1) 3D Modeling and Prototyping Equipment

№	Name / type of equipment / technical characteristics	Pcs.	appearance
2	**Ultimaker 3 3D Printer FDM** Fused filament fabrication technology -FFF Printer head: Dual extrusion print head with automatic nozzle lift system and replaceable print core Construction size: XYZ: 215 x 215 x 200 mm (exclusively left or right nozzle) XYZ: 197 x 215 x 200 mm (dual extrusion) Filament diameter: 2.85 mm Layer resolution: 0.25 mm nozzle: 150 - 60 microns 0.4 mm nozzle: 200 - 20 microns 0.8 mm nozzle: 600 - 20 microns XYZ resolution 12.5, 12.5, 2.5 microns Print head movement speed 30 - 300 mm / s Print speed: up to 24 mm3 / s Printed circuit board: heated glass Printing plate temperature: 20 - 100 ° C Print plate level adjustment: Active plate level adjustment PCB warm-up time <4 min (20 to 60 ° C)	1	

	Supported materials: PLA, Tough PLA, ABS, Nylon, CPE, CPE +, PC, PP, TPU 95A, PVA, Breakaway (also supports third party materials) Nozzle diameter 0.25 mm, 0.4 mm, 0.8 mm Nozzle temperature 180 - 280 ° C Nozzle heating time <2 min PCB warm-up time <4 min (20 to 60 ° C) Noise generated: 50 dBA Connectivity: Wi-Fi, LAN, USB port Live camera monitoring (from a desktop computer or via the Ultimaker app) Dimensions 342 x 380 x 389 mm 342 x 505 x 588 mm (with Bowden tube and spool		

	holder)		
3	**Ultimaker S5 3D Printer FDM** Fused filament fabrication technology-FFF) Printer head: double extrusion print head with unique automatic nozzle lift system and replaceable print cores Construction size XYZ: 330 x 240 x 300 mm Filament diameter: 2.85 mm Layer resolution: 0.25 mm nozzle: 150 - 60 microns 0.4 mm nozzle: 200 - 20 microns 0.6 mm nozzle: 300 - 20 microns 0.8 mm nozzle: 600 - 20 microns XYZ resolution 6.9, 6.9, 2.5 microns Print speed <24 mm3 / s Printing plate: heated glass Printing plate temperature: 20 - 140 ° C Printing plate level adjustment: Active plate level adjustment PCB warm-up time <4 min (from 20 to 60 ° C) Supported materials: PLA, Tough PLA, ABS, Nylon, CPE, CPE +, PC, PP, TPU 95A, PVA, Breakaway Feeder type: double, wear-resistant (ready for composite materials) Nozzle diameter: 0.25 mm, 0.4 mm, 0.6 mm, 0.8 mm Nozzle temperature: 180 - 280 ° C Nozzle heating time <2 min Noise produced <50 dBA Maximum output power: 500 W Material recognition: automatic recognition with NFC scanner Connectivity: Wi-Fi, LAN, USB port Display: 4.7 inch (11.9 cm) color touch screen Monitoring: live camera (desktop or Ultimaker application)	1	

4	**Ultimaker 2 Go 3D Printer FDM** Volume: 120 x 120 x 115 mm Layer resolution: 200 microns - 20 microns Precise placement: Xs / I / Z 12.5 / 12.5 / 5 microns Felt diameter: 2.85 mm Nozzle diameter: 0.4 mm Print speed: 30 mm / s - 300 mm / s Printing surface: Glass plate with ribbon Work surface: 258 x 250 x 287.5 mm Weight: 6.2 kg Supplied software: Cura - Official Ultimaker Software Supported OS: Windows / Mac / Linux File types: STL / OBJ File transfer: Standalone AC input: 100 - 240 V / 1.4 A / 50 - 60 Hz / 120 V Average operating noise: 49 dBA Nozzle temperature: 180 - 260 ° C Operating ambient temperature: 15 - 32 ° C	1	
5	**Ultimaker 2 Extended 3D Printer FDM** Volume: 223 x 223 x 305 mm Nozzle diameter: 0.4 mm Supported filaments: PLA, ABS, CPE Felt diameter: 2.85 mm Layer resolution: Up to 20 microns Sound: Average operating noise: 49 dBA Print speed: 300 mm / s - 300 mm / s Accuracy: 12.5 / 12.5 / 5 microns Nozzle temperature: 180 - 260 ° C Operating temperature: 15 - 32 ° C Storage temperature: 0 - 32 ° C Desktop size: 357 x 342 x 488 mm Weight: 12.0 kg	1	

