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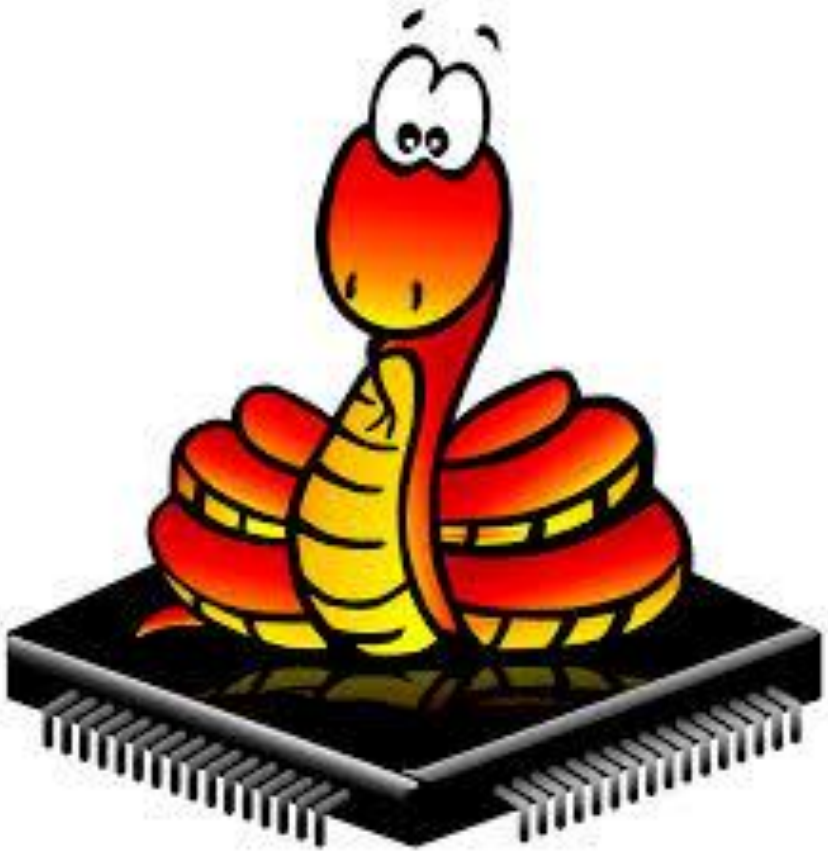
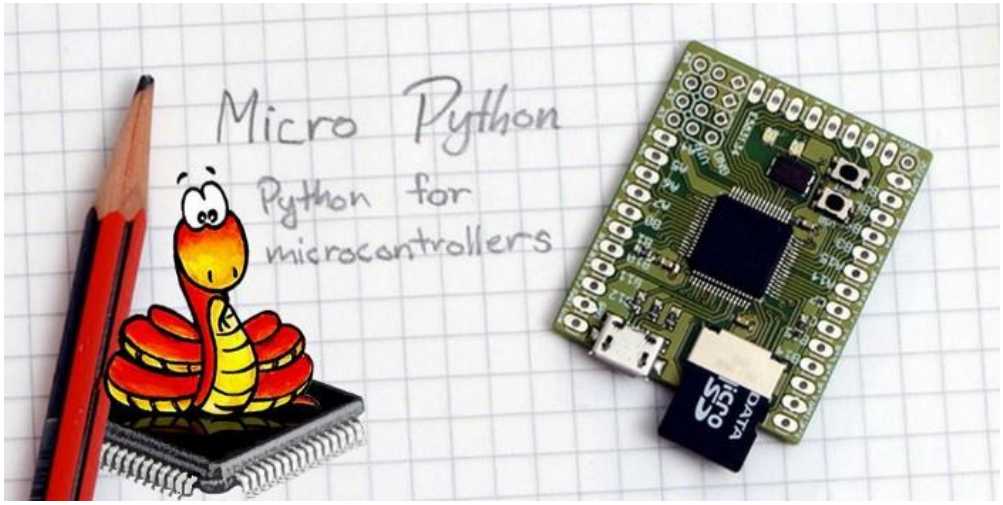


Contents:

A Beginners Guide to MicroPython

Python's popularity has proliferated in recent years. These days, it's used everywhere from DevOps to statistical analysis to Data science, and even in desktop software. But for a long time, there was one field where Python use was conspicuously missing. The professionals working with microcontrollers had not yet adopted the language. **MicroPython** has attracted professionals and hobbyists from other platforms who see the potential and convenience of the language. These developers may have come from more mature platforms, like Arduino, Raspberry pi. Many came to realize the benefits of using **MicroPython**, as well as specifying Python and MicroPython together, not least for rapid prototyping and faster time-to-market.

These days microcontrollers are everywhere from your mobile phones to your office desktop, from home appliances to space rockets. Everywhere around up they are adding intelligence and control to your devices. They compress a CPU, memory, and IO into one general-purpose chip, rather than requiring a whole board of chips that team up to perform a task. To get them working a firmware code is flashed or burned into the memory. Microcontrollers have existed long before the advent of Micropython, but why does anyone switch from their traditional programming to Micropython. To get these answers, let us first see what is Micropython.



