**Title: Wireless IoT Sensing System for Structural Health Monitoring**

**Brief:**

This lecture covers the topics of wireless IoT sensing system and its applications in structural health monitoring (SHM). With the advancement of 4G/5G communication, edge/cloud computing infrastructure, and green artificial intelligence, great opportunities show up to upgrade traditional wireless smart sensors to wireless IoT sensing systems for next-generation wireless structural health monitoring systems. Though sharing several similar features, IoT sensing systems have their unique functionalities, such as IoT protocol-based communication and cloud-based data storage. In this lecture, we will discuss the fundamental knowledge, existing challenges, and emerging technologies for wireless IoT sensing systems, in the aspects of IoT protocols, edge/cloud computing, autonomous/remote operation. In particular, we will discuss the recent advances in wireless IoT sensing, including adaptive triggered sensing, self-diagnosis/recovery, and edge intelligence enabling AIoT network, as well as their applications in structural anomaly detections. Furthermore, full-scale applications will also be presented and discussed. In addition, to prepare for hands-on group projects, we will dedicate some time for prototype development of wireless sensors, which consists of microcontroller, MEMS accelerometers, radio transmitters, etc. Both knowledge of hardware and software will be introduced, assembly and programming procedure will be illustrated, and hands-on guidance and tips will be shared.

