What do you need to know to become a CCTV Security Engineer?

Old days it was a very difficult task to enter the field of CCTV, Intruder Alarms, or Fire Alarms as there was no widely available and easy to access knowledge online. One had to become an apprentice, go through expensive courses, and spend years learning. That has fortunately changed over the recent years. It has never been easier to enter the Security Engineer Profession (CCTV, Fire, Intruder & Access).

There is one thing that has not changed. It is the fact that a Security Engineer (CCTV, Intruder, Fire, Access) is still one of the best paid technical professions out there (outranked mostly by some people from IT and programmers). A good security engineer can make 50k(£/€/$) per year or even better.

Can you learn the CCTV Engineer profession from YouTube CCTV tutorials?

There are countless videos available on YouTube that can explain to you a lot of subjects. The problem is that you will spend a few times more time just searching for something (not knowing what you need and what you will get from watching – been there myself!) than you will spend learning from a made by a pro, tailored for a CCTV security engineer course. When searching YouTube CCTV tutorials (intruder alarm tutorials or fire alarm tutorials) you will never know if you have already learned all that you need. In addition to that a lot of tutorials are simply product overviews so they will teach you very little.

Another problem with YouTube CCTV tutorials (as with in-person training) is that many of them are made by the people from the outside of the industry (they are not active security engineers and probably never were), so they do not know what you really need to know (from a practical point of view) to get started, even if they have some sort of understanding of the subject.

So, in short you can use YouTube as an additional source but not as your main knowledge base to learn a CCTV Engineer or Fire Engineer profession.

Can you learn CCTV Engineer or Fire Alarm Engineer profession during an in-person training?

There are in-person courses in most countries but those usually are very expensive (i.e. LENEL training costs 10k+) and time-consuming (in-person = during the working week). Unfortunately even those do not guarantee that you will learn what you need as they tend to use old equipment (a lot of them use old analogue cameras and DVRs instead of HD and IP). Another problem with those courses is that they fill time with fluff to expand the hours instead of getting straight to the point. Another type of in-person training is a producer specific training. Some of them are ok (i.e. LENEL) and you will learn important functions of the equipment but many of them are designed to teach you equipment so you can sell it, not to teach you something.
In general, if you pick the right course you can learn a lot from in-person training but it is very

costly and time-consuming. You are not only paying for a course but also losing money because you are not working.

So what is the best way to become a CCTV Security Engineer?

I would use a mix of resources in the following manner:

1. **get enrolled in a comprehensive online course (inexpensive and can be used when you have time),**
2. **drill down on certain subjects by searching YouTube and the Internet (you will already have some understanding of the subject by then from the online course),**
3. **get product specific training when required – this may be especially important for Intruder Alarm panels and Access Control Systems,**
4. **start working in the industry as nothing can replace real hands-on experience.**

A Security Engineer has transformed over the years from "an electrician" to "an IT specialist". Most of the current security systems (CCTV and others) got heavily involved in the IP Networks. It is especially true in the CCTV field. Some CCTV systems are done solely over IP networks without any coaxial cables. Hence, nowadays you also need to have some understanding of IP Networks.

Please sign up below and you will get a FREE PDF document which outlines all the subjects (to the best of my knowledge as per the day of creation/update of this document) that you have to learn to become a CCTV Installation Engineer! This will give you a good idea of what to learn and sort of list on which you start ticking boxes as you go.

So what do you need to know to become a CCTV Installation Engineer?

I will start with what you do NOT NEED to become a Security Engineer:

- you do not need a third level technical education (although it helps – that is how I got in),
- you do not need expensive courses, certificates, years of education,
- you do not need to be a qualified electrician (although some knowledge is required),
- you do not need a high level of IT expertise to start with – for instance you will not need the CCNA (Cisco Networks). I'm not saying that it is not useful, only that it is not essential. I will explain why. Most of the installations are build using unmanaged switches (1-3 hours tutorial should do to learn some of Network Fundamentals). If you will have to use a customer's managed network (i.e. CISCO), a customer usually will not let you touch it anyway, they will have their own people to do it.