(Image Source - https://github.com/micropython/micropython)

MicroPython

While many of us know python is an interpreted, object-oriented, high-level programming language with dynamic semantics. MicroPython is a lean and efficient utilization of the **Python 3** programming language that includes a small subset of the Python standard library and is optimized to run on microcontrollers and in constrained environments.

MicroPython is a full Python compiler and runtime that runs on the *bare-metal*. You get an interactive prompt (the **REPL**) to execute commands immediately, along with the ability to run and import scripts from the built-in filesystem. The REPL has history, shell, tab completion, auto-indent and paste mode for a great user experience.

MicroPython is packed full of advanced features such as an interactive prompt, arbitrary precision integer, closures, list comprehension, generators, exception handling, and more. It aims to be compatible with normal Python and allow you to transfer code with ease from the desktop to a microcontroller or embedded system.

What Benefits does it add to the traditional practices?

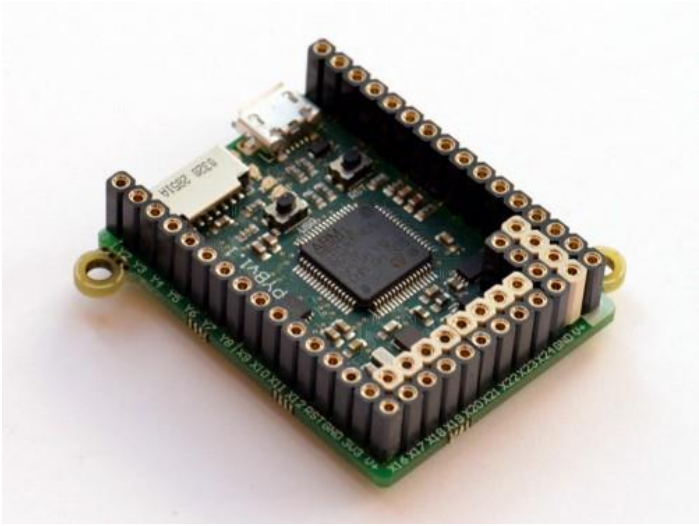
First, the language is more accessible to beginners and professionals than competing languages. It is fast for small projects and powerful enough for industrial use cases. You can go from learning the basics to doing real work, and quickly.

Second, Python allows for rapid feedback. This is done by interactively enter commands and get a response using the REPL. You could even tweak your code and run it right away, rather than iterating through code-compile-upload-execute cycles.

Third, the huge library support of Python code and experience out there means that you can do some things more quickly and easily as a Python programmer.

MicroPython employs many advanced coding techniques and lots of tricks to maintain a compact size while still having a full set of features. you don't need to be a Python expert to use MicroPython, it is praised to have a clean and easy to learn syntax that's great for beginners.

Which Hardware Supports MicroPython



(Image Source — https://store.micropython.org/product/PYBv1.1H)

- Pyboard — The first Micropython board has complete support for the language and hardware peripherals. This board comes with MicroPython running on it so you can get started with the code with any additional setup.
- ESP8266 — The Micropython supports the popular ESP8266 controller. You can access the peripherals like ADC, wifi, PWM, GPIOs, I2C/ SPI. Through the webREPL, allows you to code the ESP8266 using a web browser.
- Teensy 3.x — The Teensy device has some of the early access to Mircropython. While this port is a bit less mature compared to other boards but you can access the basic GPIOs.
- Raspberry Pi PICO — The recently launched Pico board gives extensive support to MicroPython. The Pico port of MicroPython includes modules for accessing low-level chip-specific hardware. To get started on Pico with Micropython check https://medium.com/analytics-vidhya/how-to-set-up-and-program-raspberry-pi-pico-58f5c75c382a

(Image Source — https://medium.com/analytics-vidhya/how-to-set-up-and-program-raspberry-pi-pico-58f5c75c382a)

MicroPython Workflow

For working with a controller the workflow essentially consists of writing the code in an IDE and burning it into the memory of the controller. With Micropython it is something different.

Getting a MicroPython REPL prompt

REPL stands for Read Evaluate Print Loop and is the name given to the interactive MicroPython prompt that you can access on the controller. Using the REPL is by far the easiest way to test out your code and run commands. You can use the Putty terminal to run get this prompt.

There are two ways to access the REPL:

- **Use a serial terminal connection:** wired connection through the UART serial port.

To get a serial REPL on a Mac, for example, you can write:

```
$ screen /dev/tty.wchusbserial1430 115200
```

- Use the WebREPL: **This is an option for boards with WiFi.**

```
import webrepl_setup
```

Once you have a prompt you can start experimenting. you can enter commands just like you would from your Python interactive session. MicroPython will run the code that you enter and print the result.

You can try the following commands:

```
>>> print("hello Pico")
hello Pico
```

Command-Line Tools and IDEs

Another simple way to code in MicroPyhton is by using some command-line tools like Thonny IDE for python.