6	**3D Printer SLA - Form 2**	1	
	Dimensions: 35 × 33 × 52 cm		
	Operating temperature: automatic heating up to 35 ° C		
	Temperature control		
	Self-heating resin tank		
	Power requirements: 100-240 V, 1.5 A 50/60 Hz, 65 W laser		
	Specifications: EN 60825-1: 2007 certified, Class 1 Laser,		
	Product 405nm, violet laser 250mW laser Connectivity: Wifi, Ethernet and USB		
	Printer control and management: interactive Touch-screen with Push-button technology: Stereolithography (SLA)		
	Peel mechanism: Sliding Peel process with eraser		
	Resin filling system: automatic		
	Layer thickness: (Axis resolution): 25, 50, 100 microns		
	Laser dot size (FWHM): 140 microns		
	System requirements: Windows 7 (64-bit) or above Mac OS X 10.9 or above OpenGL 2.1, 4GB RAM		
7	**Formlabs Wash 3D object processing equipment** - Dimensions: 26.2 x 29.3 x 34.0cm	1	
	Maximum object size: 14.5 × 14.5 × 17.5 cm		
	Proposed working environment: 18-28 ° C		
	Mixing method: Magnetically coupled impeller		
	Power requirements: 90–240 V, 2.0 A 50/60 Hz, 50W		

8	**Formlabs Cure 3D object processing equipment** - Dimensions: 26.2 x 26.2 x 34.0 cm (10.3 x 10.3 x 13.4 in) Open height: 64 cm (25.2 in) Weight: 5.6 kg (12.4 lbs) Rotation diameter: 19.3 cm (7.6 in) Maximum piece height: 18.5 cm (7.28 in) Recommended operating temperature: 18-28 ° C Maximum chamber temperature: 80 ° C Light source: 13 multi-directional LED bulbs LED power: 39 W LED air power: 9.1 W LED wavelength: 405 nm Power requirements: 90–240 V, 6.0 A 50/60 Hz, 144 W	1	

9	**Laser/Cam Range Vision Spectrum 3D scanner** Zone: [1] [2] [3] Surface. scanning (mm): 520 * 390 * 390 280 * 210 * 210 133x100x100 3D resolution (mm): 0.26 0.17 0.072 Detailed specification 3.1 MPix camera, 1/2 ″ WXGA projector (1280x800) Light source: LED Scanning principle: Structured light Scan modes: Free scan, with markers, on the rotary stand Scan with color textures: Yes Formats: STL, OBJ, PLY Connection: HDMI, 2xUSB 2.0 Power: 220V, 65W Calibration time: 7 min Weight: 1.25 kg System: Windows 7/8/10 64bit operating system, Intel Core i3 / i5 1.8 GHz or better CPU RAM: At least 4 GB	1	

10	**Laser Artec Eva 3D scanner**	1	
	3D resolution: up to 0.5 mm		
	3D point determination accuracy: up to 0.1 mm		
	3D distance accuracy, up to 0.03% over 100 cm		
	Colors: 24 bpp,		
	Texture resolution: 1.3 mp		
	Structural lighting scanning technology Structured light bulb light source (without laser)		
	Working distance: 0.4 - 1 m		
	Linear display field: HxW @ minimum area 214 × 148 mm		
	Linear field of view: HxW @ farthest range 536 × 371 mm		
	Angular field of view: HhW 30 × 21 ° Video frame rate (ratio, ratio): up to 16 fps, exposure time: 0.0002 sec.		
	Data collection speed: up to 2 million point / sec.		
	Multi core processing: Yes		
	Network 3D formats: OBJ, PLY, WRL, STL, AOP, ASCII, Disney PTEX, E57, XYZRGB Measurement formats: CSV, DXF, XML 3D point cloud formats: BTX, PTX		
	Weight: 0.9 kg (2 lbs),		
	Dimensions: HxDxW 262 × 158 × 63 mm Electr. power: 12V, 48W		
	Interface: 1 × USB 2.0, USB 3.0 compatible Processing capacity: 40 million triangles / 1GB RAM		