**Budget for Arduino Node Components:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Item NO.** | **Item** | **Component** | **Description** | **Vendor** | **Unit** **Price** **(RMB)** | **Quantity** | **Total Price (RMB)** | **Link** |
| ~~1~~ | ~~Main Control (non-consumable)~~ | ~~Arduino Uno R4 Devkit~~ | ~~main control board + sensors  (trigger sensor included) + accessories~~ | ~~Keyes~~ | ~~730~~ | ~~1~~ | ~~730~~ | [~~Link~~](https://item.taobao.com/item.htm?app=chrome&bxsign=scdBdL4-k1hrJADVg6dG2p10ioVhuXtw9XqGAW9jpvPCTIwpiUzUGSut082ntFvs0CyRhCePP4BHi_F9P3_UK4x07L7DsKVkZPaL9hTYGnaKAySrCXOf5OGPrQfkp4lgMyN&cpp=1&id=800925975219&price=275&shareUniqueId=30525938447&share_crt_v=1&shareurl=true&short_name=h.TIsOodvDqRMIwFc&skuId=5625115542252&sourceType=item&sp_tk=THNqZWVpeldidWw%3D&spm=a2159r.13376460.0.0&suid=D9BAD155-F807-4829-A85F-DB2424DA196E&tbSocialPopKey=shareItem&tk=LsjeeizWbul&un=da9398d2eb10733dd327b29a79c3809c&un_site=0&ut_sk=1.YQ%2BEdxFco9wDAEpcPBtvBZKC_21380790_1739955800795.Copy.1&wxsign=tbwb3RXzC6WBqJHA-32SinGTM42xYf8Xrto66pioW1P546a5RQsWaRnjEsX_HL2He3PyPu-pYdjqjOC8YjFO7PoA7gbAzaId4XY6YvIyKbNXqaLQqUKfOBmOXGvhUqvKjyE) |
| 2 | Main Control (non-consumable) | Arduino Uno R4 Wifi | Backup | Keyes | ~~134~~  235.2 | ~~1~~  2 | ~~268~~  470.4 | [Link](https://detail.tmall.com/item.htm?abbucket=6&id=738941670744&pisk=g7qjqWtAbvcrLDAunsBrOXpRDVn_15sEDdMTKRK2BmnA1hw4Onut_-o1C7cz0jyqDfi_KWNqgV84V0HKdIHtBxdJwAhz_hy4fzx_KRqVncWmm-miX65FYcw0ncf85cH4c3H-p8K9MxQr212xuQfFYMy5kxmae6r2Ry1idv-tXq3te4hoQFdY6qhJ2bDiBIntMTw-ZbHvXnLxe4HKHxdY6nhJexkKHFKxXQH-KbhtXcFTeb_pFAQji-6bpuBIghs0nbt9XuMRiXefChk7qxGiO-EXXhBihqGLHb1nFCDsRS3_j9t7NlGs7X0Dp6m8KzPxFDs62mgQkSM8E1tIMyy3smrRBEhLuSo-0uCpffz3gugumtIbemG4nmuR2h30pj3g84OykW3Q8y37jMx0h2coVYqNZnh_yPEqocAAGceSBgJpYXNGwF9S-hMSTT6WSFX-nBcboT_W3qHohwW5FIUikYDSYT6WSwgxEx6FFTOA5&rn=09b2554a86723433ab02f6a727718a70&spm=a1z10.5-b.w4011-25295428345.28.53af5d8c2bipmy&skuId=5100439501404) |