Shell window of Thonny IDE

Thonny comes with Python 3.7 built-in, so just one simple installer is needed and you're ready to learn to program. The initial user interface is stripped of all features that may distract beginners.

Creating and Deploying Your Code

To execute your code, in most cases you're going to create .py text files and execute them on your MicroPython device. while some devices feature real-time processing some devices need the .py file to be burned on the memory.

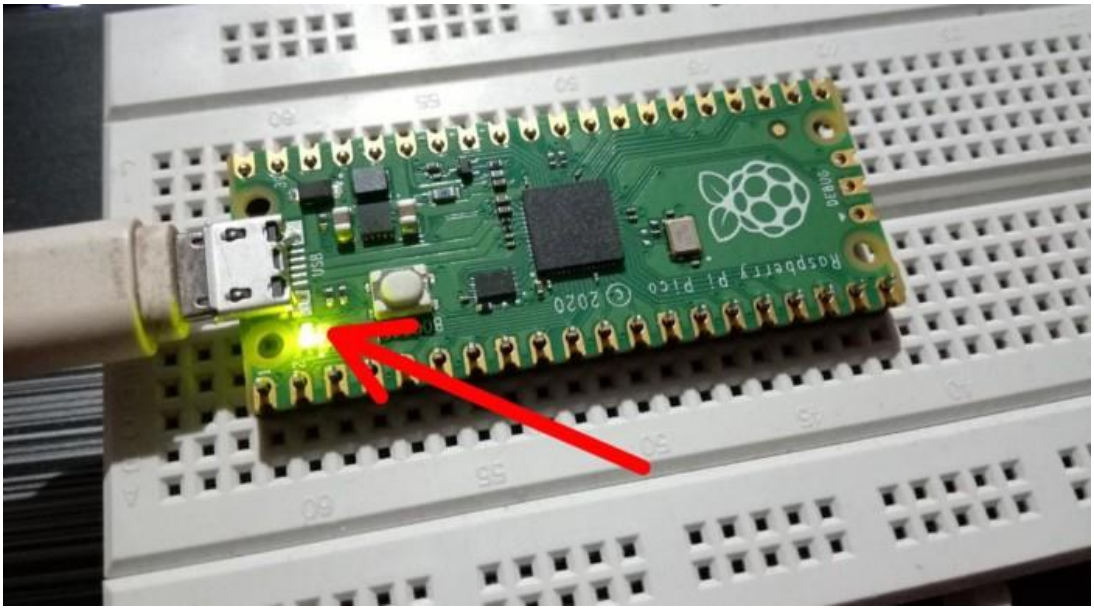
First program (onboard LED)

MicroPython includes the machine module, and more specifically the machine.Pin class to access and work with GPIO pins.

Copy the given code in the command line:

```
from machine import Pin
led = Pin(25, Pin.OUT)
led.on()
```

You will see the onboard LED of pico will lit as soon as you hit enter



Source- Aniket Arya

ADC (temperature reading)

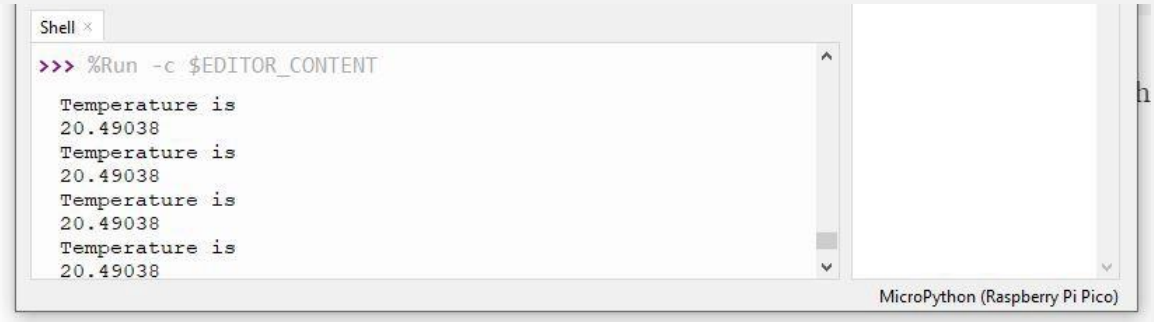
The temperature sensor that comes with the Pico is connected to one of a few special pins called ADCs or Analog-to-Digital Converters. The difference between a standard GPIO pin and an ADC pin is that a GPIO pin supports only two states, high and low, while an ADC pin supports a range of values, which is determined by the input voltage applied to the pin.

The machine module provides the ADC() class to work with ADC pins. The following code can be used to read the temperature sensor from the MicroPython shell:

```
from machine import ADC
from machine import Pin
from utime import sleepled = Pin(25, Pin.OUT)
temp_sensor = ADC(4)       //ADC pin
temperature = temp_sensor.read_u16() //to read tempearture
to_volts = 3.3 / 65535  //converting to 0 - 3.3v
temperature = temperature * to_volts
```

```
celsius_degrees = 27 - (temperature - 0.706) / 0.001721 //converting in
celcius
while True:
    print("Temperature is")
    print(celsius_degrees)
    led.on()
    sleep(1)
    led.off()
    sleep(1)
```

You will notice the temperature readings and LED blink every *second* while executing this code.