	Required: Intel I5 or I7 processor, 12 GB memory, NVIDIA, AMD, or Intel video cards, Windows 7, 8, 10 - x64, free disk space: 300 MB for installation Not supported: Windows XP, Windows Vista, 32 -bit OS, AMD FirePro M6100 Fire GL V		

	Not recommended: Xeon or AMD processors, NVIDIA SLI or AMD CrossFire configurations		

2) Electrical Quantities Measurement Equipment

№	Name / type of equipment / technical characteristics	Pcs.	Appearance
1	**Rigol DSA832 Spectrum Analyzer** Frequency range: 9 kHz - 3.2 GHz Phase noise: <-99 dBc / Hz (at 100 kHz from carrier) DANL (preamp off): <-129 dBm, <-133 dBm (typ.) (For f from 10 MHz to 3.2 GHz) Trekking generator operating range: 100 kHz - 3.2 GHz trekking generator level: -35 dBm to 0 dBm	1	
1.1	**PA-DSA832 Preamplifier** Spectrum analyzer preamplifier Band: 100 kHz - 3.2 GHz Nominal gain:> 16 dB	1	
1.2	**NFP-3 Near field probe** Set of 4 probes for EMI measurements for spectrum analyzer Work range: 30 MHz - 3 GHz Includes measuring probes on cables, PCBs and field measuring at a distance of 10cm and 3cm	1	
1.3	**S1210 EMI Pre-compliance Software** Software for EMI measurements on a spectrum analyzer The license unlocks the option for EMI measurements on the spectrum analyzer	1	

| 2 | **Transmille 3050A Multifunction Calibrator**
DC voltage: 0 - ± 1000V
DCV accuracy (at 1 year, in at least one range): ± 50 ppm
DC current: 0 - ± 22A
DCA accuracy (at 1 year, in at least one range): ± 100ppm
AC current: 20uA - 22A, 10Hz to 10kHz
ACA accuracy (for 1 year, in at least one range): 0.07%
resistance: 0 Ohms - 100 M Ohms
OHM precision (for 1 year, in at least one range):
60ppm capacitance: 10nF - 1uF
C accuracy (for 1 year, in at least one band): 0.25%
frequency: 1Hz - 10MHz
frequency precision (for 1 year, in at least one range): 20ppm
thermocouple: J / K / T / R / S / B / U / N / E / L / U / C /
10uV ° C T precision (for 1 year, in at least one range): ± 0.09 ° C | 1 | |

3	**Rohde & Schwarz SMC100A Signal Generator** Frequency range: 9 kHz - 3.2 GHz Frequency adjustment resolution: 0.001 Hz Frequency stability: <0.1 ppm Output level: –120 dBm to +13 dBm Feedback power: 50 W (for the band 1 MHz - 1 GHz) Modulations: AM, FM, PhiM, Pulse	1	

4	**Rohde & Schwarz RTB2004 Digital Oscilloscope, 2.5GSa / s** Bandwidth: 300 MHz Number of channels: 4 Number of digital channels: 16 Integrated generator function 50 MHz, 1 channel Serial protocol decoding I2C, SPI, CAN / LIN, RS232 Segmented memory Resolution: 10 bits Memory: 10 M dots Screen: 10 "touch	1	
5	**Tektronix AFG31021 Function and Arbitrary Signal Generator** Number of channels: 1 channel Sine wave signal: 25 MHz Memory: 16 M dots Screen: 9 "touch Possibility of making arbitrary signals directly on the instrument InstaView technology - the ability to view the actual signal on the device under test	1	
6	**Keithley DMM6500 Multimeter** Accuracy: 6.5 digits Sensitivity: 100 nV, 10 pA, 1 uOhm, 0.1 pF Digitizer: 1 M dots, 16 bits Screen: 5 "touch Displaying histograms and graphics on the screen Possibility of expansion with a multiplexer card with 10 channels	1	
7	**Fluke 116 DMM Multimeter** Handheld multimeter True RMS Display: 6000 digits Bar graph: 33 segments Maximum voltage: 600V Built-in thermometer: -40 ° C - 400 ° C Basic accuracy 0.5%	1	
8	**Fluke 289 Multimeter** Handheld multimeter T True RMS Display: 50,000 digits magnification options 14x	1	