| 3 | Extension Board (non-consumable) | Sensor Shield | extension board | Keyes | 9.8 | 2 | 19.6 | [Link](https://detail.tmall.com/item.htm?abbucket=6&id=663358716903&pisk=gSEiq3GF3UvffHPJ6Wo1PT7ND-QKCdijOSKxMmhV8XlIXPLOCjz3FWXsDSeqiSVKOlBsMOO0i-2i7Akq7D-ECYJw0fy2nxPKbqatMfhmm-Nlp_IR2Rwscq5RwgnjxJCqVFl20IHeLxmmQlqGbiyscm5Dpn7RqRNPWXPo3xkFKxHv0APq_XlEOxD2QSlZ8Bkjhml4gSuETxMj3Fl2bB8EOYL2bfkwLBkxedlq_SyFKxGEgbZ2bbr4Ak5htVmzcY4uxA0iaJbB0nfnQQhuQ1tD0k4nSb--tn-4xA2dpUhkYilzPWzU7zvwvqnIt8MgGgtsbq4asvocmHog1Rrq-oCpsvaasku0vt_sdPy3m4ZfhFhTRS0uj2vfTviar5lLgKx8GcDSkrmcApGaPyFaYm9JRcU8eogzbGAS94M0ZYVMsgzy8U-J3nMFHk8XlVkIKb3i-vA2pFmSd9XHPmgZdACRK9YXhVkIK7WhKUNj7vMt7&rn=3f9c2948bd3255c25dbbba65f1bf9b72&spm=a1z10.5-b.w4011-25295428345.45.7ca8289cLqsyZo) |
| 4 | Accelerometer  (non-consumable) | MPU6050 | accelerometer | Keyes | ~~17~~  18.62 | 2 | ~~34~~  37.24 | [Link](https://detail.tmall.com/item.htm?abbucket=2&id=668984438017&ns=1&pisk=gYcEF64oStC1lWgqfjVPgsxrl0VLL7-XTbZ7r40uRkq3A44uacmWJkgkv0lzj4HBJ8tdzwhZ0_1Bvp3la7NkcnOXG23Qw7xb7YvSKMU0ogA7xkqg9zwpfFs6G23L2wSklAAf4LtI3gXuq0VgIzzYZyVu-VYazzsuZk2ljO40j7qoqzbgjz4Px9quqFWguybhququjN48zMVuZ00M7zEg-biir25alJYlsWrsUO8Ypo03b_fVWzwHxVX5w_ea-Jlo8lus5fzULoy9uN_oaquoO5kVqp046jwSsVOP6WgqI54EqIx3sqDZlJle06Z-5Dh4tj-FOPwrvjyithCz5Y0sN72Gz_uscDe4o0JfpVV_k-DbpM54NXuiOPnPo9gLEAGLHXtGTSDxRWMojC5Emglf2PjRYbHFqTy3WPrX7FuAH_audye0YTB8ICUaceaCeTe3BPrX7NBReRxT7oTBi&priceTId=213e367917381891117768651eb7a9&skuId=4988894103512&spm=a21n57.1.item.3.22d0340dlB9gUA&utparam=%7B%22aplus_abtest%22%3A%220c383a5842c5f2f93401778954fef342%22%7D&xxc=taobaoSearch) |
| 5 | RF Module (non-consumable) | nrf24l01 | wireless communication | Keyes | ~~10.7~~  10.78 | 2 | ~~21.4~~  21.56 | [Link](https://detail.tmall.com/item.htm?abbucket=6&id=745189429142&pisk=gCQxbx9jIDAXfaL3orZksBOSv2PuKNC2wt5ISdvmfTBRh9hcmKf61NBGFFx_3EbOeO6tSibDoha6etgMmNCZWC11QSJggufVgF8_KJYT-s5q15em-ZnjP01yOjO_qnwumOp3KJ43WoGWW-ehnDLCn0OpOFOXfdT7wCdXGFtXc3NJ1CDXCK61N7py_Ig6CFiWNBAjcFgXC4TWgI361mtXN39y1F91CFG4c-p-Gd0OvjLnPfZPpVg1yIK7xs95COFMGndAMLeQdaUeDp1XeVwEYk-9hB_QEmRpDOK5r1cnS3ffYORChxwv5_ddpBBYjfJAV6bDagytXpI1iMS14R3phMfFYhQ0K0fWlKKeLglTwFBPAHQy7filghOd3E_bExL9yB-GXt2r5KjdNTKhrY0HP6sJygWf-wd9CvvpsmN8wcowcQrvI9WjkqpMKQp3MEnZb3PywpV82cowc_dJKSpxbc-yW&rn=c31858320f9edd93063daaeb5c4b4258&spm=a1z10.5-b.w4011-25295428345.41.17026fa0qlqs4G) |