Temperature readings printed in shell

Conclusion

You never have thought that programming embedded systems would be so accessible and easy. In Traditional languages, you had to sacrifice a lot of functionality. But with python, you can extract all the functionalities and compress the code in the hardware. In this article, you learned about the features of MicroPython and some of its codes on pico.

MicroPython is continuing to grow and more controllers are supporting it. Developers and hobbyists are always adding new code, tools, projects, and tutorials. This is an exciting time to be a MicroPython developer.

I hope this was a fun and easy introduction to MicroPython and getting started with MicroPython on the Pico microcontroller.I will be posting more programs and features of MicroPython.

Source: Aniket Arya

BE, Electronics

Expert Lecture/Seminars/Courses/Industrial Visits Organized

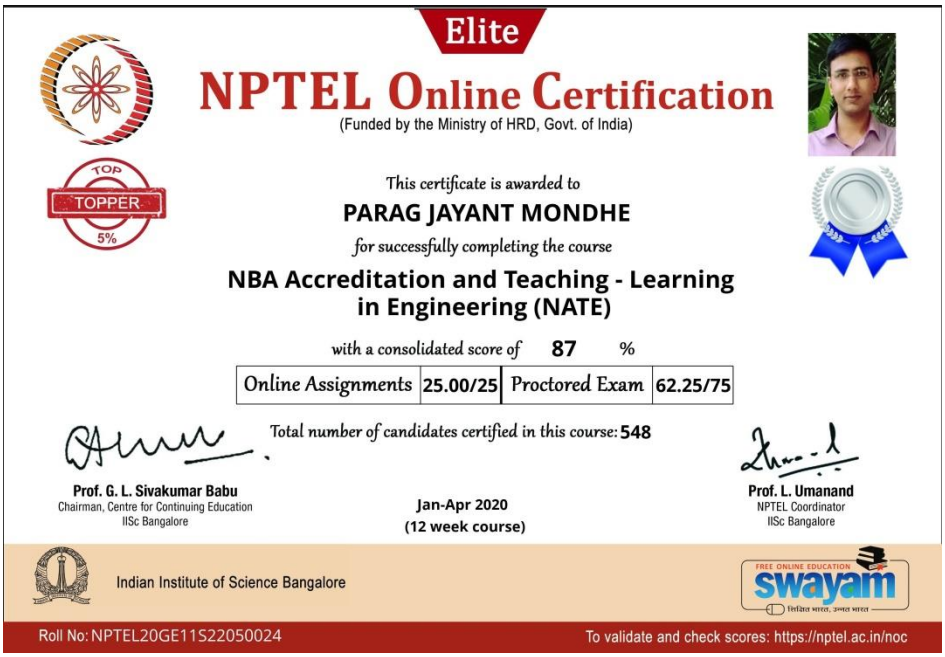
- Webinar was conducted on “Education Opportunities Abroad ” by Mr. Amit Gore, Mr. Hiren Panjwani, and Mr. Dhiraj Matlani (Alumnus of E&TC Department) on 22nd January 2021

- Webinar was conducted on “Safety: The Way of Life” by Er. Anant Krishna Waghchoure , Manager - Sales, Megger India Private Limited, Mumbai on 3rd February 2021

- Webinar was conducted on “Guidance session on distributed control system” by Er. Pooja Hiremath , Project Engg, Emerson on 6th February 2021.

Industrial Training / Seminar/Workshop done by Staff

- Mr. P. J. Mondhe has completed NPTEL course on “NBA Accreditation and Teaching-Learning in Engineering (NATE)” from January 2020 to April 2020.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Chairman, Centre for Continuing Education
IISc Bangalore

Jan-Apr 2020
(12 week course)