	Maximum voltage: 1000V		

	Memory for 15,000 recorded events Basic accuracy: 0.025%		
9	**Tektronix PWS2326 Power source** Number of channels: 1 Voltage: 0-32V Current: 0-6A	1	
10	**Keithley 2230-30-1 Power Source** Number of channels: 3 30 V, 5 A Remote sensing - allows the correct voltage to be applied to the device under test	1	
11	**Air conditioning chamber (-40 ° C ~ + 180 ° C, 100l) - Weisstechnik LabEvent L C / 100/40/5** Temperature tests and climate tests Temperature range: -40 ° C - + 180 ° C Change temperature speed: 4.5 K / min (cooling), 3 K / min (heating) Temperature homogeneity over time (+ -0.3 K to + -1 K) Relative humidity range: +10 - +95% RH Bottom surface material: 1.4301 stainless steel Internal dimensions of the chamber (in mm, minimum): 495x485x400 External dimensions of the chamber (in mm, maximum): 1200x810x1150	1	

II Lasers and UV Printers Lab

	Name / type of equipment / technical characteristics	Pcs.	Appearance
1	**JQ 1390 Laser engraver** Work surface: (mm) 1300 x 900 Laser power: 100W, Laser type: CO2 Engraving speed: 0 - 60.000mm / min Drive: step motors, Minimum font size: 1mm x 1mm Interface: USB, Supported formats: BMP, PLT, DWG, CDR, AI Supported software: ArtCut, CorelDraw, PhotoShop, AutoCAD Power supply: AC220V / 50Hz, AC 110V / 60Hz Weight: 450kg Operating environment: Temperature 10-35 C, Humidity 5-95% Additional options: Z table axis operation, active chiller, red dot, rotary attachment	1	
2	**Spirit GL 100 Laser engraver** Work surface: 25 x 18 in. (640 x 460 mm), expandable to: 29 x 18 in. (740 x 460 mm) Max. workpiece size (W x L x H) All doors closed: 30 x 19 x 6.5 in. (762 x 482.6 x 165 mm) All doors open: 30 x ∞ x 6.5 in. (762 x ∞ x 165 mm) Table size: 31.1 x 20.9 in. (790 x 530 mm) Dimensions: (W x L x H) 44.3 x 28.3 x 39.6 in. (1125 x 720 x 1005 mm) Laser power: 12 to 100W 10.6-μm sealed CO2 Laser / 20W & 60W 9.3-μm sealed CO2	1	

	Laser Cooling: Air cooling, operating ambient temperature15 ° -30 ° C (60 ° -86 ° F) Drivers Closed-loop DC Servo Control Max. Engine speed: 60 IPS Flow * 245.5 in² / hr (1584 cm² / hr) Flow with SmartACT ™ 283.4 in² / hr (1828.8 cm² / hr) Speed control: Adjustable from 0.1 ~ 100% (it is possible to define parameters up to 16 colors) Power control: Adjustable from 0.1 ~ 100% (it is possible to define parameters up to 16 colors) Accuracy: 0.254 mm or 0.1%, Z-axis Auto Focus Lenses: Standard 2.0 ", optional 1.5", 2.5 ", & 4.0" Resolution (DPI): 125, 250, 300, 380, 500, 600, 760, 1000, 1500 Interface Full speed 2.0 USB Port Memory: 32MB standard Compatible with: MS Windows Display: 4 - line LCD panel showing the current file name, total operating time, laser power, engraving speed, file (s) in the memory buffer, setting and diagnostic menu. Safety: Class I laser product - EN60825 Class II: laser product - CDRH 2006/42 / EC Recommendations for Compliance Machines Voltage: Below 80W 100-240V AC Auto Switch Above 80W 200-240V AC Auto Switch Voltage: 700W - 3300W Exhaust system: External exhaust system, one 4 "connection on the back of the machine		