| ~~6~~ | ~~RTC Component (non-consumable)~~  ~~(consumable)~~ | ~~RTC DS1307~~ | ~~real time clock~~ | ~~Keyes~~ | ~~10.7~~ | ~~2~~ | ~~21.4~~ | [~~Link~~](https://detail.tmall.com/item.htm?abbucket=6&id=688544887403&pisk=gossbNmT0LAFM0hhI5eeNQKH8TKflsZzGx9AEtnZHhKTGm6NNc8vgO-bh6AFbCWwXItfE_1w_EuNRx6lOsT0IIRvGsWA7Jrz4OXMmndbauryNFUios996CnLHKpSBJ8tsP8XNnFzaogEpFVwD1kW2aiKJLApBKdvWJOpUKtvBddYdBpXEInOMneQddJXHfd9MvhphB3xMmp9pppMBfnvDCeCpBvXDIh-Yv9Y5CX_CTpW-My4nOOIDmIBp5ARC-nDpMp_SQW6O7F5AuY6wOdID70urEO9egFESLT1GeIF3Yo28OQliLCt65tAdL1WF1aqnC_dUGJh-SgXNZBNrZQ3G0OOzTbklGPr89K91UAl-xwBc6bJPMxmH2WMkL1MXGFE1ntBEE7f_Wmv_a6dOUSET0-dewtC4ynyNsVKlvTocpOzdJgmoJpiZC_gdyMwWpv_zJwI6ZY9KptzdJg0PFpHC8yQdfUf.&rn=ddd3249257869efe86d298c9bbc7f60b&spm=a1z10.5-b.w4011-25295428345.69.29506fa0jwVgqt) |
| ~~7~~ | ~~Power Supply (consumable)~~ | ~~Lithium Battery & Box~~ | ~~power supply~~ | ~~Keyes~~ | ~~2.8~~ | ~~2~~ | ~~5.6~~ | [~~Link~~](https://detail.tmall.com/item.htm?abbucket=6&id=679381234914&pisk=gJ-EjbXkIrE_hRKEZOjz0o0hy7jdmMcXq315ELvld6fHOvnu4Lf_VwgpNY8wZCQCtX3dEuRD6TwBE36k4MK6Ru1I9gJkGgljGmiXppQRqjGj_Nw5GiX0t7V5tObGVToLU4HyppIRZRNolFvLa2kl0yXlZASGUtXhq6XhjAW53yjltaVMITfGZgAu-GbGnTEuZkboQPXcLkVl-afGI96zqgjkZdDNebGpEprNhwDujC07gA3C-svh_uq4B973NpU7VuOcKw-kL1J6ChWF8sbtHCOX4KJkAG84Z2vVXn_WjdizXM92SGXeZmchjKYwhw-Egk1JCBKVxnlUAO_y9n7MxfEPCUv6VgbgUuJ6GBQVnQubJdj1HZYfJWrVVHJMAOdzny9drFtdkHGgYiYvdMTkscreigz0wOV8T3LUZz7hBO5jQAJYku6uJumx5zURScBNGv6QyzQhWO5jQRU8yNcOQsMIm&rn=ddd3249257869efe86d298c9bbc7f60b&spm=a1z10.5-b.w4011-25295428345.53.29506fa0jwVgqt) |
| 8 | Power Supply (consumable) | Battery | battery | 新星兄弟 | ~~46~~  48 | ~~2~~  1 | ~~92~~  48 | [Link](https://item.taobao.com/item.htm?id=809531552141&ns=1&pisk=gq8tep6_nuf6cqM-QFohi8WHLXhhHDAZIdR7otXgcpppG94m_NmVkKBp3OjG5O4AkIp2nKdq_s6XhKBDjD0k_C7VlYXxr4AwhLPaNdB1cwGfasFstGw91NP1lYDokkVCbAbXIvLRw2ZCa911Gi1s9w1AiP_fflgI9s10Coa6hXdCLsXb5s6bd61f6P_blZgQRs1Yflsff6_CLs_fhK_j9MG4ZxBQ1t4v2VjWZ4HFqraXJ1IIqBXBDnGc1GQJ69HSFe3PXTO1prHu2aSPC_TSKl5RXKIB-IVuoMA64K5WCRMOlBCJe_ptmSW9AQYGTHkYDTKXs3-XYxURC3Ay4iLiEkAC5OIPUHPx9ZpeVgLFuSZH_i1JQNTsKRQAJ_SDDdDUlOxJOpIk-J4lRQtdJg5WrUCAh8XRilGK9orVf6oOnLJs5WcAo6Bo6qE40MlF9TcK9orVYX5dEf330oSel&priceTId=2150437317385084349456379eae0c&skuId=5665172406995&spm=a21n57.1.hoverItem.1&utparam=%7B%22aplus_abtest%22%3A%22234b61a016079ef984d5a92ae51d05d9%22%7D&xxc=ad_ztc) |