What you really need to get started:

1. Some basic understanding of electric circuits.

You have to:
1. know what Volts, Amps, Watts and Ohms are and how to measure and count them,
2. understand voltage, current, and resistance,
3. know what is DC and AC voltage/current,
4. know what is a serial and a parallel connection and how it changes voltage, current, and resistance,
5. understand the difference between low voltage (12V, 24V, 48V) and high voltage 220V (a security engineer should not have to work with a higher voltage than that ever),
6. know what multimeter is and to use it,
7. know how a transformer works,
8. know what circuit breakers are,
9. know what fuses are and what types are used in the security industry,
10. know how a relay works and what are NC (normally closed) and NO (normally opened) contacts,
11. know what batteries are and how to check them,
12. know how to wire your PSU (power supply) to a spur with 220V AC(110V in the USA),
13. know what types of PSUs you will use, what they look like and how to connect them,
14. know what live (brown), neutral (blue) and earth (yellow/green) wires are and how to connect them,
15. know all the basic safety rules when working with 220V(110V in the USA) – although most of the employers in most of the countries will provide you with a safety training.

2. Fundamentals of CCTV

You should know how a CCTV camera works:
1. what are lenses, how they work, what types & sizes are used, how they are connected to a modern camera,
2. what are depth of field and a zoom,
3. what are sensors (chips that change light into electric signals), what sensor sizes are available and how that influences a resolution (quality) of a picture you can get,
4. what is the focal length, how to calculate it for a particular camera and object position,
5. what is a picture resolution, what picture resolutions cameras can produce, what resolutions you will need for a particular job, old and new camera resolutions (you will still find old equipment on sites),
6. what are frames per second,
7. what cables, connectors, and basic tools are being used.

3. Modern HD CCTV

You should:

1. understand a difference between an old analogue equipment (low resolution: CIF, D1, VGA) and a modern analogue HD equipment (high resolution: from 720p, full HD to 4k, HDMI),
2. know what different camera types are (bullet, dome, fisheye, ptz),
3. know how to power up and connect HD camera to a DVR
4. know different HD formats used (CVI, TVI, AHD, SDI),
5. know compression formats, frames and streams (main & sub) and how that changes HDD requirements,
6. know how to power up and connect a DVR,
7. know how to configure a modern DVR – Digital Video Recorder (network configuration included),
8. understand setting recording schedule in DVR,
9. understand motion and even recording,
10. know how to playback and export videos,
11. know how to install and replace HDDs (hard drives),
12. know menu navigation and functions,
13. understand what is and how works a Hybrid DVR (DVR & NVR in one), know how to configure hybrid DVR,
14. know how to add IP Cameras to the Hybrid DVR

4. Fundamentals of IP Networks for Modern CCTV.

You should know:
1. LAN and WAN Networks,
2. Ethernet Cables on IP Networks,
3. how IP Addresses Work in CCTV,
4. how to Use IP/TCP Ports for CCTV,
5. DNS in IP Camera Networks,
6. Routers and Switches in IP CCTV Systems,
7. PoE Basics,
8. how to change the IP of Your Computer.

5. Modern IP CCTV Systems

1. types of Network Cameras,
2. video quality contributors in Network Cameras,
3. how to configure IP Cameras - live configuration examples are essential,
4. main NVR types,
5. how to configure different NVR types (hybrid, with built-in switch) – live configuration examples are ,
6. how to add IP cameras to the system in above NVRs,
7. examples of Video Management Software: IC RealTime VMS - Smart IC RSS - installation & setup, Hikvision VMS - iVMS 4200 - installation & setup,
8. how to view cameras remotely with a live example (i.e. Hik-Connect peer tom peer system),
9. tools and testers: network cable tester, PoE tester,
10. software tools available with live examples of setup & functions (i.e. Advanced IP Scanner, IC Real-Time Config Tool, Hikvision SDAP Tool),

I believe that the above list is pretty comprehensive but by no means not exhaustive. With time, I may add some more points. Also, the job type you will carry may add a twist here and there. One of the twists may be equipment make. Although Hikvision is the most popular brand your employer may be using Dahua or some top-shelf equipment. Remember to not overdo with searching for new equipment type because different makes of the equipment are very similar from the point of view of setup and configuration.

You may encounter some problems if you will have to use complex systems like Milestone. This will not work for you without a product-specific training (i.e. Milestone has a free online learning portal). That complex systems require many days of training devoted only to them, so I cannot cover it in my course.

I have created this website for people that want to enter the Security Industry (CCTV, Fire, Intruder & Access) and I'm constantly adding new content and courses.

I'm a security engineer in Ireland and have years of field experience. I have worked for many top security companies in Ireland and provided services for Banks, Blue Chip Companies, Large Retail Networks, and countless smaller entities.

From my experience I have chosen subject that you will need the most, without any watering down.

Sign Up for the CCTV Installation Course Today!

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