3	**PolyJET Stratasys Objet30 Prime 3D printer**	1	
	Rigid opaque modeling materials: VeroWhitePlus ™, VeroBlackPlus ™, VeroGray lue, VeroBlue ™		
	Banners: VeroClear ™		
	Simulated Polypropylene: Rigur ™ and Durus ™		
	High temperature support material: SUP705 gelatinous photopolymer support		
	Maximum construction size (XYZ): 294 x 192 x 148.6 mm		
	Dimensions :: 82.6 x 60 x 62 cm Weight: 106 kg		
	Resolution: X-axis: 600 dpi; Y-axis: 600 dpi; Z-axis: 900 dpi		
	Accuracy: 0.1 mm (0.0039 in.) Varies depending on the geometry of the parts, size, orientation, material and post-process method		
	Minimum layer thickness: 28 microns (0.0011 in.); 16 microns for VeroClear material (.0006 in.)		
	Highest quality modes: 16-micron (.0006 in.)		
	Resolution Top speed: 28-micron (.001 in.)		
	Resolution Object Studio software ™: intuitive 3D printing software Workstation compatible with Windows XP / Windows 7 / Windows 8 operating systems		
	Network connection: Ethernet TCP / IP 10/100 base T		
	Operating conditions: temperature 18-25 ° C;		
	relative humidity 30-70%		
	Power requirements: one phase 100-120V; 50-60Hz; 7A or 200-240V; 50-60Hz 3.5A		
	Regulatory compliance: CE, FCC / RoHS		

| 4 | **Benchtop -Roland UV Printer**
VersaUV LEF-12i

Printing method: Piezo ink-jet method
Maximum media width: 12.2 inches (310mm)

Maximum media length: 13.2 inches (335mm)

Maximum media thickness: 3.94 inches (100mm)

Maximum media weight: 11 lbs (5Kg)
Maximum print width: 12 inches (305mm)

Maximum print length: 11 inches (280mm)

Cartridge ink: Type ECO-UV 220ml
Cartridge Colors: 6 colors, CMYK, White, Gloss

Ink cleaning unit with built-in UV LED light

Print resolution: (dpi) max. 1440 dpi | 1 | |

	Distance accuracy (when printing) * 1 Error less than ± 0.3%, distance ± 0.3mm, whichever is greater Connectivity: Ethernet (10Base-T / 100Base-TX, automatic switch) Power requirements :: AC 100 to 240V ± 10%, 1.8A (50 / 60Hz)		
	Power consumption: approx. 149W during operation, approx. 13W during standby mode		
	Noise: during operation 60 dB (A) or less, during standby mode: 49 dB (A) or less		
	Dimensions: length 39.3 inches (998 mm), depth: 34.2 inches (867 mm), height 21.5 inches (546mm), weight: 187.4 lb (85kg)		
	Operating temperature: 20 to 32 ° C, operating humidity 20 to 80% RH (no condensation);		
	Temperature out of operation: 5 to 40 ° C humidity: 20 to 80% RH (no condensation)		
	System requirements: Operating system Windows® 10 (32/64-bit), Windows® 8.1 (32/64-bit), Windows® 7 Professional / Ultimate (32/64-bit)) CPU Intel® Core ™ 2 Duo, 2.0 GHz or faster recommended, RAM 2 GB or more recommended, Video card and monitor A resolution of 1,280 x 1,024 or more recommended		
	Free hard disk space: 40 GB or more recommended		
	Hard-disk file system: NTFS format Optical drive DVD-ROM drive		
	Other requirements: Ethernet or USB port		

5	**Graphtec CE6000-120 Cutter Vinyl** Maximum cutting width: 1213mm / 50m Maximum speed: 1000mm / s Maximum acceleration: 13.9m / s2 Maximum force: 4.9N Reading registration marks Perforated cut to create a separation line on the labels Minimum character size: approx. 5 mm alphanumeric Programmable resolution: GP-GL: 0.1 / 0.05 / 0.025 / 0.01 mm, HP-GL 0,0: 0.025 mm Media type: Self-adhesive marking film (vinyl, fluorescent, reflective) without high intensity reflective film, thickness up to 0.25 mm, Polyester film up to 0.25 mm thick (unlimited accuracy) Interface: RS-232C, USB2.0 Buffer memory: 2 MB Compatible OS (* 2) Windows 10 / 8.1 / 8/7		