| 9 | SD Card Module (non-consumable) | SD card module | SD card module | xyuanli | 3.02 | 2 | 6.04 | [Link](https://item.taobao.com/item.htm?abbucket=20&id=626877175399&ns=1&pisk=ggzjUVYA7XDzuTWgq-frdwQZHvg_V_SP8tR_tWHwuh3YFAH79sDVji2_VReo0xHViViTB-esjsDZBAwa6o5P8wP0iV0tC97F8VLTA92sMVKAy1hsOhCrDKNxoI3OL9764Qnc3VeVVBffy3hnejhtHFCSyfcxMVntM7CS6fJvXEeON7Ho_hpxXFdJ2flXHVhtX3d-9XcvHjHAyaHo6VHTBVCSybhBOfsjnS1jWi1oqFQnZYT9WzGRn5PfMdnuSjijpSUbE8aW-mMLMYT1LHgnxxhLJT-mOmws2zPwTFozMk2i9-pAhVFSOJGQhGRihuFUubqlChMQXSr3XuX6RxEUtkm_u9-zwqHjxvqk1_g_EknQrVA94SmtO-0YkTJj54GnblwVEFH4A7eSYzJy84FLV4sPoekQITK6NDYsNv55NhxGwjvnhi7nugoxZjiPN_9YjmhoNv55NKEiDbcj4_1WHlf..&priceTId=2150458d17383992205357185ed82d&spm=a21n57.1.item.52.4c6a523cmMPnaA&utparam=%7B%22aplus_abtest%22%3A%2261e7793b1e98104a9bc1e7bb138fb3ae%22%7D&xxc=taobaoSearch) |
| 10 | SD Card (non-consumable) | SD Card | SD Card 16 GB | Sandisk | 28.9 | 2 | 57.8 | [Link](https://detail.tmall.com/item.htm?abbucket=20&id=43920214586&ns=1&pisk=gR8te46_nufshGM-QFohiQoginG3dDbw_G9_orbcID9ddISboc7GDZpCKFXMsN6bkKADSKYvgrCXGKlNnfoH_C7VlYDlk4Aw_IA80pTO12aBT_BbfDjsIC_0_YDorqn_OZHtEdVK8APCw__f1i6XOXCcNs6XhiaBO95VGR1b5Xhdg91bcPsbOW1RM5w6ht6IRsCfG16f1WZCLs_fhK_j9wG-4xBQ1t4v22HbQZDZ80nJJ1IOHPY0kd9urZBWg9ajFffNXlA1praXRH0AjQXxR8B2RKQ5lgFoBC7pSLCkI2a9eCtWh39IJPIefBLA4Euzw9T9MeIwxRiGdHdB7gxnByXwkOsJ5MmUpBOJ2IfRA7r99gWFJ39mGuB2t3IXqGytKtxktFspFv4p3iK6B6_54LYkysBbETC0fXhL0oS1TcBDUdg_tjQc9TctkorVYX5dEXhL0oSET6Bo6qE40MlF.&priceTId=213e36c517383994625017887edf9f&spm=a21n57.1.hoverItem.2&utparam=%7B%22aplus_abtest%22%3A%22f7ada5f1cf296bf680a317b2d42244ea%22%7D&xxc=taobaoSearch&sku_properties=5919063%3A6536025) |
| ~~11~~ | ~~Case (consumable)~~ | ~~Case~~ | ~~case~~ | ~~Keyes~~ | ~~9~~ | ~~2~~ | ~~18~~ | [~~Link~~](https://detail.tmall.com/item.htm?abbucket=6&id=677700896064&pisk=gxpq25jMqWe5rgpqSgXaLJ401IWApt0Cod_1jhxGcZbDlmHgQhb7CsGv5cRySUCfoqhAjR8HyGZXmsVuZMj3mibgI7AykHfX7hnAjNYM7NOjNvtvDOBiRNkIdndlT5wJuibGrcjdA-m5inWhTS6iR2MaNufxlOYbYH47E7jdrijGSOmPZMsdIiXGm07lbMQgnFXi40SdY5bgIRVuZG7usr20n3xlDiPGSGbi43bRjObiiDxM08SCic2lOmOK4NCV-nbzLHpPmEPv0al-NLRPgw2CzR2MUi-SVW_UEAbH9UAkiBr0F16RzHI2WveAn1RDugXZQ8X2knvGadg7ugdDuLfwFchA2IxyQ6ptXS_XwF5e3_rtrgBDTEbWSlyBWtSd1CWZeuQD9QTDEOEQwtOBAdCHnxzdP6Iw8M84ugJgWg4Tudd4S55c2g7I40-L9RsgMRDKN5FOZYIPRmsb65Ccwg7I4uFT6_0R4wijK&rn=8598e45301dce632f071ed1d115127e3&skuId=5038262714172&spm=a1z10.5-b.w4011-25295428345.38.1f71e6dfa8NUoV) |
