q, Subang Business Centre, 47620 UEP Subang Jaya, Selangor, Malaysia

**Selangor Office:**
36, Jalan Puteri 5/12, Bandar Puteri, 47100, Puchong, Selangor.

**Penang Office:**
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