Prof. L. Umanand
NPTEL Coordinator
IISc Bangalore

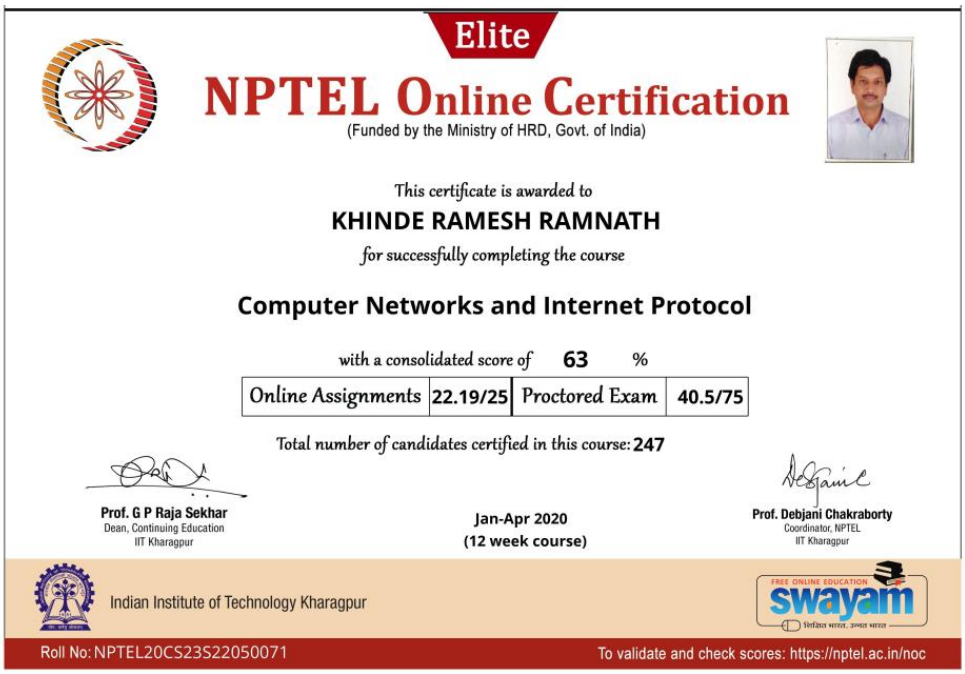
Indian Institute of Science Bangalore

swayam

Roll No: NPTEL20GE11S22050024

To validate and check scores: https://nptel.ac.in/noc

- Mr. R. R. Khinde has completed NPTEL course on “Computer Networks and Internet Protocol” from January 2020 to April 2020.


Elite

NPTEL Online Certification

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Computer Networks and Internet Protocol

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IIT Kharagpur

Jan-Apr 2020
(12 week course)

Prof. Debjani Chakraborty
Coordinator, NPTEL
IIT Kharagpur

Indian Institute of Technology Kharagpur

swayam

Roll No: NPTEL20CS23S22050071

To validate and check scores: https://nptel.ac.in/noc

- Mrs. S. S. Bhabad, Mr. R. R. Khinde and Mrs. V. R. Lele have participated in one day workshop on “SEQUEL App” organized by E&TC department, Bhartiya Vidya Bhavan’s Sardar Patel Institute of Technology, Mumbai on 16th January 2021.

Certificate

One Day Workshop on SEQUEL App

This is to certify that

Mrs. Sanjwani Pravin Munot

From K. K. Wagh Institute of Engineering Education & Research, Nashik

Attended One Day Workshop on SEQUEL App

Conducted by Dr. M. B. Patil

(Department of Electrical Engineering, IIT Bombay, Mumbai)

Organized by

Electronics & Telecommunications Engineering Department,

Bharatiya Vidya Bhavan's Sardar Patel Institute of Technology,

Munshi Nagar, Andheri(W), Mumbai - 400058

Date: 16-January-2021

Dr. Y. S. Rao

Vice Principal, Dean R&D

Certificate

One Day Workshop on SEQUEL App

This is to certify that

Mr. Ramesh Ramnath Khinde

From K. K. Wagh Institute Of Engineering Education And Research, Nashik

Attended One Day Workshop on SEQUEL App

Conducted by Dr. M. B. Patil

(Department of Electrical Engineering, IIT Bombay, Mumbai)

Organized by

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Bharatiya Vidya Bhavan's Sardar Patel Institute of Technology,

Munshi Nagar, Andheri(W), Mumbai - 400058

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Conducted by Dr. M. B. Patil

(Department of Electrical Engineering, IIT Bombay, Mumbai)

Organized by

Electronics & Telecommunications Engineering Department,

Bharatiya Vidya Bhavan's Sardar Patel Institute of Technology,

Munshi Nagar, Andheri(W), Mumbai - 400058

Date: 16-January-2021

Dr. Y. S. Rao

Vice Principal, Dean R&D

- Mrs. S. A. Karpe has participated in online faculty orientation workshop under the aegis of BOS (E&TC) SPPU, Pune SE (E&TC/Electronics) revised syllabus 2019 course on "Signal and System" organized by department of E&TC, Maratha Mitra Mandal's College of Engineering, Pune on 18th January 2021 to 20th January 2021.

BoS, SPPU

Board of Studies (E&TC/Electronics)

Savitribai Phule Pune University

Marathwada Mitra Mandal's

COLLEGE OF ENGINEERING

Karvenagar, Pune-411052

Faculty Orientation Workshop

S. E. (E&TC) Revised Syllabus 2019 Course

Subject: Signals & Systems

DBOCMO-CE000083

E-Certificate of Participation..!

This is to certify that,

Smita Amit Karpe

of KKWIEER

has attended Faculty Orientation Workshop on SE (E&TC) revised syllabus (2019 Course) under the aegis of Board of Studies (E&TC), Savitribai Phule Pune University, organized by Dept. of E&TC Engineering, Marathwada Mitra Mandal's College of Engineering, Karvenagar, Pune from 18/01/2021 to 20/01/2021.