| 12 | Case (consumable) | 3D-print Case | case | 专业FDM打印⼯坊 | 0.2/g | ~~50g~~  260g | ~~20~~  52 | [Link](https://item.taobao.com/item.htm?id=709536903439&ns=1&pisk=g2sZE5vcK4nQLv6POgxq4vbGIiK9knP7biOXntXDCCAM1tvD06fbBC606sS2ttQ_BENt3AIFami_6PBm0nt0N7Z7VOB6DnV7c9hM0ApXUA0mGdY3xn94bWaIOOB9DIDIiz_hBjzihqDMnI2exKJjmnYMov0H9KumosAM-XvyenxDmsYhKdpoIdxmmpAH9LdmIdAi-kvvHmmiSsX3LKdHinYiNBWcQDJWS-m2qX5mkcY6ZOAEm0kpQF2CCqiq0GvM7iXMTp9CYd8waeerdxjVUtj6Yal0ST-dVEshdoopfT7Hxd50q5xhEwWW7GPrfIBC6g-G45o6dE5O4ejg9mJCo9sXmeDq09156UJlgzgOKH9JraTt_0-fb9j6psko5OLcRGLRfWmwqaB6fZf3Yc5l4SGvKjhNDNlmuFvpLQwULT3-cKY6BUAZkqL3vpR7CdgxkFYpLQwEpq3v-WpeNRZl.&priceTId=213e36ee17382732713984700ea72a&spm=a21n57.1.hoverItem.6&utparam=%7B%22aplus_abtest%22%3A%22836eead6add649271915eb3cd0c8eb89%22%7D&xxc=ad_ztc) |
| ~~13~~ | ~~Multimeter ( non-consumable)~~ | ~~Multimeter~~ | ~~Multimeter~~ | ~~DELIXI~~ | ~~78~~ | ~~2~~ | ~~156~~ | [~~Link~~](https://detail.tmall.com/item.htm?abbucket=20&id=760843426195&ns=1&pisk=gXptez__o7jsL70-7dlhmguBJfonGXxZSF-7nZbgGeLpcw2mbOcVHEQpuNfGCN2AHnL2oEKqbi_XlEQDsXDkbhWVh4bxEYxZWnO7fFCbhvifqiqsx1a9fOr1h40oHWqC_VXXSbnr5vNC4ws1csNsv9sPVZ6fGGtIvis05Sw6lDKC8iE1c56bOwsl4Z6bCitQAgS4hisf1vwC8i6flE6jv6GRuqQQfZ2vwAhkVhHqASNXpGCOkRbbHIAzEsQ5owwjP5s165x1J-wXdBDAs3bxdzQ2dEB5h_EoWhWpIUIkSvw9yhOWlQTIpRCe1HpAaKkz2w99DpCwtPGGRBKBQ_AnWJbwHN1JC6cUJHtJwnjROuP9v_7FpQTmc7Q2xQCXZ1zt-ZAkxd1pP22pusd6WM654TvkeiQbraI01DnLgS51YfQDzFM_xmBcvamtHSPVTDSdrDnLgS5EYMQoXxF4g6oF.&priceTId=2150433717384666729446122e18a1&skuId=5707713797023&spm=a21n57.1.hoverItem.7&utparam=%7B%22aplus_abtest%22%3A%22347f31f33d5f1ef5d6fdffe6732d0603%22%7D&xxc=taobaoSearch) |
| 14 | Dupont Wire (consumable) | Dupont Wire  male-female | Dupont Wire 10cm | telesky | 9.53 | 2 | 19.06 | [Link](https://detail.tmall.com/item.htm?id=41254478179&ns=1&pisk=gqUnFNMNanAW2B_cRdgCcEkZvBsOz2gSA8L-e4HPbAk6J0kRA8mueRizJ2FLIYyYEbULyzq6rSN7J6gRO2NIP4WAHZ3uOWgWpeLWYymw7XFw8pkFXVWp_4bOHZQYsMlIy5WYJIA3UXGvz4oE4AuZCbceT0yrbFlSQely8bJNsAGrzX-E4NPZibteL4yr_VloiU8y8UuwQXHZU4uzU55iZbQvzx4z5PWMjwi0a8xLBXmn3WkUwb4wYb-QiAvBpPqG0xFeVU8zSXmUPLoWWU3u4SZozVfFzWwxC0kQQNLnr5lunj2HQO0zsyambyW6r2UQToozuTtznyNUzc4RBhD4X5Za-cRyP0UILJl4ONfa9mMnJP32QTGgbSwSgDv9Y-PTMyi_rtvZFkhj7X2PuOjzah-2kQ8S__UwV3iE1fDxxccMUfMR0D1GsnsIYfGdH1fMV3iE1XBAs1xfADls9tC..