	Mac OSKS 10.6 to macOS 10.12 (Graphtec Studio: 10.6 - 10.12, Cutting Master 4: 10.7 - 10.12) Included software: Cutting Master 4, Graphtec Pro Studio (for Windows), Graphtec Studio (for Mac), Windows driver, Cutting Plotter Controller		

III CNC Machines and Power Tools for Finishing

№	*Name / type of equipment / technical characteristics*	*Pcs.*	*Appearance*

| 1 | **Revera Design 996MT CNC 5 Axis**
-Standard workspace: X-860mm x Y-940mm x Z-510mm
- Footprint: L-1325mm x W-1720mm x H-2540mm - Control: Mach3
- Fast Step motors, toothed heads on all axes (two on the X axis)
- Solid precision bearings and reinforced steel rails on each axis.
- Reliable power transmission on each axis
- Cutting speed up to 600 "/ min (depending on the choice of cutting tool and material)
- Transition speed of 1,800 "/ min
- Step resolution of .0004 ".
- Switch-off switch in the control box with integrated and wired remote stop buttons | 1 | |
| 2 | **Roland MDX-40A CNC 4 Axis DT**
Supported materials: rubber resin like chemical wood, modeling wax, wood (metal not supported)
X, Y, and Z sweep: 305 (X) x 305 (Y) x 105 (Z) mm
Distance from the top of the spindle to the top of the table: max. 123 mm (4.84 in.)
Board size: 305 (W) x 305 (D) mm
Load weight: 4 kg (8.8 lb)
XYZ-axis motor: Stepping motor
Power rate: XY-axis: 0.1 to 50 mm / sec.
Z-axis: 0.1 to 30 mm / sec.
Software resolution NC-code: 0.001mm / step (move)
RML-1: 0.01 mm / Step (move)
Mechanical resolution: 0.002 mm / step (Micro-step)
Spindle motor Brushless DC motor, maximum 100 W | 1 | |

Spindle rotation: 4500 to 15000 rpm, tool head collet		

Power supply: voltage and frequency AC100 to 240 +/- 10%, 50/60 Hz Required capacity: 2.1 A Power consumption: approx. 210 W Noise: 56 dB (A) or less, in standby mode: 42 dB (A) or less Dimensions: 669 (W) x 760 (D) x 554 (H) mm Weight: 65 kg (143.3 lb) Operating Temperature: 5 to 40 ° C (41 to 104 ° F) Operating humidity: 35 to 80% (no condensation) Featured items: Power cord, power adapter, USB cable, collet, Z0 sensor, hex key, hex screws, spanners, Roland Software Package CD. System requirements: Windows 7, Vista (32-bit or 64-bit) or XP		

3	**Hand-held Power Tools for Finishing**	1	
	Metabo DKG 80/16 Pneumatic Stapler -		
	- SATA Jet 3000 Paint Spray Gun	1	

Bosch PBD40 Electric Bench Drill	1	
Dremel 8220 Fine Grinding and Polishing Hand-held Machine	2	
Dremel 930 Plastic Welding Heat Gun	1	

	Dremel MotoSaw MS20 Electric Table Model Saw	1	
	Bosch GSR 12V-15 Cordless Drill/Driver	1	
	Dremel DSM2 Electric Handheld Drill	1	
	Womax W-BS 240 Combined Electric Grinder	1	

| 4 | **Metabo Basic 250-50 Air Compressor**

 Oil-free, low service needs
 For single-phase alternating current
 The operating pressure can be regulated via a regulator with a manometer
 Overload protection: protects the motor from overheating
 Rubber wheels for more convenient transport
 Additional manometer for tank pressure display
 Technical data:
 Suction capacity 220 l / min
 Filling capacity 120l / min
 Effectively (90% max. Pressure) 100 l / min Motor power 1.5 kW
 Max. speed 2850 / min
 50l tank
 Dimensions 780x400x625 | 1 | |
| 5 | **HBS 450N Band Saw**
 Power: 2,2kw
 Cutting height: 280mm
 Weight: 180kg | 1 | |

6	**TS250C Circular Table Saw** Power: 2.2 kW, 4000 rpm Cutting height: 45 / 60mm 65 / 80mm Weight: 110kg	1	