Mrs. M. R. Pangaonkar, Faculty Coordinator

Mrs. R. R. Malekar

Mrs. P. S. Sawant, HoD, Dept. of E&TC Engg.

Dr. S. M. Deshpande, Principal

Dr. D. S. Bormane, Chairman, BoS

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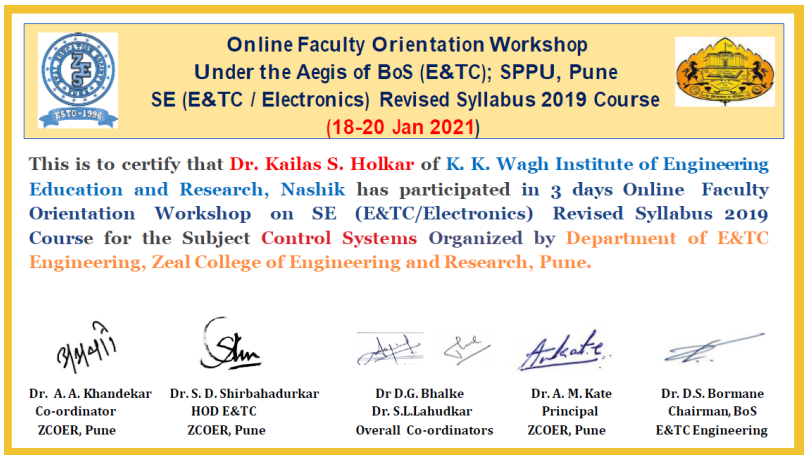
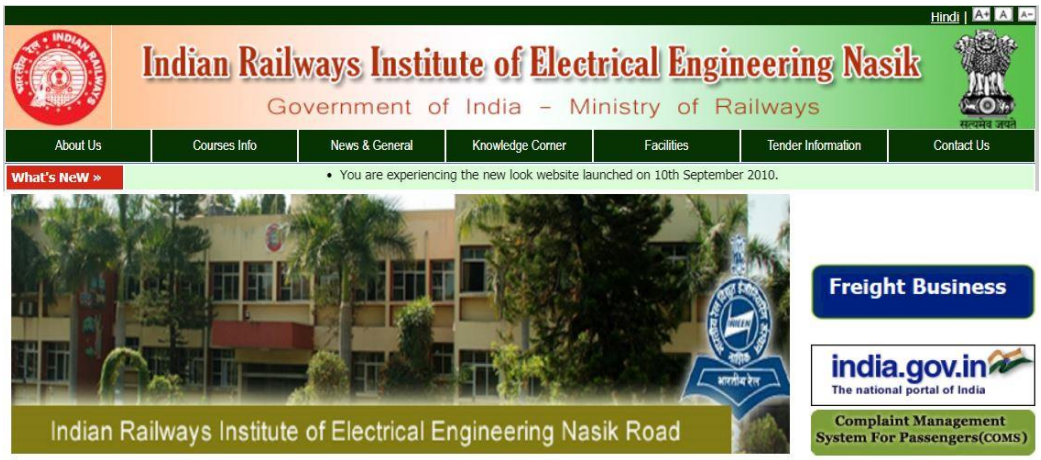
- Dr. K. S. Holkar has participated in Faculty Orientation Workshop on SE (E&TC/Electronics) Revised Syllabus 2019 Course for the Subject Control Systems organized by SPPU and Department of E&TC Engineering, Zeal College of Engineering and Research, Pune on 18th January 2021 to 20th January 2021.



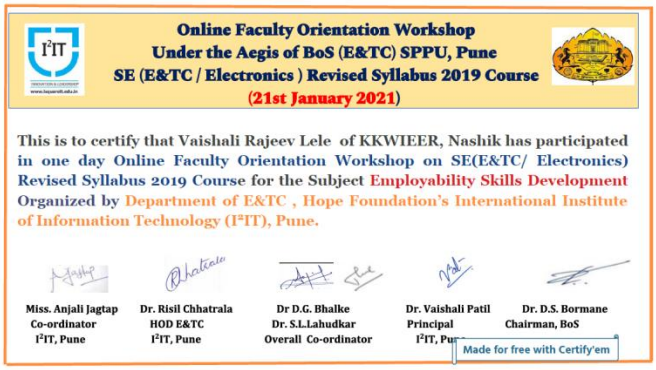
- Mrs. P. P. Patil has participated in Faculty Orientation Workshop on SE E&TC/ELEX revised syllabus 2019 course on Principal of communication systems organized by BoS, SPPU and D. Y. Patil, institute of technology, Pimpri, Pune on 18th January 2021 to 20th January 2021.

- Mrs. V. R. Lele was the resource person in Faculty Orientation Workshop of SE (E&TC/ Elex) 2019 course on “Object Oriented Programming” organized by Electronics and Telecommunication Engineering Department AISSMS College of Engineering, Pune-01 under the Aegis of BoS(E&TC), SPPU, Pune on 19th January 2021.
- The following staff member was the resource person for various sessions at Indian Railways Institute of Electrical Engineering, Nashik on 20th January 2021 and 21st January 2021.