&priceTId=2147843917384670564475028edfef&skuId=5363149407088&spm=a21n57.1.hoverItem.1&utparam=%7B%22aplus_abtest%22%3A%22ec9d2b1fda83dc21e35b93883a6eaced%22%7D&xxc=ad_ztc) |
| 15 | Dupont Wire (consumable) | Dupont Wire  Female-female | Dupont Wire 15cm | telesky | 9.31 | 2 | 18.62 | [Link](https://detail.tmall.com/item.htm?id=41254478179&ns=1&pisk=gqUnFNMNanAW2B_cRdgCcEkZvBsOz2gSA8L-e4HPbAk6J0kRA8mueRizJ2FLIYyYEbULyzq6rSN7J6gRO2NIP4WAHZ3uOWgWpeLWYymw7XFw8pkFXVWp_4bOHZQYsMlIy5WYJIA3UXGvz4oE4AuZCbceT0yrbFlSQely8bJNsAGrzX-E4NPZibteL4yr_VloiU8y8UuwQXHZU4uzU55iZbQvzx4z5PWMjwi0a8xLBXmn3WkUwb4wYb-QiAvBpPqG0xFeVU8zSXmUPLoWWU3u4SZozVfFzWwxC0kQQNLnr5lunj2HQO0zsyambyW6r2UQToozuTtznyNUzc4RBhD4X5Za-cRyP0UILJl4ONfa9mMnJP32QTGgbSwSgDv9Y-PTMyi_rtvZFkhj7X2PuOjzah-2kQ8S__UwV3iE1fDxxccMUfMR0D1GsnsIYfGdH1fMV3iE1XBAs1xfADls9tC..&priceTId=2147843917384670564475028edfef&skuId=5627773561514&spm=a21n57.1.hoverItem.1&utparam=%7B%22aplus_abtest%22%3A%22ec9d2b1fda83dc21e35b93883a6eaced%22%7D&xxc=ad_ztc) |
| ~~16~~ | ~~Breadboard (consumable)~~ | ~~Breadboard~~ | ~~Breadboard Suit~~ | ~~Tmall~~ | ~~39.8~~ | ~~2~~ | ~~79.6~~ | [~~Link~~](https://item.taobao.com/item.htm?app=chrome&bxsign=scd4fgYf5iF5OAmJicIo8iDGaUsRWCKvhd72ySfn57pRrBT2pPAYhLKu9gtqqdEx21nKi6ZyseOSsTa8eiwPArHIefizS99FVtzGhG4EdHu0E4hIZCd1MlLQ-RQyEYvWfih&cpp=1&id=732795303962&price=39.8&shareUniqueId=30526150185&share_crt_v=1&shareurl=true&short_name=h.TIfWRzLOj3Nt6rB&skuId=5244345319018&sourceType=item&sp_tk=QTdEVmVpejVhRWU%3D&spm=a2159r.13376460.0.0&suid=C52028D3-13D5-4AB6-AA7D-4C88B1CD3E97&tbSocialPopKey=shareItem&tk=A7DVeiz5aEe&un=da9398d2eb10733dd327b29a79c3809c&un_site=0&ut_sk=1.YQ%2BEdxFco9wDAEpcPBtvBZKC_21380790_1739955800795.Copy.1&wxsign=tbwXAIHPmVF8CbhHdEFpioiPtL818gIgppBaQP38PexM2Q_7iFa1yDdkb90jgKVo8bilX2rQDMmXzgsvPUxqG_mWRxT47fHLuJAztlHa36I7eHamCer6-S_fDEkPlJImFh5) |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  | **TOTAL** | ~~1433.12~~  750.32 |  |

**Total for one suit: ~~1433.12~~** 750.32 **RMB**

**Total for 12 suits: ~~1433.12~~** 750.32**\*12 = ~~17197.44~~ 9003.84 RMB**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Item NO.** | **Item** | **Component** | **Description** | **Vendor** | **Unit** **Price** **(RMB)** | **Quantity** | **Total Price (RMB)** | **Link** |
| 17 | RGBLED | RGBLED | Status Indication | Keyes | 12 | 1 | 12 | [Link](https://item.taobao.com/item.htm?app=chrome&bxsign=scdEfndTbq-9VQcM5TXap7RNtqISmKRTP9I6jr0b8F-Sfp8SDpMQsUbDy-yebVj4Pt30YS9wtZ_mV3--QgYhlfzMsGEsVkNxNn5fvzEjOQ_AVKTV99QQPUUZLpgD4hvlipv&cpp=1&h5_spm=a-tb-item.b-tb-item&id=695301189319&share_crt_v=1&shareurl=true&short_name=h.hgdIm8kbUKNtrfn&sp_tk=Tk1VSVZ6WVN3SVg%3D&spm=a2159r.13376460.0.0&tbSocialPopKey=shareItem&tk=NMUIVzYSwIX&un=da9398d2eb10733dd327b29a79c3809c&un_site=0&ut_sk=1.YQ%2BEdxFco9wDAEpcPBtvBZKC_21380790_1751551613801.TaoPassword-Weixin.1&wxsign=tbwmSFkmNbHVWfhLj0Kz-ZyUwg28D65XsArbZORfAnWAXwTKGRhb0Ene5X0NF-8A5qWMwSrAZHjYDJKKhH4fWUOb1vh5GuDFC79tzhvJCC6CiUCuh129TWkO7D7eOsQ9yTD&x-ssr=true&skuId=4937576909196) |
| 18 | Battery Holder | Battery Holder | Battery Holder | - | 24.8 | 1 | 24.8 | [Link](https://item.taobao.com/item.htm?app=chrome&bxsign=scdCNapT7lo1WizATFAI5s8-YbIaNsgp2NwjG58f6m0q0zLpy-zKZ0uPfqhOot72Rf3RYNkch_xCYKoupuCmlw5sJXay0IPB1kMOlkMYwYNdeg6Xwa8zZ4CkSBhHvtUWPgw&cpp=1&h5_spm=a-tb-item.b-tb-item&id=680313999743&share_crt_v=1&shareurl=true&short_name=h.h5I7yPUTFFsLYjw&sp_tk=VmVNSlZ6Ym5YaHM%3D&spm=a2159r.13376460.0.0&tbSocialPopKey=shareItem&tk=VeMJVzbnXhs&un=da9398d2eb10733dd327b29a79c3809c&un_site=0&ut_sk=1.YQ%2BEdxFco9wDAEpcPBtvBZKC_21380790_1751548678864.TaoPassword-Weixin.1&wxsign=tbwBuB4St0rJEUq4TqeCIHq41_sFX_goKgkOY0mD-J0APbV9bLyAEh8mJ58MTOni9s5BYEajs-btNs-61PwPeDU2i2CIe7-jTh0zgoHNgKc9vK9Xw8Y_T935pFh3zr1U_Tz&x-ssr=true&skuId=4973548713026) |
| 19 | Hex Standoff | Hex Standoff | Hex Standoff | - | 2.86 | 1 | 2.86 | [Link](https://e.tb.cn/h.hgZ7GD01WbYkxGX?tk=P07HVzhq3fu) |
| 20 | Nut | Nut | Nut |  | 3.07 | 1 | 3.07 | [Link](https://e.tb.cn/h.h5AB7Au4rw79SpS?tk=hmFyVzhr7pV) |
| 21 | Screw | Screw | Screw |  | 2.3 | 1 | 2.3 | [Link](https://e.tb.cn/h.h5AAkcT2Nj1WzCz?tk=6TkQVzhsogn) |
| 22 | Cloth Tape | Cloth Tape | Cloth Tape | - | 7 | 1 | 7 | [Link](https://detail.tmall.com/item.htm?app=chrome&bxsign=scdLx960XcN_tt2ihKtxL_7YhgNxPvBXsD6tXa3nqg0eOPkG5NkUfs_okOtAG3ju1NHC1y0d-NMPa_qcqumcdg6oSAX91gnyku-DK4qbaRs4xvglZGVglVmhkL_q7Yd_q7c&cpp=1&h5_spm=a-tb-item.b-tb-item&id=692984974840&share_crt_v=1&shareurl=true&short_name=h.hg5dDj8WYHTYzpC&skuId=5093375511194&sp_tk=RExEeVZ6TnNXVmo%3D&spm=a2159r.13376460.0.0&tbSocialPopKey=shareItem&tk=DLDyVzNsWVj&un=da9398d2eb10733dd327b29a79c3809c&un_site=0&ut_sk=1.YQ%2BEdxFco9wDAEpcPBtvBZKC_21380790_1751615722278.TaoPassword-Weixin.1&wxsign=tbwt8IR9KGXyQ9fnPEvHtwd0d3pNDI40URoQetn2FpiVXiAc71ON2vit3Vf55r8qkViBO3c61F4c4QiINh647UNPDEgfpLr1lQtioZtpB1D4SDTe7L50YuaKXZCZDJKvLqL&x-ssr=true) |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  | **TOTAL** | 52.03 |  |

The following items are newly added, not for reimbursement.

**Total for one suit:** 52.03 **RMB**

**Total for 12 suits:** 624.36 **RMB**

**Item 1: Main Control - Arduino Uno R4 Devkit**

图形用户界面, 表格

AI 生成的内容可能不正确。

**Item 2: Main Control - Arduino Uno R4 Wifi**

图形用户界面

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**Item 3: Extension Board**

图形用户界面

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**Item 4: Accelerometer**

图形用户界面

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**Item 5: RF Module**

图形用户界面

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**Item 6: RTC Component**

图形用户界面

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**Item 7: Power Supply- Lithium Battery & Box**

图形用户界面

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**Item 8: Power Supply-** **Battery**

图形用户界面

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**Item 9:** **SD Card Module**

图形用户界面

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**Item 10: SD Card**

图形用户界面

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**Item 11: Case**

图形用户界面, 应用程序

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**Item 12: 3D-print Case**

**图形用户界面, 文本, 应用程序

AI 生成的内容可能不正确。**

**Item 13: Multimeter**

**图形用户界面, 网站

AI 生成的内容可能不正确。**

**Item 14: Dupont Wire**

**文本

AI 生成的内容可能不正确。**

**Item 15: Dupont Wire**

**图形用户界面, 网站

AI 生成的内容可能不正确。**

**Item 16: Breadboard**

**图形用户界面

AI 生成的内容可能不正确。**