Sr. No.	Name of Staff	Topic
1.	Prof. Dr. D. M. Chandwadkar	Computer-I (Advance Features of Microsoft Word)
2.		Computer-II (Expert Features of Microsoft Power Point)
3.	Dr. S. A. Patil (Ugale)	Computer-III (Basics of Microsoft Excel)
4.		Computer-IV (Advance Features of Microsoft Excel-I)
5.		Computer-V (Advance Features of Microsoft Excel-II)
6.	Mr. K. S. Navale	Power Electronics- I (Semiconductor Switches, IGBT, GTO, Rectifier & Inverters)
7.		Power Electronics- II (PWM Techniques & Electrical Drives)

- Mrs. V. R. Lele and Ms. V. S. Taware have participated in online faculty orientation workshop under the aegis of BOS (E&TC) SPPU, Pune SE (E&TC/Electronics) revised syllabus 2019 course on “Employability Skill Development” organized by department of E&TC, Hope Foundation’s International Institute of Information Technology (I2IT), Pune on 21st January 2021.


Online Faculty Orientation Workshop
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SE (E&TC / Electronics) Revised Syllabus 2019 Course
(21st January 2021)

This is to certify that Vaishali Rajeev Lele of KKWIEER, Nashik has participated in one day Online Faculty Orientation Workshop on SE(E&TC/ Electronics) Revised Syllabus 2019 Course for the Subject Employability Skills Development Organized by Department of E&TC , Hope Foundation's International Institute of Information Technology (I²IT), Pune.

Miss. Anjali Jagtap, Co-ordinator, I²IT, Pune
Dr. Risil Chhatrala, HOD E&TC, I²IT, Pune
Dr D.G. Bhalke, Dr. S.L.Lahudkar, Overall Co-ordinator
Dr. Vaishali Patil, Principal, I²IT, Pune
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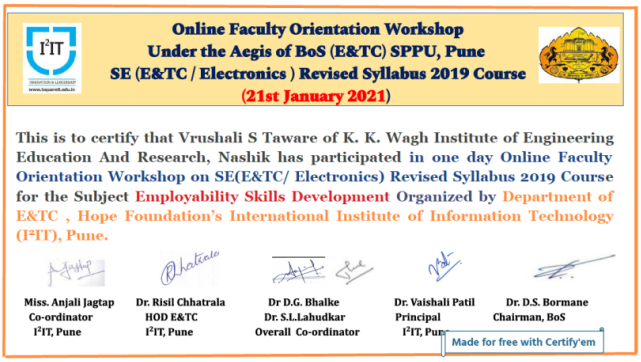
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Dr. Risil Chhatrala, HOD E&TC, I²IT, Pune
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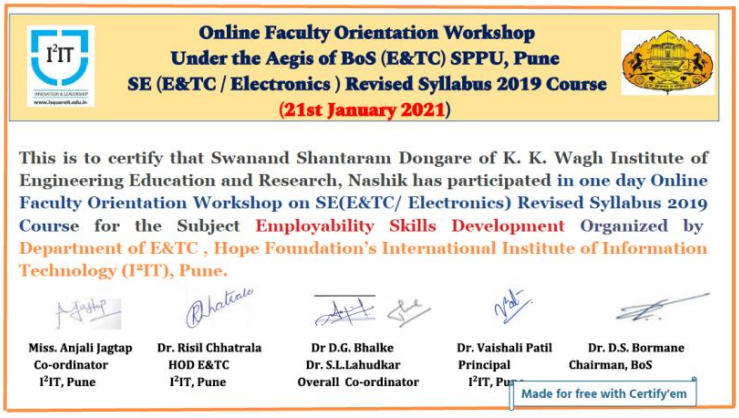
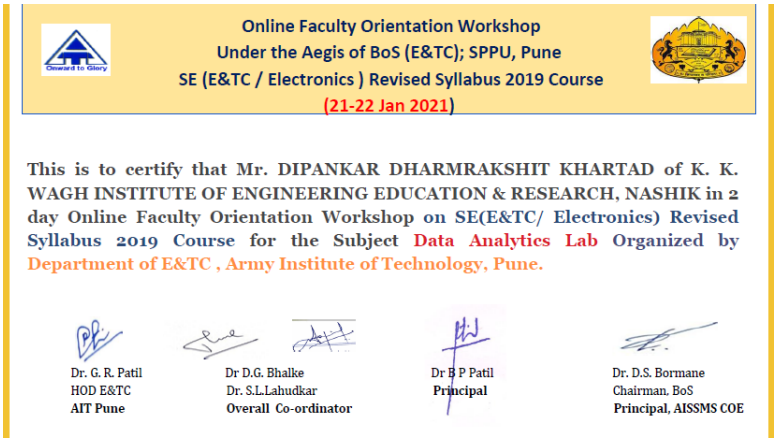
- Mr. S. S. Dongare has participated in Faculty Orientation Workshop on SE (E&TC/ Electronics) Revised Syllabus 2019 Course for the Subject Employability Skills Development organized by Department of E&TC, Hope Foundation’s International Institute of Information Technology (I2IT), Pune on 21st January 2021.



- Mr. D. D. Khartad has participated in Faculty Orientation Workshop on SE E&TC/ELEX revised syllabus 2019 course on Data Analytics Lab organized by BoS, SPPU and Army Institute of Technology, pune on 21st January 2021 to 22nd January 2021.



- Ms. V. S. Taware has participated in Faculty Orientation Workshop SE (E&TC/Elex) Revised Syllabus 2019 Course for the subject "Project Based Learning" organized by BoS, SPPU and BRACT Vishwakarma Institute of Technology Pune 23rd January 2021.

Udemy Courses Developed by Staff

- Staff has developed and uploaded different courses on Udemy platform

Sr. No.	Name of Staff	Name of Course	Link
1.	Prof. Dr. D. M. Chandwadkar	Charging Infrastructure for Electric Vehicles	https://www.udemy.com/course/charging-infrastructure-for-electric-vehicles/?referralCode=E2C6CE52421D6DF3D504
2.	Prof. Dr. M. R. Admane	PIC18FXXXX Microcontroller Programming	https://www.udemy.com/course/pic-microcontroller-programming/?referralCode=FC91D500CCE851AB700B
3.	Dr. K. S. Holkar	Control System and its Modelling	https://www.udemy.com/course/control-system-and-its-modelling/learn/lecture/24309508?utm_campaign=email&utm_medium=email&utm_source=sendgrid.com#overview
4.	Dr. S. S. Morade	Learn graphic LCD interface with microcontroller from scrath	https://www.udemy.com/course/learn-graphic-lcd-interface-with-from-scratch/?referralCode=0EA883CB5E7B896E70CF
5.	Mrs. S. P. Munot	FIR filter design using MATLAB	https://www.udemy.com/course/design-of-fir-filter-using-windowing-technique-in-matlab/?referralCode=BFC575CFA80A214338E1
6.	Dr. S. A. Patil (Ugale)	Fiber Optics Network Design and Maintenance	https://www.udemy.com/course/fiber-optics-network-design-and-maintenance/
7.	Mrs. S. V. Shelke	Digital Circuit design and Implementation	https://www.udemy.com/course/digital-circuit-design-and-implementation/?utm_source=sendgrid.com&utm_medium=email&utm_campaign=email

Research Paper

Title: Understanding Aspirations of First Year Undergraduate Engineering Students

Auther: Shahabadkar Pramod, Joshi Ajinkya, Lele Vaishali, Patil Vilas

Institute: K. K. Wagh Institute of Engineering Education and Research, Nashik - 422 003

Name of Journal: Journal of Engineering Education Transformations, Volume 34, January 2021, Special issue, eISSN 2394-1707

Abstract: Success of any educational institute largely depends upon how the students excel after they complete their studies. This may be in terms of obtaining dream placement, admission to higher studies in reputed institutes or even starting a venture of their choice. Desired results can be achieved if the aspirations are understood at an early stage and students are groomed properly for achieving their dreams. The objective of this study is to understand the aspirations of engineering students in their first year itself and develop a model for nurturing these aspirations. This paper also identifies factors influencing changes in aspirations and the contribution of these factors.

In the present study, the aspirations of undergraduate engineering students were collected immediately after their admission. This activity was carried out consecutively for three academic years: 2017-18, 2018-19 and 2019-20. Aspirations of 2043 students were collected during this period by using IT tools. The study indicated that maximum students during their first year Engineering were inclined towards obtaining placements in multinational firms followed by seeking admission to higher education in reputed institutes, entrepreneurship and joining the civil services. The institute under consideration has developed a five stage model to help the students in fulfilling their aspirations. This includes establishment of a Career Development Cell, Entrepreneurship Development Cell, International Facilitation Centre, Higher Study Cell and Novel Master Student Program.

Aspirations were collected again during the final year in order to understand the deviations when students moved from first to final year. Results indicate that there was a substantial shift in the student aspirations. By the time the students reached the final year, there was an increase of 47.90% in the number of students who opted for placements while the number of students planning for higher studies decreased by 30.51%. Brainstorming session was conducted to identify the factors that prompted the students to change their minds during their course curriculum. The data presented here will give an insight to the academicians and institutes in understanding student ambitions and developing a model for fulfilling them.

Published By

Department of E&TC

K.K. Wagh Institute of Engineering Education & Research, Nashik

Hirabai HaridasVidyanagari, Amrutdham, Panchavati Nashik-422003

Editor: Mr. Dipankar D. Khartad

E-mail: ddkhartad@kkwagh.edu.in

Vision

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M1: To educate the students with the state-of-the-art technologies and value based education to meet the growing challenges of industry.

M2: To provide scholarly ambience & environment for creating competent professionals.

M3: To inculcate awareness towards societal needs.